الجامعة العراقية

كلية الهندسة

برنامج قسم هندسة الحاسوب

وفق مسار بولونيا

للعام الدراسي

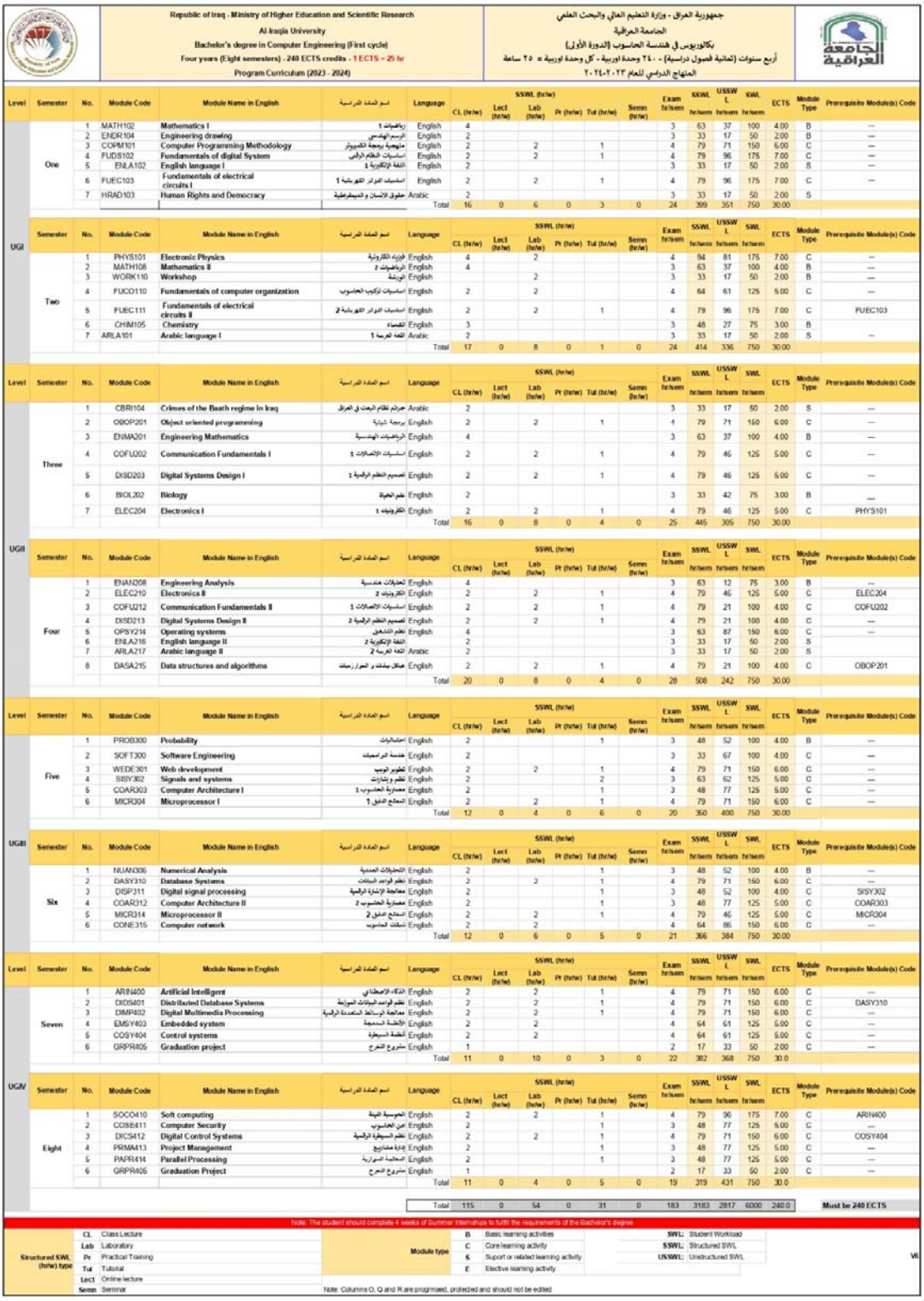
2024-2025

الملحق رقم (1)

تصميم المنهاج الدراسي لقسم هندسة الحاسوب

Curriculum Design for Computer Engineering

Curriculum Design for Computer Engineering



Republic of Iraq - Ministry of Higher Education and Scientific Research
Al-Iraqia University
Bachelor's degree in Computer Engineering (First cycle)
Four years (Eight semesters) - 240 ECTS credits - 1 ECTS = 25 hr
Program Curriculum (2023 - 2024)

جمهورية العراق - وزارة التعليم العالي والبحث العلمي
الجامعة العراقية
بكالوريوس في هندسة الحاسوب (الدورة الأولى)
أربع سنوات (ثمانية فصول دراسية) - ٢٤٠ وحدة اوربية - كل وحدة اوربية = ٢٥ ساعة
المنهاج الدرسي للعام ٢٠٢٣-٢٠٢٤

Level	Semester	No.	Module Code	Module Name in English	اسم المادة الدراسية	Language	SSWL (hr/w) CL (hr/w)	Lect (hr/w)	Lab (hr/w)	Pr (hr/w)	Tut (hr/w)	Semn (hr/w)	Exam hr/sem	SSWL hr/sem	USSWL hr/sem	SWL hr/sem	ECTS	Module Type	Prerequisite Module(s) Code
UGI	One	1	MATH102	Mathematics I	رياضيات 1	English	4						3	63	37	100	4.00	B	---
		2	ENDR104	Engineering drawing	الرسم الهندسي	English	2						3	33	17	50	2.00	B	---
		3	COPM101	Computer Programming Methodology	منهجية برمجة الكمبيوتر	English	2		2		1		4	79	71	150	6.00	C	---
		4	FUDS102	Fundamentals of digital System	اساسيات النظام الرقمي	English	2		2		1		4	79	96	175	7.00	C	---
		5	ENLA102	English language I	اللغة الإنكليزية 1	English	2						3	33	17	50	2.00	S	---
		6	FUEC103	Fundamentals of electrical circuits I	اساسيات الدوائر الكهربائية 1	English	2		2		1		4	79	96	175	7.00	C	---
		7	HRAD103	Human Rights and Democracy	حقوق الإنسان و الديمقراطية	Arabic	2						3	33	17	50	2.00	S	
						Total	16	0	6	0	3	0	24	399	351	750	30.00		

Level	Semester	No.	Module Code	Module Name in English	اسم المادة الدراسية	Language	SSWL (hr/w) CL (hr/w)	Lect (hr/w)	Lab (hr/w)	Pr (hr/w)	Tut (hr/w)	Semn (hr/w)	Exam hr/sem	SSWL hr/sem	USSWL hr/sem	SWL hr/sem	ECTS	Module Type	Prerequisite Module(s) Code
UGI	Two	1	PHYS101	Electronic Physics	فيزياء الكترونية	English	4		2				4	94	81	175	7.00	C	---
		2	MATH108	Mathematics II	الرياضيات 2	English	4						3	63	37	100	4.00	B	---
		3	WORK110	Workshop	الورشة	English			2				3	33	17	50	2.00	B	---
		4	FUCO110	Fundamentals of computer organization	اساسيات تركيب الحاسوب	English	2		2				4	64	61	125	5.00	C	---
		5	FUEC111	Fundamentals of electrical circuits II	اساسيات الدوائر الكهربائية 2	English	2		2		1		4	79	96	175	7.00	C	FUEC103
		6	CHIM105	Chemistry	الكيمياء	English	3						3	48	27	75	3.00	B	
		7	ARLA101	Arabic language I	اللغة العربية 1	Arabic	2						3	33	17	50	2.00	S	---
						Total	17	0	8	0	1	0	24	414	336	750	30.00		

Level	Semester	No.	Module Code	Module Name in English	اسم المادة الدراسية	Language	SSWL (hr/w) CL (hr/w)	Lect (hr/w)	Lab (hr/w)	Pr (hr/w)	Tut (hr/w)	Semn (hr/w)	Exam hr/sem	SSWL hr/sem	USSWL hr/sem	SWL hr/sem	ECTS	Module Type	Prerequisite Module(s) Code
UGII	Three	1	CBRI104	Crimes of the Baath regime in Iraq	جرائم نظام البعث في العراق	Arabic	2						3	33	17	50	2.00	S	---
		2	OBOP201	Object oriented programming	برمجة شيئية	English	2		2		1		4	79	71	150	6.00	C	---
		3	ENMA201	Engineering Mathematics	الرياضيات الهندسية	English	4						3	63	37	100	4.00	B	---
		4	COFU202	Communication Fundamentals I	اساسيات الاتصالات 1	English	2		2		1		4	79	46	125	5.00	C	---
		5	DISD203	Digital Systems Design I	تصميم النظم الرقمية 1	English	2		2		1		4	79	46	125	5.00	C	---
		6	BIOL202	Biology	علم الحياة	English	2						3	33	42	75	3.00	B	---
		7	ELEC204	Electronics I	الكترونيات 1	English	2		2		1		4	79	46	125	5.00	C	PHYS101
						Total	16	0	8	0	4	0	25	445	305	750	30.00		

Level	Semester	No.	Module Code	Module Name in English	اسم المادة الدراسية	Language	SSWL (hr/w) CL (hr/w)	Lect (hr/w)	Lab (hr/w)	Pr (hr/w)	Tut (hr/w)	Semn (hr/w)	Exam hr/sem	SSWL hr/sem	USSWL hr/sem	SWL hr/sem	ECTS	Module Type	Prerequisite Module(s) Code
UGII	Four	1	ENAN208	Engineering Analysis	تحليلات هندسية	English	4						3	63	12	75	3.00	B	---
		2	ELEC210	Electronics II	الكترونيات 2	English	2		2		1		4	79	46	125	5.00	C	ELEC204
		3	COFU212	Communication Fundamentals II	اساسيات الاتصالات 2	English	2		2		1		4	79	21	100	4.00	C	COFU202
		4	DISD213	Digital Systems Design II	تصميم النظم الرقمية 2	English	2		2		1		4	79	21	100	4.00	C	---
		5	OPSY214	Operating systems	نظم التشغيل	English	4						3	63	87	150	6.00	C	---
		6	ENLA216	English language II	اللغة الإنكليزية 2		2						3	33	17	50	2.00	S	
		7	ARLA217	Arabic language II	اللغة العربية 2	Arabic	2						3	33	17	50	2.00	S	
		8	DASA215	Data structures and algorithms	هياكل بيانات و خوارزميات	English	2		2		1		4	79	21	100	4.00	C	OBOP201
						Total	20	0	8	0	4	0	28	508	242	750	30.00		

Level	Semester	No.	Module Code	Module Name in English	اسم المادة الدراسية	Language	SSWL (hr/w) CL (hr/w)	Lect (hr/w)	Lab (hr/w)	Pr (hr/w)	Tut (hr/w)	Semn (hr/w)	Exam hr/sem	SSWL hr/sem	USSWL hr/sem	SWL hr/sem	ECTS	Module Type	Prerequisite Module(s) Code
UGIII	Five	1	PROB300	Probability	احتمالية	English	2				1		3	48	52	100	4.00	B	---
		2	SOFT300	Software Engineering	هندسة البرمجيات	English	2						3	33	67	100	4.00	C	---
		3	WEDE301	Web development	تطوير الويب	English	2		2		1		4	79	71	150	6.00	C	---
		4	SISY302	Signals and systems	نظم و إشارات	English	2				2		3	63	62	125	5.00	C	---
		5	COAR303	Computer Architecture I	معمارية الحاسوب 1	English	2				1		3	48	77	125	5.00	C	---
		6	MICR304	Microprocessor I	المعالج الدقيق 1	English	2		2		1		4	79	71	150	6.00	C	---
						Total	12	0	4	0	6	0	20	350	400	750	30.00		

Level	Semester	No.	Module Code	Module Name in English	اسم المادة الدراسية	Language	SSWL (hr/w) CL (hr/w)	Lect (hr/w)	Lab (hr/w)	Pr (hr/w)	Tut (hr/w)	Semn (hr/w)	Exam hr/sem	SSWL hr/sem	USSWL hr/sem	SWL hr/sem	ECTS	Module Type	Prerequisite Module(s) Code
UGIII	Six	1	NUAN306	Numerical Analysis	التحليلات العددية	English	2				1		3	48	52	100	4.00	B	---
		2	DASY310	Database Systems	نظم قواعد البيانات	English	2		2		1		4	79	71	150	6.00	C	---
		3	DISP311	Digital signal processing	معالجة الإشارة الرقمية	English	2				1		3	48	52	100	4.00	C	SISY302
		4	COAR312	Computer Architecture II	معمارية الحاسوب 2	English	2				1		3	48	77	125	5.00	C	COAR303
		5	MICR314	Microprocessor II	المعالج الدقيق 2	English	2		2		1		4	79	46	125	5.00	C	MICR304
		6	CONE315	Computer network	شبكات الحاسوب	English	2		2				4	64	86	150	6.00	C	---
						Total	12	0	6	0	5	0	21	366	384	750	30.00		

Level	Semester	No.	Module Code	Module Name in English	اسم المادة الدراسية	Language	SSWL (hr/w) CL (hr/w)	Lect (hr/w)	Lab (hr/w)	Pr (hr/w)	Tut (hr/w)	Semn (hr/w)	Exam hr/sem	SSWL hr/sem	USSWL hr/sem	SWL hr/sem	ECTS	Module Type	Prerequisite Module(s) Code
UGIV	Seven	1	ARIN400	Artificial Intelligent	الذكاء الاصطناعي	English	2		2		1		4	79	71	150	6.00	C	---
		2	DIDS401	Distributed Database Systems	نظم قواعد البيانات الموزعة	English	2		2		1		4	79	71	150	6.00	C	DASY310
		3	DIMP402	Digital Multimedia Processing	معالجة الوسائط المتعددة الرقمية	English	2		2		1		4	79	71	150	6.00	C	---
		4	EMSY403	Embedded system	الأنظمة المدمجة	English	2		2				4	64	61	125	5.00	C	---
		5	COSY404	Control systems	أنظمة السيطرة	English	2		2				4	64	61	125	5.00	C	---
		6	GRPR405	Graduation project	مشروع التخرج	English	1						2	17	33	50	2.00	C	---
						Total	11	0	10	0	3	0	22	382	368	750	30.0		

Level	Semester	No.	Module Code	Module Name in English	اسم المادة الدراسية	Language	SSWL (hr/w) CL (hr/w)	Lect (hr/w)	Lab (hr/w)	Pr (hr/w)	Tut (hr/w)	Semn (hr/w)	Exam hr/sem	SSWL hr/sem	USSWL hr/sem	SWL hr/sem	ECTS	Module Type	Prerequisite Module(s) Code
UGIV	Eight	1	SOCO410	Soft computing	الحوسبة الليئة	English	2		2		1		4	79	96	175	7.00	C	ARIN400
		2	COSE411	Computer Security	امن الحاسوب	English	2				1		3	48	77	125	5.00	C	---
		3	DICS412	Digital Control Systems	نظم السيطرة الرقمية	English	2		2		1		4	79	71	150	6.00	C	COSY404
		4	PRMA413	Project Management	إدارة مشاريع	English	2				1		3	48	77	125	5.00	C	---
		5	PAPR414	Parallel Processing	المعالجة التوازية	English	2				1		3	48	77	125	5.00	C	---
		6	GRPR406	Graduation Project	مشروع التخرج	English	1						2	17	33	50	2.00	C	---
						Total	11	0	4	0	5	0	19	319	431	750	30.0		
						Total	115	0	54	0	31	0	183	3183	2817	6000	240.0		Must be 240 ECTS

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

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

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

الملحق رقم (2)

دليل البرنامج الاكاديمي لقسم هندسة الحاسوب

Program Catalog for Computer Engineering

Al-Iraqia University
الجامعة العراقية

First Cycle – Bachelor's degree (B.Sc.) – Computer Engineering

بكالوريوس علوم - هندسة الحاسوب

Table of Contents | جدول المحتويات

1. Mission & Vision Statement

Vision Statement

Our vision is to foster an environment where excellence thrives and minds are empowered. We envision a community of learners and innovators driven by curiosity and fueled by the passion of learning. Through a blend of competent academics, hands-on experience, and collaborative research, we aim to nurture the next generation of engineers who will lead technological advancements and shape the world with their creativity and expertise.

Mission Statement

Our mission is to educate and empower students in computer engineering, conduct ground-breaking research, and foster industry partnerships. We promote diversity, serve the community, and continuously enhance our programs to meet evolving needs.

2. Program Specification

Program code:	BSc-CE	**ECTS**	240
Duration:	4 levels, 8 Semesters	**Method of Attendance:**	Full Time

1. Program Title: Bachelor of Science in Computer Engineering.
2. Program Objectives:
    - To provide students with a solid foundation in mathematics, science, and engineering principles necessary for computer engineering.
    - To develop students' analytical, problem-solving, and critical-thinking skills applicable to computer engineering.
    - To equip students with knowledge and practical experience in designing, implementing, and testing computer hardware and software systems.
    - To prepare students for successful careers in computer engineering and related fields.
    - To foster an understanding of ethical, societal, and professional responsibilities in the field of computer engineering.
3. Program Duration: 4 years (8 semesters).
4. Curriculum Structure:
    - General Education Courses: These courses cover a range of subjects including mathematics, computer engineering sciences. They provide a broad educational foundation and develop students' communication and critical-thinking skills.
    - Core Computer Engineering Courses: These courses form the backbone of the program and cover fundamental topics such as digital logic design, computer organization, data structures and algorithms, software engineering, computer networks, operating systems, and embedded systems.

- Elective Courses: Students have the opportunity to choose elective courses based on their interests and career goals. These courses may cover specialized areas such as artificial intelligence, cybersecurity, computer vision, robotics, or hardware design.
- Laboratory Courses: Laboratory components are integrated into the curriculum to provide hands-on experience in designing, implementing, and testing computer systems. These labs reinforce theoretical concepts and develop practical skills.
- Capstone Project: In the final year of the program, students undertake a capstone project that involves applying their knowledge and skills to solve a real-world problem or develop an innovative computer engineering solution. This project may be conducted individually or in teams.

5. Co-op/Internship Opportunities: The program may offer co-op or internship opportunities in collaboration with industry partners. These experiences provide students with practical exposure to the workplace, allowing them to apply their knowledge in a professional setting and gain industry-specific skills.
6. Assessment and Evaluation: Student performance is assessed through a combination of examinations, assignments, projects, laboratory work, and presentations. Regular evaluations are conducted to monitor student progress and ensure the achievement of program outcomes.
7. Accreditation: The program may be accredited by a relevant accrediting body or professional organization to ensure its quality and alignment with industry standards.

3. Program Goals

1. To provide an effective and comprehensive education that prepares students for successful careers in engineering.
2. To conduct high-impact research that advances knowledge and addresses critical societal needs.
3. To promote diversity, equity, and inclusion within the engineering community.
4. To engage with industry partners and stakeholders to create meaningful collaborations and opportunities for students and faculty.
5. To contribute to the development of sustainable technologies and practices that benefit society and the environment

Program Educational Objectives (PEOs)

1. Enter the computer engineering profession as practicing engineers and consultants with prominent companies and organizations in diverse areas that are related to computer engineering.
2. Pursue graduate education and research at major research universities in computer engineering, and related fields.
3. Engage in continued learning through professional development.
4. Participate in and contribute to professional societies and community services.

4. Student Learning Outcomes

1. An ability to identify, formulate, and solve computer engineering problems by applying principles of engineering, science, and mathematics.

2. An ability to apply the engineering design process to produce solutions that meet specified needs with consideration for public health and safety, and global, cultural, social, environmental, economic, and other factors as appropriate to the discipline.

3. An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.

4. An ability to communicate effectively with a range of audiences

5. An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.

6. An ability to recognize the ongoing need to acquire new knowledge, to choose appropriate learning strategies, and to apply this knowledge.

7. An ability to function effectively as a member or leader of a team that establishes goals, plans tasks, meets deadlines, and creates a collaborative and inclusive environment.

5. Academic Staff

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6. Credits, Grading and GPA

Credits

(Name) University is following the Bologna Process with the European Credit Transfer System (ECTS) credit system. The total degree program number of ECTS is 240, 30 ECTS per semester. 1 ECTS is equivalent to 25 hrs student workload, including structured and unstructured workload.

Grading

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

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

Calculation of the Cumulative Grade Point Average (CGPA)

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

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

   CGPA = [(1st ^{m}odule score x ECTS) + (2nd ^{m}odule score x ECTS) + ……] / 240

7. Curriculum/Modules

Semester 1 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
MATH102	**Mathematics I**	63	37	4.00	B	—
ENDR104	**Engineering drawing**	33	17	2.00	B	—
COPM101	**Computer Programming Methodology**	79	71	6.00	C	—
FUDS102	**Fundamentals of digital System**	79	96	7.00	C	—
ENLA102	**English language** I	33	17	2.00	S	—
FUEC103	**Fundamentals of electrical circuits I**	79	96	7.00	C	—
HRAD103	**Human Rights and Democracy**	33	17	2.00	S	**—**

Semester 2 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
PHYS101	**Electronic Physics**	94	81	7.00	C	—
MATH108	**Mathematics II**	63	37	4.00	B	**—**
WORK110	**Workshop**	33	17	2.00	B	**—**
FUCO110	**Fundamentals of computer organization**	64	61	5.00	C	**—**
FUEC111	**Fundamentals of electrical circuits II**	79	96	7.00	C	**Fundamentals of electrical circuits I**
CHIM105	**Chemistry**	33	42	3.00	B	
ARLA101	**Arabic language I**	33	17	2.00	B	—

Semester 3 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
CBRI104	**Crimes of the Baath Regime in Iraq**	33	17	2.00	S	—
OBOP201	**Object oriented programming**	79	71	6.00	C	—
ENMA201	**Engineering Mathematics**	48	52	4.00	B	—
COFU202	**Communication Fundamentals I**	79	46	5.00	C	—
DISD203	**Digital Systems Design I**	79	46	5.00	C	—
BIOL202	**Biology**	33	42	3.00	B	—
ELEC204	**Electronics I**	79	46	5.00	C	**Electronic Physics**

Semester 4 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
ENAN208	**Engineering Analysis**	48	27	3.00	B	—
ELEC210	**Electronics II**	79	46	5.00	C	**Electronics 1**
COFU212	**Communication Fundamentals II**	79	21	4.00	C	**Communication Fundamentals I**
DISD213	**Digital Systems Design II**	79	21	4.00	C	—
OPSY214	**Operating systems**	63	87	6.00	C	—
DASA215	**Data structures and algorithms**	79	21	4.00	C	**Object oriented programming**
ENLA202	**English language II**	33	17	2.00	S	—
ARLA201	**Arabic language II**	33	17	2.00	S	—

Semester 5 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
PROB300	**Probability**	48	52	4.00	B	—
SOFT300	**Software Engineering**	33	67	4.00	C	—
WEDE301	**Web development**	79	71	6.00	C	—
SISY302	**Signals and systems**	63	62	5.00	C	—
COAR303	**Computer Architecture I**	48	77	5.00	C	—
MICR304	**Microprocessor I**	79	71	6.00	C	—

Semester 6 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
NUAN306	**Numerical Analysis**	48	52	4.00	B	—
DASY310	**Database Systems**	79	71	6.00	C	—
DISP311	**Digital signal processing**	48	52	4.00	C	**Signals and systems**
COAR312	**Computer Architecture II**	48	77	5.00	C	**Computer Architecture I**
MICR314	**Microprocessor II**	79	46	5.00	C	**Microprocessor I**
CONE315	**Computer network**	64	86	6.00	C	—

Semester 7 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
ARIN400	**Artificial Intelligent**	79	71	6.00	C	—
DIDS401	**Distributed Database**	79	71	6.00	C	**Database systems**

	Systems					
DIMP402	**Digital Multimedia Processing**	79	71	6.00	C	—
EMSY403	**Embedded system**	64	61	5.00	C	—
COSY404	**Control systems**	64	61	5.00	C	—
GRPR405	**Graduation project**	17	33	2.00	C	

Semester 8 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
SOCO410	**Soft computing**	79	96	7.00	C	**Artificial Intelligent**
COSE411	**Computer Security**	48	77	5.00	C	—
DICS412	**Digital Control Systems**	79	71	6.00	C	**Control Systems**
PRMA413	**Project Management**	48	77	5.00	C	—
PAPR414	**Parallel Processing**	48	77	5.00	C	—
GRPR405	**Graduation Project**	17	33	2.00	C	—

8. Contact

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الملحق رقم (3)

دليل المواد الدراسية لقسم هندسة الحاسوب

Modules Catalog for Computer Engineering

1-Iraqia University
الجامعة العراقية

First Cycle – Bachelor's Degree (B.Sc.) - Computer Engineering

بكالوريوس علوم - هندسة الحاسوب

Table of Contents

1. Overview

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

نظره عامه

يتناول هذا الدليل المواد الدراسية التي يقدمها برنامج هندسة الحاسوب للحصول على درجة بكالوريوس العلوم. يقدم البرنامج (53) مادة دراسية، مع (٦٠٠٠) إجمالي ساعات حمل الطالب و ٢٤٠ إجمالي وحدات أوروبية. يعتمد تقديم المواد الدراسية على عملية بولونيا.

2. Undergraduate Courses 2024-2025

Module 1

Code	Course/Module Title	ECTS	Semester
MATH102	Mathematics I	4	1
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
4	-	63	37
Description			
The aims of the module are to introduce engineering students to the central role that mathematics plays in the development and practice of engineering. To help students to begin to develop the skill of analyzing problems in a rational (rigorous, logical) and methodical manner. To develop the students' ability to transfer their mathematical understanding (and the associated methods) to diverse engineering application areas. Topics covered are: Matrices, Solving a system of linear equations, Eigen value and Eigen vector, Functions :graphs , domain and range, Limit and continuity, Differentiation, Chain rule, implicit Differentiation, derivations, integrations of trigonometric functions, natural logarithm , exponential, and other functions.			

Module 2

Code	Course/Module Title	ECTS	Semester
ENDR104	Engineering drawing	2	1
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	-	33	17
Description			
At the end of this course, students are able to: Produce an engineering drawing to communicate. Draw a complete drawing with proper dimensions and scale. Differentiate different type of drawings. Read and analyze engineering drawings. Produce work in a given time. Using the computer in the engineering drawing.			

Module 3

Code	Course/Module Title	ECTS	Semester
COPM101	Computer Programming Methodology	6	1
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	3	79	71
Description			
The objectives of this course are to provide an introduction to basic programming techniques, including the design and implementation of algorithms, structured programming techniques, and an introduction to a high-level language, including arrays.			

Module 4

Code	Course/Module Title	ECTS	Semester
FUDS102	Fundamentals of digital System	7	1
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	3	79	96
Description			
Basic Number Systems: various number systems and Codes such as decimal, binary, octal, hexadecimal, Binary Coded Decimal (BCD).and Gray system and the arithmetic operations of various number system and 1'complement and 2'complement of the binary number. Analysis of LOGIC Gates: analyze and solve LOGIC Gates using tables for each circuit such as and, or, and other gates. Boolean algebra and Logic Simplification: various rules and theorem of Boolean algebra and DeMorgan's Theorems. The equivalent expressions of digital circuits will be simplified by using Karnaugh map and			

SOP or Boolean algebra rules. Combinational Logic Analysis: basic combinational circuit will be calculated and designed using logic circuits, the pulse waveform will be applied to inputs of the Combinational Logic gates and the observed outputs will be calculated.

Module 5

Code	Course/Module Title	ECTS	Semester
ENLA102	English language I	2	1
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	0	33	17
Description			
English language materials encompass a wide range of resources designed to facilitate language learning and proficiency in English. These materials provide structured content and activities that cover vocabulary, grammar, reading, writing, listening, speaking, and cultural understanding. They employ strategies such as contextualization, interactive activities, authentic materials, and skill integration to create engaging and effective learning experiences. English language materials often follow a progressive approach, scaffolding learners' knowledge and skills. They incorporate multimedia resources and provide feedback and assessment mechanisms to support learners' progress. With a learner-centered focus, these materials cater to individual needs and promote autonomy in language learning. English language materials aim to enhance language proficiency, communication skills, cultural awareness, and overall language competence, preparing learners for academic, professional, and social contexts where English is used.			

Module 6

Code	Course/Module Title	ECTS	Semester
FUEC103	Fundamentals of electrical circuits I	7	1
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	3	79	96
Description			
At the end of the course, the student will learn the direct- current (DC) part of electrical circuits and different methodologies to analysis DC circuits. The core subjects covered in this course include Ohm's law, Kirchhoff's laws, node voltage analysis, mesh current analysis, Thevinon , Norton, super-position theorems, and transient analysis.			

Module 7

Code	Course/Module Title	ECTS	Semester
HRAD103	Human Rights and Democracy	2	1
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	0	33	17
Description			
Human rights refer to the fundamental freedoms and entitlements that every individual is entitled to by virtue of being human. These rights are universal, inalienable, and indivisible, and they are enshrined in international law through treaties, conventions, and declarations. The most commonly recognized human rights include the right to life, liberty, and security of person; the right to freedom of expression, thought, and belief; the right to education, work, and health; and the right to protection from discrimination, torture, and slavery. Human rights are essential for the promotion of human dignity, justice, and peace. They provide a framework for protecting individuals and communities from abuses of power and for holding governments accountable for their actions. However, human rights violations continue to occur around the world, often due to ignorance, prejudice, or political expediency. It is therefore crucial to continue advocating for human rights and to ensure that they are respected and upheld for all people, regardless of their race, gender, religion, or social status.			

Module 8

Code	Course/Module Title	ECTS	Semester
PHYS101	Electronic Physics	7	2
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	4	94	81
Description			
This course explain the Atomic structure and the electronic state of electron and give an enough knowledge about the diode structure and work and it's applications as well as about the zener diode. also this course clarify the rectifiers (half wave and full wave rectifiers) and related circuit clipper and clamper and zener diode application.			

Module 9

Code	Course/Module Title	ECTS	Semester
MATH108	Mathematics II	4	2
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	63	37
Description			
This course deals mainly with Integral Calculus in addition to complex numbers and functions. This			

involves concepts such as the derivative and integral of inverse and hyperbolic trigonometric functions beside the advanced methods of integration, which enable us to make sense of the idea of length of a curve, area, and volume of a surface. Thus, improve the students logical thinking and mathematical skills to solve advanced mathematical problems. The final part of the course presents polar coordinates and its applications which form a cornerstone of sciences and engineering.

Module 10

Code	Course/Module Title	ECTS	Semester
WORK110	Workshop	2	2
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
	2	33	17
Description			
Technical workshop aim to improve the student's skills that deals with an electronic component and any physical entity in an electronic system used to affect the electrons or their associated fields in a manner consistent with the intended function of the electronic system. Components are generally intended to be connected together, usually by being soldered to a printed circuit board (PCB), to create an electronic circuit with a particular function (for example an amplifier, radio receiver, or oscillator). Components may be packaged singly, or in more complex groups as integrated circuits. Some common electronic components are capacitors, inductors, resistors, diodes, transistors, etc. Components are often categorized as active (e.g. transistors and thyristors) or passive (e.g. resistors, diodes, inductors and capacitors.			

Module 11

Code	Course/Module Title	ECTS	Semester
FUCO110	Fundamentals of computer organization	5	2
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	64	61
Description			
The fundamentals of computer organization model refer to the basic principles and components that make up a computer system. This model provides a framework for understanding how computer systems are designed, built, and operated. The key components of the computer organization model include the central processing unit (CPU), memory, input/output (I/O) devices, and storage devices. The CPU is the brain of the computer, responsible for executing instructions and performing calculations. Memory is used to store instructions and data that the CPU needs to access quickly. I/O devices are used to input data into the computer and output results to the user. Storage devices are used to store data and programs for long-term use.			

Module 12

Code	Course/Module Title	ECTS	Semester
FUEC111	Fundamentals of electrical circuits II	7	2
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	3	79	96
Description			
At the end of the course, the student will learn the fundamentals of Alternating current (AC) electrical circuits and analysis of single and three-phase systems. The main topics covered in this course includes alternating quantities, analysis of single and three phase systems, and resonance phenomenon in AC circuits			

Module 13

Code	Course/Module Title	ECTS	Semester
CHIM105	**Chemistry**	3	2
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2		33	42
Description			
By the end of this course, students will gain a comprehensive understanding of the chemical principles essential for engineering applications. The course covers the fundamental concepts of chemistry with a focus on their relevance to engineering, including atomic and molecular structures, chemical bonding, thermodynamics, and reaction kinetics. Students will also explore the properties and behaviors of materials, corrosion, and electrochemistry, as well as their applications in industrial processes. The course is designed to provide a strong foundation in chemistry, enabling students to apply chemical principles to solve engineering problems and innovate in their respective fields.			

Module 14

Code	Course/Module Title	ECTS	Semester
ARLA101	Arabic language	2	2
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	0	33	17
Description			
Facilitating students' understanding and application of the fundamental concepts of the Arabic language through practical examples. Introducing students to skills related to writing and expression, as well as assisting them in identifying and correcting pronunciation errors. Ensuring students master accurate writing skills by focusing on spelling rules and common error-prone areas. Emphasizing the			

importance of preserving the Arabic language as it is the language of the Holy Quran. Teaching students how to accurately transcribe spoken words, paying particular attention to correct and impaired sounds. Instructing students in the subject of numerals and how to write them properly. Equipping students with the ability to find appropriate solutions to complex, real-world problems. Cultivating critical thinking skills and broadening students' conceptual understanding through practical examples and application of the Arabic language. Requiring students to write research papers and reports to assess their comprehension of the Arabic language's basic rules and their ability to apply these rules in their daily lives.

Module 15

Code	Course/Module Title	ECTS	Semester
CBRI104	Crimes of the Baath Regime in Iraq	2	3
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	0	33	17
Description			
ارتكب نظام البعث في العراق إبآن حكمه عدداً كبيرا مَن الجرائم المختلفة، واختلافها يلْزم بيان مفاهيم وتعاريف للطالب ليكون على معرفة ودراية بما يمر به مما لها علاقة بمادة المنها ج ، كمفهوم الجريمة وأقسامها، والجرائم الدولية التي حُكِم عليها قيادات وأزلام نظام البعث وفق قانون المحكمة الجنائية العراقية العليا لقد تضمن هذا المنهجُ ما جاء مفاتيحَ معرفية بيدِ الطالبِ الجامعيّ يقَوى بها على كلِّ مُرتجَ حَبكَت رواية أكُذوبته أيَادي البعثِ وإعلامُه المزيفِ ، وباعت ضميرَها أنَفسُ ترى أنَ تبقى إلِى الآنَ ذليلة أسَيرة ، وذيَلًا تابعاً.			

Module 16

Code	Course/Module Title	ECTS	Semester
OBOP201	Object oriented programming	6	3
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	3	79	71
Description			
Upon completion of this course, you should. understand Object-Oriented Programming concepts and techniques, understand the principles of software engineering in Object-Oriented languages, understand the fundamentals of programming in C++, be able to design and implement Object-Oriented software to solve moderately complex problems, be able to write good program documentation			

Module 17

Code	Course/Module Title	ECTS	Semester
ENMA201	Engineering Mathematics	4	3
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
4	-	48	52
Description			
At the end of the course, the student will be familiar with the fundamental of Fourier series, Fourier transform and review of Infinite series, in addition to the Multiple Integrals including double and triple integrals in various forms and coordinates.			

Module 18

Code	Course/Module Title	ECTS	Semester
COFU202	Communication Fundamentals I	5	3
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	3	79	46
Description			
The objective of this course is to introduce undergraduate students to the fundamentals of communication systems. After a brief review of signals and systems (mainly Fourier analysis), techniques of transmitting and receiving information signals using analog carrier modulation techniques (AM, FM, PM) are studied. Performance of these systems in the presence of channel noise is established. Methods of digital transmission of analog signals (Binary and M-array PCM) are studied			

Module 19

Code	Course/Module Title	ECTS	Semester
DISD203	Digital Systems Design I	5	3
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	3	79	46
Description			
After learning this course, the students should be able to: Understand the construction and working of different combinational circuits etc. Understand different flip-flops and its applications. Understand different sequential logic circuits and basic design of sequential circuits and counters. Understand the fundamentals of D/A and A/D converters			

Module 20

Code	Course/Module Title	ECTS	Semester
BIOL202	**Biology**	3	3
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2		33	42
Description			
This course provides students with a foundational understanding of biological principles and their applications in engineering. By the end of the course, students will be able to integrate biological concepts with engineering techniques to address challenges in biotechnology, healthcare, and environmental sustainability. Topics covered include cell structure and function, genetics, biomolecules, bioinformatics, and systems biology. The course emphasizes the application of biological knowledge to the design and development of innovative solutions in areas such as synthetic biology, biomedical engineering, and bioengineering. Students will be equipped with the skills necessary to bridge the gap between biology and engineering, fostering innovation in multidisciplinary fields.			

Module 21

Code	Course/Module Title	ECTS	Semester
ELEC204	Electronics I	5	3
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	3	79	46
Description			
this course describe the structure of BJT transistors as well as the FET transistors, it clarify the configuration circuits (common emitter, common base and common collector configurations) DC biasing circuit and its characteristics. Saturation level of transistor, Transistor switching configuration for each BJT and FET transistors.			

Module 22

Code	Course/Module Title	ECTS	Semester
ENAN208	Engineering Analysis	3	4
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	1	48	27
Description			
At the end of the course, the student will be familiar with the vector including vector analytic geometry in surfaces, dot and cross products in addition to the Laplace transformation and Z-transform technique for solving equations.			

Module 23

Code	Course/Module Title	ECTS	Semester
ELEC210	Electronics II	5	4
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	3	79	46
Description			
This course describe the BJT transistor Modeling clarifying the amplification in the AC Domain. it clarify the configuration circuits (common emitter, common base and common collector configurations) AC biasing circuit and its characteristics for each BJT and FET transistors. this course also give an introduction to the Two-Port Systems, and the effect of the Rs and RL. also this course explaining the General Frequency Considerations (Low frequency response and high frequency response). also this course give a knowledge about operational amplifiers and active filters as well as the feedback and oscillator circuits. and voltage regulators.			

Module 24

Code	Course/Module Title	ECTS	Semester
COFU212	Communication Fundamentals II	4	4
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	3	79	21
Description			
The objective of this course is to introduce undergraduate students to the fundamentals of communication systems. After a brief review of signals and systems (mainly Fourier analysis), techniques of transmitting and receiving information signals using analog carrier modulation techniques (AM, FM, PM) are studied. Performance of these systems in the presence of channel noise is established. Methods of digital transmission of analog signals (Binary and M-array PCM) are studied			

Module 25

Code	Course/Module Title	ECTS	Semester
DISD213	Digital Systems Design II	4	4
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	3	79	21
Description			
After learning this course, the students should be able to: Understand the construction and working of different combinational circuits etc. Understand different flip-flops and its applications. Understand different sequential logic circuits and basic design of sequential circuits and counters. Understand the fundamentals of D/A and A/D converters			

Module 26

Code	Course/Module Title	ECTS	Semester
OPSY214	Operating system	6	4
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
4	0	63	87
Description			
The student will be taught principles of modern operating systems. In particular, the course will cover details of concurrent processes, multi-threads, CPU scheduling, memory management, file system, storage subsystem, and input/output management, The course will integrate theory and practice through coordinated lecture and lab hours. This course covers general issues of design and implementation of advanced modern operating systems. The focus is on issues that are critical to the applications of distributed systems and computer networks, which include interprocess communication, distributed processing, sharing and replication of data and files. Approximately two third of the course will be devoted to basic concepts and techniques, and the remaining third will be on assorted current topics in modern operating systems and distributed systems			

Module 27

Code	Course/Module Title	ECTS	Semester
ENLA202	English language II	2	4
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	0	33	17
Description			
English Language II is designed to enhance students' proficiency in the English language, focusing on advanced reading, writing, listening, and speaking skills. This course aims to deepen students' understanding of complex grammatical structures, vocabulary expansion, and the effective use of language in various contexts.			

Module 28

Code	Course/Module Title	ECTS	Semester
ARLA201	Arabic language II	2	4
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	0	33	17
Description			
تُبنى اللغة العربية II على المهارات الأساسية التي تم اكتسابها في اللغة العربية I ، وتهدف إلى تعزيز إتقان الطلاب للغة من خلال استكشاف أعمق. يركز هذا المقرر على تطوير مهارات القراءة والكتابة والاستماع والمحادثة في المستوى المتوسط، مما يمكّن الطلاب من التواصل بفاعلية في مجموعة متنوعة من السياقات.			

Module 29

Code	Course/Module Title	ECTS	Semester
DASA215	Data structures and algorithms	4	4
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	3	79	21
Description			
The objective of the course is to teach students how to design, write, and analyze the performance of C/C++ programs that handle structured data and perform more complex tasks, typical of larger software projects. Students should acquire skills in using generic principles for data representation & manipulation with a view for efficiency, maintainability, and code-reuse			

Module 30

Code	Course/Module Title	ECTS	Semester
PROB300	Probability	4	5
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	1	48	52
Description			
The probability module is a mathematical concept that deals with the likelihood of an event occurring. It is used in various fields, including statistics, finance, and science, to make predictions and decisions based on uncertain outcomes. The module involves calculating the probability of an event by dividing the number of favorable outcomes by the total number of possible outcomes. The probability module is essential in understanding risk and uncertainty in decision-making. It helps to determine the likelihood of an event happening and provides a basis for predicting future outcomes. The module is also used in statistical inference, where probabilities are used to estimate parameters of a population based on a sample. In addition, the probability module has applications in various fields such as insurance, gambling, and finance. It helps to assess the risk involved in different scenarios and make informed decisions based on the likelihood of outcomes. Overall, the probability module is a fundamental concept in mathematics and is essential in various fields to make predictions and decisions based on uncertain outcomes.			

Module 31

Code	Course/Module Title	ECTS	Semester
SOFT300	Software Engineering	4	5
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	0	33	67
Description			
Software engineering is a field of computer science that deals with the development of software systems in a systematic and efficient way. The software engineering module provides students with the knowledge and skills required to design, develop, and maintain software systems. It covers a range of topics, including software design, software testing, software maintenance, and software project management. The software engineering module emphasizes the importance of a structured approach to software development. It teaches students to follow a systematic process that includes requirements gathering, design, implementation, testing, and maintenance. The module also covers various software development methodologies, such as agile, waterfall, and iterative, to give students a broad understanding of the different approaches to software development.			

Module 32

Code	Course/Module Title	ECTS	Semester
WEDE301	Web development	6	5
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	3	79	71
Description			
This course provides students the opportunity to: 1. Present the student with basic web design knowledge. 2. Provide the student with techniques required to create interactive web applications. 3. Familiarize the student with how relational database servers, such as MySql and Oracle, can be used to power a web based application. 4. Introduce students to TCP/IP networking concepts and the creation of client/server applications. 5. Familiarize the student with the creation of Java applications and Applets.			

Module 33

Code	Course/Module Title	ECTS	Semester
SISY302	Signals and systems	5	5
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	63	62
Description			
The objective of this course is to provide a basic introduction to the theory of digital signal processing (DSP) Much of what we do extends these ideas to the field of discrete time systems. Major parts of the course will concentrate on signal analysis using Fourier transforms, linear system analysis, Filter design and a few more topics			

Module 34

Code	Course/Module Title	ECTS	Semester
COAR303	Computer Architecture I	5	5
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	1	48	77
Description			
Computer Architecture explores the design and organization of computer systems. Students will study the structure and components of computers, including processors, memory systems, and I/O devices. They will learn about instruction set architectures (ISA), processor microarchitecture, and memory hierarchies. The subject covers topics such as pipelining, cache design, virtual memory, and I/O systems. Students will analyze the performance and optimization of computer architectures, including instruction-level and program-level optimizations. Emerging trends in computer architecture, such as multicore processors and hardware accelerators, will also be explored. Practical exercises and projects provide hands-on experience in designing and evaluating computer architectures. By the end of the subject, students will have a solid understanding of computer architecture principles, enabling them to analyze, optimize, and design efficient computer systems.			

Module 35

Code	Course/Module Title	ECTS	Semester
MICR304	Microprocessor I	6	5
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	3	79	71
Description			
This course explaining the general construction of microcomputer system. and explain that a microcomputer system consists of CPU, RAM and ROM memories, input /output interfaces and peripheral units. And explain how to make receiving and sending of data explain the terms of 'address and data bus'. and examine the units in microcomputer system. and examine the construction of CPU, know registers and bus systems. Explain the information of introduction to programming. explaining the arranging of the typical assembly language program and its structure. Explain that this program should be written in a general form consists of blocks 'Label Area" Instruction Area" "Explaining Area ". it give an understanding about the data transfer.			

Module 36

Code	Course/Module Title	ECTS	Semester
NUAN306	Numerical Analysis	4	6
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	1	48	52
Description			
The module of numerical analysis is a field of study within mathematics and computer science that focuses on developing and analyzing numerical algorithms for solving mathematical problems. It involves the use of computational methods to approximate solutions to complex mathematical equations and problems that may not have exact analytical solutions.			

Module 37

Code	Course/Module Title	ECTS	Semester
DASY310	Database Systems	6	6
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	3	79	71
Description			
This module aims to equip students with the principles and skillset necessary to design and develop a database system that fulfills the requirements of business operational needs. It explains the technical and practical approaches that database designers and developers use in practice. It enables the students to develop a database system to solve real-world problems and facilitate human daily activities. The module provides understanding of the characteristics of the database approach, entity–relationship (ER) model, data models, schemas and instances. It also provides understanding of the relational data model and relational database constraints. It also covers the basics of functional dependencies and normalization for relational databases. The optimal database queries and effective SQL will also be introduced to ensure database systems can be efficiently and effectively operated. Search and inquiry-based skills are also covered to learn, connect, and develop database systems. Finally, the module will provide understanding of the storage organization of databases, hashing techniques, indexing structures, and database security.			

Module 38

Code	Course/Module Title	ECTS	Semester
DISP311	Digital signal processing	4	6
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	1	48	52
Description			
The objective of this course is to provide an introduction to the Fourier and Laplace transforms and concepts such as linearity and shift invariance that are used in the description and analysis of linear analog systems. Much of what we do extends these ideas to the field of discrete time systems. Major parts of the course will concentrate on signal analysis using Fourier transforms, linear system analysis, Filter design and a few more advanced topics. We will study the discrete Fourier transform and its properties. The Students will also study the sampling theorem and the relationship between continuous and discrete time transforms.			

Module 39

Code	Course/Module Title	ECTS	Semester
COAR312	Computer Architecture II	5	6
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	1	48	77
Description			
Computer Architecture is a comprehensive subject that explores the organization, design, and functionality of computer systems. Students will study the structure and components of computers, including instruction set architectures, processor organization, memory systems, and input/output interfaces. They will learn about the principles and techniques involved in optimizing computer performance, including pipelining, caching, and virtual memory. The subject also covers emerging trends such as multicore processors and hardware accelerators. Through practical exercises and projects, students will apply their knowledge to design and evaluate computer architectures. By the end of the subject, students will have a solid understanding of computer architecture principles, enabling them to analyze, optimize, and stay up-to-date with advancements in computer system design.			

Module 40

Code	Course/Module Title	ECTS	Semester
MICR314	Microprocessor II	5	6
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	3	79	46
Description			
This course will give a knowledge about Representing Binary Code With LED Array, and interfacing the Seven Segment, Light Detected Resistor (LDR), IC Tester, Stepper Motor. this course also clarify how to Rotate The Stepper Motor Bidirectional, Reading Switches Status And Output To Leds. Using Switches As Input To Control Mechanical Press, Converting Analogue Input (Variable Pot) To Digital, Generating Sine Wave Using DAC, Motor Control, and Temperature Control.			

Module 41

Code	Course/Module Title	ECTS	Semester
CONE315	Computer network	6	6
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	64	86
Description			
A computer network module is a course that teaches students about the design, implementation, and maintenance of computer networks. The module covers a range of topics, including network			

architecture, network protocols, network security, and network performance. The computer network module is essential in today's digital world, where computer networks are vital for communication and data exchange. The module provides students with the knowledge and skills required to design and implement computer networks that are efficient, secure, and reliable. It also covers various network technologies, such as LAN, WAN, and VPN, to give students a broad understanding of different network types.

Module 42

Code	Course/Module Title	ECTS	Semester
ARIN400	Artificial Intelligent	6	7
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	3	79	71
Description			
Artificial Intelligence (AI) is a rapidly growing field that involves the development of intelligent computer systems that can perform tasks that typically require human intelligence, such as perception, reasoning, learning, and decision-making. The AI module teaches students about the fundamental concepts and techniques used in AI, including machine learning, natural language processing, computer vision, and robotics. The AI module provides students with the knowledge and skills required to develop intelligent computer systems that can solve complex problems and make decisions based on data. It covers various AI applications, such as virtual assistants, autonomous vehicles, and medical diagnosis systems, to give students a broad understanding of the practical applications of AI.			

Module 43

Code	Course/Module Title	ECTS	Semester
DIDS401	Distributed Database Systems	6	7
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	3	79	71
Description			
This course covers basic technology and advanced research topics in connection with distributed data management and big data. It will cover the following topics. Parallel database management Distributed databases and distributed query processing Data mining			

Module 44

Code	Course/Module Title	ECTS	Semester
DIMP402	Digital Multimedia Processing	6	7
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	3	79	71
Description			
Students completing this course are expected to be able to: Understand the basic mathematics of signal and image manipulation. Capture, store, process, and present multimedia data. Understand common media software tools. Understand the use of a multimedia API.			

Module 45

Code	Course/Module Title	ECTS	Semester
EMSY403	Embedded system	5	7
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	64	61
Description			
Students should be able to understand the basic components of a computer, write assembly and C language programs that perform I/O functions and implement simple data structures, manipulate numbers in multiple for-mats, and understand how software uses global memory to store permanent information and the stack to store temporary information.			

Module 46

Code	Course/Module Title	ECTS	Semester
COSY404	Control systems	5	7
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	64	61
Description			
Control systems are essential components in various industries and applications. They are designed to manage and regulate the behavior of dynamic systems to achieve desired outputs. These systems consist of sensors, actuators, and a controller that continuously monitor the system's state and make adjustments as necessary. Control systems can be classified into different types, such as open-loop and closed-loop systems. Open-loop systems provide control without feedback, while closed-loop systems use feedback to enhance accuracy and stability. Control systems play a vital role in automation, robotics, manufacturing, aerospace, and many other fields, ensuring efficient operation, optimal performance, and safety. They contribute to precision, stability, and responsiveness in complex systems, enabling control over variables and achieving desired outcomes.			

Module 47

Code	Course/Module Title	ECTS	Semester
GRPR405	Graduation project	2	7
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
1	0	17	33
Description			
The Graduation Project Module is a capstone course that provides students with the opportunity to apply the knowledge and skills they have acquired throughout their academic program to a real-world project. The module is designed to challenge students and help them develop critical thinking, problem-solving, and project management skills. The Graduation Project Module typically involves working on a project in collaboration with a team of peers, a faculty advisor, and an industry partner. The project can be in any field, including computer science, engineering, business, or social sciences.			

Module 48

Code	Course/Module Title	ECTS	Semester
SOCO410	Soft computing	7	8
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	3	79	96
Description			
Soft Computing is an interdisciplinary field that combines various techniques from artificial intelligence, mathematics, and computer science to develop intelligent systems that can learn, reason, and solve complex problems. The Soft Computing module teaches students about the fundamental concepts and techniques used in Soft Computing, including fuzzy logic, neural networks, and genetic algorithms. The Soft Computing module provides students with the knowledge and skills required to develop intelligent systems that can solve complex problems and make decisions based on uncertain or incomplete information. It covers various Soft Computing applications, such as data mining, pattern recognition, and optimization, to give students a broad understanding of the practical applications of Soft Computing.			

Module 49

Code	Course/Module Title	ECTS	Semester
COSE411	Computer Security	5	8
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	1	48	77
Description			
The Computer Security module is a course that teaches students about the principles and techniques used to protect computer systems and networks from unauthorized access, theft, or damage. The module covers various topics, including computer security threats, cryptography, access control, network security, and security management. The Computer Security module is essential in today's digital world, where computer systems and networks are under constant threat from hackers, viruses, and other malicious attacks. The module provides students with the knowledge and skills required to design and implement computer security measures that are effective, efficient, and reliable.			

Module 50

Code	Course/Module Title	ECTS	Semester
DICS412	Digital Control Systems	6	8
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	3	79	71
Description			
Digital control systems are a class of systems where the control algorithm and signal processing are implemented using digital devices. These systems convert analog signals from sensors into digital form, process them using algorithms, and generate control signals for actuators. They offer advantages like flexibility, accuracy, and ease of implementation compared to their analog counterparts. Digital control systems typically consist of a sensor to measure the system's output, an analog-to-digital converter (ADC) to convert the analog signal into digital form, a digital controller to compute the control actions based on the desired response and feedback, and a digital-to-analog converter (DAC) to convert the control signal back into analog form for actuation. They find applications in various industries, including aerospace, automotive, manufacturing, and robotics.			

Module 51

Code	Course/Module Title	ECTS	Semester
PRMA413	Project Management	5	8
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	1	48	77
Description			
Project management is a crucial aspect of any organization, and the project management module is a software tool that helps in the planning, execution, and monitoring of projects. This module provides a structured approach to project management, enabling project managers to define project goals, create project schedules, allocate resources, and track progress. The project management module is designed to streamline project management processes, reduce costs, and improve project outcomes. It provides a centralized platform for project collaboration, enabling team members to work together on tasks, share information, and communicate effectively.			

Module 52

Code	Course/Module Title	ECTS	Semester
PAPR414	Parallel Processing	5	8
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	1	48	77
Description			
Parallel processing is a technique that enables the execution of multiple tasks simultaneously within a computer system. The parallel processing module is a software tool that facilitates the use of parallel processing to improve the performance of computer systems. This module provides a set of libraries and tools that enable developers to write parallel programs that can take advantage of the processing power of multiple processors within a computer. The parallel processing module is particularly useful for applications that require high-performance computing, such as scientific simulations, data analytics, and machine learning. By using parallel processing, these applications can process large amounts of data quickly, making it possible to perform complex calculations in real-time.			

Module 53

Code	Course/Module Title	ECTS	Semester
GRPR405	Graduation Project	2	8
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
1	0	17	33
Description			
The Graduation Project Module is a capstone course that provides students with the opportunity to apply the knowledge and skills they have acquired throughout their academic program to a real-world project. The module is designed to challenge students and help them develop critical thinking, problem-solving, and project management skills. The Graduation Project Module typically involves working on a project in collaboration with a team of peers, a faculty advisor, and an industry partner. The project can be in any field, including computer science, engineering, business, or social sciences.			

Contact

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الملحق رقم (4)

وصف المواد الدراسية لقسم هندسة الحاسوب

Module Description Forms for Computer Engineering

وصف مقررات مواد المرحلة الأولى

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	***Computer programming methodology***			**Module Delivery**	
Module Type	**C**			☒**Theory** ☐**Lecture** ☒**Lab** ☐**Tutorial** ☐**Practical** ☐**Seminar**	
Module Code	**COPM101**				
ECTS Credits	**6**				
SWL (hr/sem)	**150**				
Module Level	UGI		**Semester of Delivery**	1	
Administering Department	computer engineering		**College**	College of engineering	
Module Leader			**e-mail**		
Module Leader's Acad. Title	Lecturer		**Module Leader's Qualification**	M.Sc.	
Module Tutor	Ahmed adeeb jalal		**e-mail**		
Peer Reviewer Name	Suray saadi		**e-mail**		
Scientific Committee Approval Date	01/06/2023		**Version Number**	1.0	

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	The main objectives of this course are to introduce the student the basic programming techniques by learning the C++ programming language. Then, start with the skills of writing the program and designing and implementing algorithms to solve the problem. The course gives an introduction to programming in C++ and includes topics such as: • Overview of Computers and Programming. • Introduction to Problems and Algorithms. • Problem-Solving Methodology. • Flowcharts, Decomposition outline, and Pseudo-code. • C++ Programming Basics (data types, operators and expressions, keywords and identifiers, variables and assignment, basic input/output routines). • Operators and Operations (Arithmetic Operators, Relational Operators, Logical Operators, Operators Precedence in C++, Bitwise Operators, Assignment Operators, and Casting Operators) • Math Operations in C++. • Input and Output statements. • Iteration (Loop) Statements. • Control Structures (sequence, selection [if, if\else, switch], iteration [for, while, do/while]), break and continue statements. • Arrays One dimension (1D), two dimensions (2D). • Learn how to create simple functions with different types.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	By the end of this course, the students will be able to do the following: 1. State the basic parts of any computer system and explain them. 2. Demonstrate the differences between various parts of the computer system (like RAMs and ROMs, Input / outputs, buses) and others. 3. Identify variables and constants and apply them in statements in the program. 4. Work with input output functions to inquire data from keyboard and display them on the monitor. 5. Deal with various mathematical and logical operations inside the program. 6. Construct flowcharts for solving different problems and presenting solutions. 7. Include many libraries in the programs that require extra functionalities. 8. be able to use conditional statements like (if, case,...) in the program and how to use them in various conditions. 9. Implement repetitive structures like (for) and how to utilize it inside the program. 10. Use the (while, do while) structures as an alternative for (for). 11. Write the syntax for identifying array and how to identify them in a program. 12. Understand the principle of indexing and how to manipulate indices throughout the program. 13. Write custom functions in the program and how to identify and use a new function by the user. 14. Provide learners with an understanding of how to read, write, and process array elements and functions in C++ and create new functions with return values and calls.
Indicative Contents المحتويات الإرشادية	1. Introduction to Programming: Basics of programming languages, program structure, variables, data types, operators, control structures (conditionals, loops), functions, and basic input/output.

	2. Object-Oriented Programming (OOP): Concepts of objects, classes, inheritance, polymorphism, encapsulation, and abstraction. Implementation of OOP principles using a specific programming language. 3. Software Development Life Cycle (SDLC): Overview of the different phases of software development, including requirements gathering, analysis, design, implementation, testing, deployment, and maintenance. Introduction to methodologies such as waterfall, agile, and iterative development. 4. Algorithms and Data Structures: Introduction to fundamental algorithms and data structures, such as arrays, linked lists, stacks, queues, trees, graphs, sorting, searching, and complexity analysis. Design and implementation of algorithms and data structures. 5. Software Testing: Principles and techniques of software testing, including unit testing, integration testing, system testing, and acceptance testing. Test case design, test-driven development (TDD), and debugging strategies. 6. Version Control Systems: Introduction to version control concepts and tools such as Git. Working with repositories, branching, merging, and resolving conflicts. Collaborative development practices. 7. Software Design Principles: Principles and patterns for software design, including SOLID (Single Responsibility, Open-Closed, Liskov Substitution, Interface Segregation, Dependency Inversion), design patterns (e.g., Factory, Singleton, Observer), and architectural patterns (e.g., MVC, MVP, MVVM). 8. Software Documentation and Code Organization: Writing clear and effective code documentation. Best practices for code organization, naming conventions, and code modularity. 9. Debugging and Error Handling: Techniques for identifying and resolving software bugs. Strategies for error handling and exception management. 10. Software Development Tools: Introduction to integrated development environments (IDEs), code editors, and other tools used in the software development process.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	In this course, attendance is one of the mandatory tasks for students, since the key idea behind each topic the subject would be given during the lab. Also, assignments play an important role in keeping track of comprehending all the skills and problem-solving methods for topics. Exams are the true criterion for measuring the depth of students' understanding to the given material.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	79	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	71	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**150**		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	2	10% (10)	5 and 10	LO #3, #4,#6, #7, #9 and #14,
	Assignments	2	10% (10)	2 and 12	LO #7, #8, #9, #10, #12 and #14.
	Report	1	10% (10)	13	LO #6, #9, #11 and #13.
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #1-#10
	Final Exam	3hr	60% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Computers and their uses/ Hardware/Software, Programming languages/How to use/ run programs.
Week 2	Using computers in problem solving/ requirement specifications/ analysis.
Week 3	Design and representation of algorithms/ implementation / testing and verification/ program documentation.
Week 4	Input and output/ data types.
Week 5	Arithmetic and logical operators, precedence of operators.
Week 6	C++ program control and structured programming Selections, If statement, nested if statement, if-else if ladder else.
Week 7	Switch-case statements, nested switch-case statement.

Week 8	Mid-course Exam
Week 9	Counter controlled and sentinel-controlled repetition.
Week 10	The do-while and while loops.
Week 11	Skipping loop iterations break and continue and exit() function..
Week 12	Labels and goto statement, nested loops.
Week 13	Using the array data structure to represent lists and tables of values, One-dimensional array creation, initialization and processing.
Week 14	Two-dimensional array creation, initialization and processing.
Week 15	Functions in C++, New Function Creation, Return Values, and Call.
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Create a C++ project
Week 2	Lab 2: Variables and Data Types
Week 3	Lab 3: Operators and Operations
Week 4	Lab 4: Input and Output statements
Week 5	Lab 5: Iteration (Loop) Statements
Week 6	Lab 6: Loop Control Statements and Decision-Making statements
Week 7	Lab 7: Create simple functions with different types

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Deitel, P and Deitel H, C++ How to Program, 8th Edition, Prentice Hall 2012.	No
Recommended Texts	1. Bradley, A, Programming for Engineers, Springer, 2011. 2. Bronson, G, C for Engineers and Scientists, West Publishing Company, 1993.	No
Website	https://www.w3schools.com/cpp/default.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

Module Information معلومات المادة الدراسية					
Module Title	**Fundamentals of Electrical Circuits I**			**Module Delivery**	
Module Type	**C**			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**FUEC103**				
ECTS Credits	**7**				
SWL (hr/sem)	**175**				
Module Level		UGI	**Semester of Delivery**		1
Administering Department		Computer Engineering	**College**	College of Engineering	
Module Leader	Ammar A. Al-Hamadani		**e-mail**	ammar.aladin@aliraqia.edu.iq	
Module Leader's Acad. Title		Lecturer	**Module Leader's Qualification**		Ph.D.
Module Tutor	-		**e-mail**	-	
Peer Reviewer Name		Rash T. Mohammed	**e-mail**	E-mail	
Scientific Committee Approval Date		01/06/2023	**Version Number**		1.0

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

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. Understand the fundamental concepts of electric circuits, including voltage, current, resistance, and power, and their relationships as defined by Ohm's law. 2. Analyze and solve basic DC circuits using techniques such as series and parallel circuit analysis, voltage division, and current division. 3. Apply Kirchhoff's laws (Kirchhoff's current law and Kirchhoff's voltage law) to analyze and solve complex DC circuits. 4. Calculate the equivalent resistance of resistors in series and parallel configurations and apply this knowledge to simplify complex resistor networks. 5. Analyze circuits using various circuit analysis techniques, such as nodal analysis and mesh analysis, to determine voltage, current, and power relationships. 6. Apply important circuit theorems, such as the superposition theorem, Thevenin's theorem, and Norton's theorem, to simplify complex DC circuits and calculate unknown quantities.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Understanding of basic electrical concepts: Students should gain a solid understanding of fundamental electrical concepts such as voltage, current, resistance, and power. They should be able to apply Ohm's law and solve basic electrical circuit problems using these concepts. 2. Analysis of DC circuits: Students should be able to analyze and solve DC circuits using techniques such as Kirchhoff's laws, nodal analysis, and mesh analysis. They should be able to calculate voltage drops, current flows, and power dissipation in different parts of a circuit. 3. Circuit components and their behavior: Students should learn about various circuit components such as resistors, and understand their behavior in DC circuits. They should be able to calculate the equivalent resistance of resistors in series and parallel. 4. Circuit theorems: Students should be familiar with important circuit theorems such as the superposition theorem, Thevenin's theorem, and Norton's theorem. They should be able to apply these theorems to simplify complex DC circuits and calculate unknown quantities. 5. Circuit analysis techniques: Students should develop skills in circuit analysis techniques, including using circuit diagrams, identifying circuit elements, and applying systematic problem-solving approaches. They should be able to analyze simple and complex DC circuits to determine voltage, current, and power relationships. 6. Laboratory skills: Depending on the course, students may have the opportunity to apply their theoretical knowledge through hands-on laboratory experiments. They should develop skills in using measurement instruments, constructing circuits, and verifying theoretical concepts through practical experiments.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. 1. Introduction to Electric Circuits: [15Hours] - Basic concepts of voltage, current, resistance, and power - Circuit elements: resistors, capacitors, and inductors - Circuit diagrams and symbols 2. Ohm's Law and DC Circuit Analysis: [15Hours] - Ohm's law and its applications - Series and parallel circuits - Voltage and current division - Power calculations in DC circuits

	3. Equivalent Resistance and Circuit Simplification: [15Hours] - Equivalent resistance in series and parallel circuits - Voltage and current division using equivalent resistances - Circuit simplification techniques 4. Kirchhoff's Laws and Circuit Analysis Techniques: [15Hours] - Kirchhoff's current law (KCL) and Kirchhoff's voltage law (KVL) - Nodal analysis and mesh analysis 5. Circuit Analysis using Circuit Theorems: [15Hours] - Application of superposition theorem - Thevenin's theorem and Norton's theorem - Maximum power transfer theorem 6. Review and Assessment: [5Hours] - Review of key concepts and techniques - Practice problems and exercises - Summative assessments (quizzes, tests, or exams)

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The primary approach for implementing this module will involve promoting active student engagement in exercises, as well as enhancing their ability to think critically. This goal will be accomplished through a combination of classroom sessions, interactive tutorials, and the incorporation of intriguing sampling-based experiments.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	79	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	96	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	6
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**175**		

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction - Electrical circuit, electrical current, voltage difference, notations
Week 2	Basics of Network Elements- Types of voltages, types of currents, power and energy
Week 3	Resistors and resistivity, Conductance, and Conductivity
Week 4	Ohm's law, and Temperature effect
Week 5	Series and parallel circuits,
Week 6	Delta -star , and star - delta transformation, Kirchhoff's laws.
Week 7	Mesh current analysis
Week 8	Mid-course Exam
Week 9	Branch current method
Week 10	Sources transformation

Week 11	Node voltage analysis
Week 12	Super-position circuit analysis theorem
Week 13	Thevinon's theorem
Week 14	Norton theorem
Week 15	Maximum power transfer
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Basic information and ohm's law
Week 2	Lab 2: Series and parallel circuits
Week 3	Lab 3: Voltage and Current divider
Week 4	Lab 4: Delta-Star connection
Week 5	Lab 5: Mesh and Nodal
Week 6	Lab 6: Superposition, Thevinen, and Norton theorems
Week 7	Lab 7: Maximum Power Transfer

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Introductory circuit Analysis; by Robert L. Boylestad	Yes
Recommended Texts	Sadiku, Matthew NO, and Charles K. Alexander. Fundamentals of electric circuits. New York: McGraw-Hill, 2009.	No
Websites	https://www.coursera.org/browse/physical-science-and-engineering/electrical-engineering	

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Engineering drawing**			**Module Delivery**	
Module Type	**B**			**☒Theory**	
Module Code	**ENDR104**			**☐Lecture**	
ECTS Credits	**2**			**☒Lab**	
SWL (hr/sem)	**100**			**☐Tutorial** **☐Practical** **☐Seminar**	
Module Level	UGI		**Semester of Delivery**	1	
Administering Department	computer engineering		**College**	College of engineering	
Module Leader			**e-mail**		
Module Leader's Acad. Title			**Module Leader's Qualification**		
Module Tutor	Nil		**e-mail**	Nil	
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date	01/06/2023		**Version Number**	1.0	

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

Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. The aim of this module is to provide students with a comprehensive understanding of engineering drawing principles and techniques. It aims to develop their skills in creating and interpreting technical drawings, which are essential in the field of engineering. The module also aims to enhance students' spatial visualization abilities and their understanding of the relationship between 2D representations and 3D objects. 2. Describing the AutoCAD program and Its icons, knowing what's new in AutoCAD version. 3. The students will have skills to use that's program and drawing any things (2D). 4. Reading plans of projects . 5. How to make show for them projects . 6. Auto desk AutoCAD software provide powerful ,integrated 2D modeling, drawing ,and layers tools that enable designers to focus more energy on creative ,rather than technical challenges
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Demonstrate an understanding of the principles and conventions of engineering drawing. 2. Apply appropriate techniques to create accurate and precise engineering drawings. 3. Interpret and analyze technical drawings, including dimensions and annotations. 4. Learn drawing skills by AutoCAD . 5. Learn to read construction plans by AutoCAD . 6. Increase the student's imagination by AutoCAD .
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. 1. Introduction to Engineering Drawing

	Importance of engineering drawing in the design and manufacturing process. Standards and conventions in engineering drawing. Types of technical drawings: orthographic projections, isometric projections, etc. 2. Drawing Instruments and Techniques Overview of drawing instruments and their uses Sketching techniques and line types Scaling, dimensioning, and labeling 3. Orthographic Projections Principles of orthographic projection Multi view drawings Sectional views and conventions 4. Isometric Projections Introduction to isometric projections Isometric drawing techniques and isometric scales Isometric views of objects and assemblies Extracting 2D Drawings form Isometric drawing. 5. Creating and Modifying Components by AutoCAD. 6.Modeling and Modifying Elements by AutoCAD.
Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	In this module, a combination of project-based learning, lectures, and group discussions will be utilized to create an engaging learning environment. Students will apply engineering drawing principles and techniques to real-world scenarios, participate in interactive lectures using visual aids and examples, collaborate in group discussions to analyze and problem-solve, engage in practical exercises and workshops to develop technical drawing skills with traditional tools and CAD software, and conduct independent study.

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	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	17	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3
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**	12	15% (15)	Continuous	All
	Assignments	12	20% (20)	Continuous	All
	Projects / Lab.	3	5% (5)	12,13,14 and 15	
	Report				
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Principle of engineering drawing
Week 2	Sketching techniques and line types & Scaling, dimensioning, and labeling
Week 3	Principles of orthographic projection
Week 4	Multiview drawings in orthographic projection
Week 5	Sectional views and conventions
Week 6	Introduction to isometric projections
Week 7	Isometric drawing techniques and isometric scales
Week 8	Isometric views of objects and assemblies Extracting 2D Drawings form Isometric drawing
Week 9	Mid exam
Week 10	1- Introduction - Theory lectures on history of AutoCAD program, what's new versions, how to install program. 2- Explanation the main window for program, how to arrange it before start work.
Week 11	how to use file icon from the window(open,new,save ,save as,export,merge ,drawing properties .draw orders(line and construction line with types of lines (hidden and center lines)) and modify (erase,move,copy) Orthogonally ,snaps, grid, scale and explode .
Week 12	Draw Arcs,polyline,circles and rectangle Draw Ellipses ,trim and extend orders , rotate and mirror.
Week 13	term Exam + tutorial. And Application of previous orders. Layer order (how to change color,name,type and thickness of line by layer)
Week 14	Explanation of construction and architectural plans and types of lines(showing examples) and Application of previous orders.
Week 15	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 10	Introduction - Theory lectures on history of AutoCAD program
Week 11	draw orders(line and construction line with types of lines (hidden and center lines)
Week 12	Layer order (how to change color,name,type and thickness of line by layer)
Week 13	Explanation of construction and architectural plans and types of lines

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	1-Manual of engineering drawing - Simmons C.H., Maguire D. E. 2-Autodesk AutoCAD 2021: Learn CAD With Ease (For Beginners) Hardcover – February 20, 2021 by Madhumita Kshirsagar.	no
Recommended Texts	1-Giesecke, Frederick Ernest, et al. Technical drawing with engineering graphics. Vol. 15. Prentice Hall, 2016. 2-French, Thomas Ewing, and Charles J. Vierck. The fundamentals of engineering drawing and graphic technology. McGraw-Hill Companies, 1978.	yes
Websites	https://www.autodesk.com/	

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Fundamentals of Digital Systems**			**Module Delivery**	
Module Type	**C**			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**FUDS102**				
ECTS Credits	**7**				
SWL (hr/sem)	**175**				
Module Level		UGI	**Semester of Delivery**		1
Administering Department		Computer Engineering	**College**	College of Engineering	
Module Leader	Aymen Dheyaa Khaleel		**e-mail**	aymen.d.khaleel@aliraqia.edu.iq	
Module Leader's Acad. Title		Lecturer	**Module Leader's Qualification**		Ph.D.
Module Tutor	-		**e-mail**	-	
Peer Reviewer Name			**e-mail**	E-mail	
Scientific Committee Approval Date		01/06/2023	**Version Number**		1.0

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	7. Understanding of basic Number Systems: Students should gain a solid understanding of various number systems and Codes such as decimal, binary, octal, hexadecimal, Binary Coded Decimal (BCD).and Gray system. 8. Analysis of LOGIC Gates: Students should be able to analyze and solve LOGIC Gates using tables for each circuit such as and, or, and other gates. 9. Boolean algebra and Logic Simplification: Students should learn about various rules and theorem of Boolean algebra and DeMorgan's Theorems. They should be able to calculate the equivalent expression of logic circuits by using Karnaugh map and SOP. 10. Combinational Logic Analysis: Students should be familiar with basic combinational circuit, they should be able to apply the pulse waveform inputs to the Combinational Logic gates and calculate the observed outputs.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	7. Recognize various number system and codes. 8. Use the various way to convert from system to another ones and vice versa. 9. Understand and apply the arithmetic operation for some of the system like sum, subtract, division and multiplication. 10. Apply some of arithmetic operation in logical circuit. 11. Describe logical gates like (and, or, not, nor, nand and ex-or). 12. Define the operation of each gate. 13. Identify the Boolean algebra and DeMorgan's theorems. 14. Apply Boolean algebra and DeMorgan's theorems to simplify the expressions. 15. Apply Karnaugh map and SOP to simplify the expression. 16. Explain the basic combinational logic circuit. 17. Apply the rules and use only (nand and nor gates) in connected circuit. 18. Identify the pulse waveform and applying it in the combinational logic circuits.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. 7. Digital Systems and Binary Numbers [18 Hours] • 1.1 Digital Systems 1 • 1.2 Binary Numbers • 1.3 Number-Base Conversions • 1.4 Octal and Hexadecimal Numbers • 1.5 Complements of Numbers • 1.6 Signed Binary Numbers • 1.7 Binary Codes • 1.8 Binary Storage and Registers • 1.9 Binary Logic. 8. Boolean Algebra and Logic Gates [18 Hours] • 2.2 Basic Definitions • 2.3 Axiomatic Definition of Boolean Algebra • 2.4 Basic Theorems and Properties of Boolean Algebra • 2.6 Canonical and Standard Forms • 2.7 Other Logic Operations • 2.8 Digital Logic Gates • 2.9 Integrated Circuits

	9. Gate-Level Minimization [18 Hours] - 3.1 Introduction - 3.2 The Map Method - 3.3 Four-Variable K-Map - 3.4 Product-of-Sums Simplification - 3.5 Don't-Care Conditions - 3.6 NAND and NOR Implementation - 3.7 Other Two-Level Implementations - 3.8 Exclusive-OR Function - 3.9 Hardware Description Language 10. Combinational Logic [18 Hours] - 4.1 Combinational Circuits - 4.2 Analysis Procedure - 4.3 Design Procedure - 4.4 Binary Adder–Subtractor2.6 Decimal Adder - 4.5 Binary Multiplier - 4.6 Magnitude Comparator - 4.8 Decoders - 4.9 Encoders - 4.10 Multiplexers - 4.11 HDL Models of Combinational Circuits

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The primary approach for implementing this module will involve promoting active student engagement in exercises, as well as enhancing their ability to think critically. This goal will be accomplished through a combination of classroom sessions, interactive tutorials, and the incorporation of intriguing sampling-based experiments.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	79	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	96	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	6
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**175**		

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

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	1 Digital Systems and Binary Numbers 1.1 Digital Systems 1 1.2 Binary Numbers 1.3 Number-Base Conversions 1.4 Octal and Hexadecimal Numbers
Week 2	1.5 Complements of Numbers 1.6 Signed Binary Numbers 1.7 Binary Codes
Week 3	1.8 Binary Storage and Registers 1.9 Binary Logic.
Week 4	2 Boolean Algebra and Logic Gates 2.2 Basic Definitions 2.3 Axiomatic Definition of Boolean Algebra
Week 5	2.4 Basic Theorems and Properties of Boolean Algebra 2.6 Canonical and Standard Forms
Week 6	2.7 Other Logic Operations 2.8 Digital Logic Gates 2.9 Integrated Circuits
Week 7	Mid Exam
Week 8	3 Gate-Level Minimization 3.1 Introduction 3.2 The Map Method 3.3 Four-Variable K-Map
Week 9	3.4 Product-of-Sums Simplification 3.5 Don't-Care Conditions
Week 10	3.6 NAND and NOR Implementation 3.7 Other Two-Level Implementations

Week 11	3.8 Exclusive-OR Function 3.9 Hardware Description Language
Week 12	4 Combinational Logic 4.1 Combinational Circuits 4.2 Analysis Procedure
Week 13	4.3 Design Procedure 4.4 Binary Adder–Subtractor2.6 Decimal Adder 4.5 Binary Multiplier 4.6 Magnitude Comparator
Week 14	4.8 Decoders 4.9 Encoders 4.10 Multiplexers 4.11 HDL Models of Combinational Circuits
Week 15	Final Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: logic gates
Week 2	Lab 2: logic gates
Week 3	Lab 3: Basic Combinational Logic Circuits
Week 4	Lab 4: Implementing Combinational Logic.
Week 5	Lab 5: Combinational Logic NOR Gates
Week 6	Lab 6: Combinational Logic Using NAND gates
Week 7	Exam
Week 8	Lab 7: adders
Week 9	Lab 8: Comparator
Week 10	Lab 9: Decoders

Week 11	Lab 10: Encoders
Week 12	Lab 11: Multiplexers
Week 13	Lab 12: Demultiplexers
Week 14	Exam

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	M. Morris Mano, Michael D., Digital Design, 4th edition, Ciletti Prentice Hall	Yes
Recommended Texts	Thomas L. Floyd, Digital Fundamentals, 11th Edition, Pearson Prentice Hall	Yes
Websites	https://www.coursera.org/browse/physical-science-and-engineering/electrical-engineering	

Grading Scheme

مخطط الدرجات

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Mathematics I**			**Module Delivery**	
Module Type	**B**			**☒Theory** **☐Lecture** **☐Lab** **☒Tutorial** **☐Practical** **☐Seminar**	
Module Code	**MATH102**				
ECTS Credits	4				
SWL (hr/sem)	**100**				
Module Level		UGI	**Semester of Delivery**		1
Administering Department		computer engineering	**College**	College of engineering	
Module Leader	Name		**e-mail**	E-mail	
Module Leader's Acad. Title			**Module Leader's Qualification**		
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name		Name	**e-mail**	E-mail	
Scientific Committee Approval Date		01/06/2023	**Version Number**	1.0	

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. Make students able to analyze engineering problems and formulate mathematical models to solve them. 2. Understand mathematical concepts in engineering as apply matrix techniques to problems in engineering 3. Expressing linear transforms in other forms, such as matrix equations and vector equations. 4. Distinguishing between homogeneous and nonhomogeneous systems. 5. Apply systems of linear equations to problems in networking 6. Use the characteristic polynomial to find all eigenvalues and eigenvectors 7. In engineering, by domain and range one can used to design and optimize systems. 8. Build a mathematical toolkit: The course introduces various mathematical tools and techniques necessary for engineering analysis. This includes algebraic manipulation, trigonometric functions, calculus operations (such as differentiation and integration)
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Understand and perform operations on matrices, including addition, subtraction, multiplication, and determination. 2. Apply Cramer's rule to solve systems of linear equations. 3. Calculate determinants and use them to determine properties of matrices. 4. Determine eigenvalues and eigenvectors of matrices. 5. Analyze and graph functions, including determining their domain and range. 6. Evaluate limits and determine continuity of functions. 7. Apply differentiation rules, including the chain rule and implicit differentiation, to find derivatives. 8. Apply integration rules and techniques, including integration by parts and partial fractions, to find antiderivatives. 9. Solve problems involving definite and indefinite integrals. 10. Understand and graph trigonometric functions, and apply their properties to solve problems. 11. Perform derivations and integrations involving trigonometric functions 12. Apply logarithmic and exponential functions in solving problems, and perform derivations and integrations involving these functions.
Indicative Contents	• Matrices: Introduction to matrices and their operations.

المحتويات الإرشادية	Determinants of matrices. Cramer's rule for solving systems of linear equations. Inverse matrices. • Systems of Linear Equations: • Eigenvalues and Eigenvectors: Understanding eigenvalues and eigenvectors of matrices. • Real Numbers and Functions: Understanding real numbers and intervals. Graphing functions and determining their domain and range. • limit and continuity Introducing the concept of limit and continuity. • Differentiation: Differentiation rules and examples. Chain rule and implicit differentiation. • Integration: Integration rules and techniques. Definite and indefinite integrals. • Trigonometric functions properties , Derivatives and integrals of Trigonometric functions • Logarithmic and Exponential Functions: Derivatives and integrals of logarithmic and exponential functions.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1- Giving theoretical lectures 2- Solve many problems 3- Using illustration methods such as drawing 4- Direct discussion by asking questions and opening dialogue and interaction with students. 5- Giving video lecture if need

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	37	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	2
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	20% (20)	Continuous	All
	Assignments	2	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #10, LO #11
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Matrices: introduction, operation
Week 2	Matrix determination
Week 3	Inverse Matrices
Week 4	Solving a system of linear equations by Cramer's rule
Week 5	Solving a system of linear equations by inverse method
Week 6	Eigen value and Eigen vector
Week 7	(Mid-term Exam)
Week 8	Real Numbers, Intervals, Functions:graphs , domain and range
Week 9	Limit and continuity
Week 10	Differentiation
Week 11	Chain rule, implicit Differentiation
Week 12	Rules of integration, Definite and indefinite integrals
Week 13	trigonometric functions: derivations, integrations
Week 14	natural logarithm , exponential e^x: properties, derivations, integrations
Week 15	a^x, log_a^u : properties, derivations, integrations
Week 16	**Preparatory week before the final Exam**

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Calculus By Thomas	Yes
Recommended Texts	CALCULUS EARLY TRANSCENDENTALS, By HOWARD ANTON, IRL BIVENS ,STEPHEN DAVIS	yes
Websites		

Grading Scheme

مخطط الدرجات

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**English Language I**			**Module Delivery**	
Module Type	**S**			☒ **Theory** ☐**Lecture** ☐**Lab** ☐**Tutorial** ☐**Practical** ☐**Seminar**	
Module Code	ENLA102				
ECTS Credits	**2**				
SWL (hr/sem)	**50**				
Module Level	1		**Semester of Delivery**	1	
Administering Department			**College**	Engineering	
Module Leader			**e-mail**		
Module Leader's Acad. Title	Professor or Asst. Prof.		**Module Leader's Qualification**	Ph.D.	
Module Tutor			**e-mail**		
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date	01/06/2023		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد 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. Language Proficiency: English language materials aim to enhance learners' proficiency in the language by developing their skills in reading, writing, listening, and speaking. The materials provide opportunities for learners to practice and improve their grammar, vocabulary, pronunciation, and comprehension abilities. 2. Communication Skills: English language materials focus on developing learners' ability to communicate effectively in various contexts. This includes practicing conversation skills, giving presentations, writing emails and reports, and engaging in discussions and debates. 3. Cultural Understanding: English language materials often incorporate cultural content to provide learners with insights into English-speaking countries' cultures, traditions, and societal norms. This helps learners understand and navigate cross-cultural interactions. 4. Exam Preparation: Many English language materials are designed to prepare learners for standardized tests like TOEFL, IELTS, or Cambridge English exams. These materials provide test-taking strategies, practice exercises, and sample questions to familiarize learners with the exam format and improve their performance. 5. Professional and Academic Skills: Some English language materials cater to learners who require English proficiency for specific professional or academic purposes. These materials focus on developing specialized vocabulary, writing research papers, delivering professional presentations, and enhancing critical thinking and analytical skills. 6. Self-Study and Autonomy: English language materials often aim to empower learners to become independent and autonomous language learners. They provide self-study resources, interactive exercises, and feedback mechanisms that allow learners to track their progress and take control of their learning journey.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Language Proficiency: By engaging with English language materials, learners should demonstrate improved language proficiency across various skills such as reading, writing, listening, and speaking. They should be able to comprehend and produce English texts with increased accuracy, fluency, and complexity. 2. Effective Communication: Learners should develop the ability to communicate effectively in English, both orally and in writing. They should be able to express ideas, opinions, and information clearly and coherently, adapting their language to different contexts and audiences. 3. Cultural Awareness: Engaging with English language materials should foster cultural awareness and sensitivity. Learners should gain an understanding of cultural practices, perspectives, and norms of English-speaking countries, enabling them to engage in cross-cultural communication with respect and understanding. 4. Critical Thinking and Analysis: English language materials often aim to develop learners' critical thinking and analytical skills. They should be able to

	analyze and evaluate information, identify main ideas, make connections, and draw conclusions from English texts. 5. Exam Readiness: If the materials are geared towards exam preparation, the learning outcomes may include achieving a specific score or level in standardized English proficiency tests such as TOEFL, IELTS, or Cambridge exams. Learners should demonstrate the necessary skills and strategies to succeed in these exams. 6. Independent Learning: English language materials often aim to promote independent learning skills. Learners should become self-directed and motivated language learners who can set goals, manage their learning process, and use resources effectively to continue improving their English proficiency beyond the module. 7. Academic or Professional Skills: Depending on the module's focus, the learning outcomes may include specific academic or professional skills. These may include academic writing, research skills, presentation skills, business communication, or specific English language skills required in a professional field.
Indicative Contents المحتويات الإرشادية	1. Vocabulary: English language materials often include vocabulary lessons and exercises to expand learners' word knowledge. This may involve learning new words, idioms, phrasal verbs, and collocations, as well as practicing their usage in context. 2. Grammar: English language materials typically cover various grammar topics and rules. They provide explanations, examples, and exercises to help learners understand and apply grammatical structures correctly. This may include topics like tenses, articles, prepositions, verb forms, and sentence structure. 3. Reading Comprehension: English language materials incorporate reading passages of different genres, such as fiction, non-fiction, news articles, and academic texts. Learners engage in activities like reading for gist, scanning for specific information, and comprehending main ideas, supporting details, and inference. 4. Writing Skills: English language materials focus on developing learners' writing skills, including sentence construction, paragraph development, essay structure, and formal writing styles. They may cover various types of writing, such as descriptive, narrative, argumentative, and persuasive writing. 5. Listening Comprehension: English language materials include listening activities to improve learners' listening skills and comprehension. These may involve listening to dialogues, conversations, lectures, interviews, and audio recordings, followed by tasks to assess understanding, inference, and note-taking. 6. Speaking Skills: English language materials provide opportunities for learners to practice speaking and develop their oral communication skills. This may include role-plays, discussions, presentations, and speaking tasks that simulate real-life situations and promote fluency, pronunciation, and accuracy. 7. Pronunciation and Intonation: English language materials often address pronunciation and intonation patterns to improve learners' spoken English. They may include exercises for practicing individual sounds, stress patterns,

	rhythm, and intonation to enhance clarity and naturalness in speaking. 8. Cultural and Societal Context: English language materials may incorporate cultural content to provide learners with insights into English-speaking countries' cultures, customs, and societal norms. This helps learners understand cultural context and improve their intercultural communication skills. 9. Test Preparation: If the materials are designed for exam preparation, they may include sections dedicated to practicing test-taking strategies, familiarizing learners with the format and types of questions in standardized English proficiency exams, and providing sample tests for practice. 10. Authentic Materials: English language materials often include authentic materials like newspaper articles, blogs, videos, and audio recordings to expose learners to real-life language usage and promote their understanding of English in authentic contexts.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1. English language materials often follow a structured progression, starting with simpler concepts and gradually increasing the complexity. This scaffolding approach helps learners build upon their existing knowledge and skills, ensuring a smooth and gradual learning curve. 2. English language materials provide contextualized examples and practice exercises to help learners understand how language is used in real-life situations. By presenting language in meaningful contexts, learners can grasp its practical application and improve their comprehension and usage. 3. English language materials incorporate interactive activities like group discussions, role-plays, pair work, and language games to foster active participation and engagement. These activities promote communication, collaboration, and the application of language skills in authentic situations. 4. English language materials aim to integrate the four language skills (reading, writing, listening, and speaking) to promote holistic language development. By connecting these skills, learners can enhance their overall language proficiency and ability to communicate effectively. 5. English language materials provide a variety of practice exercises that gradually increase in difficulty. This progressive practice allows learners to reinforce their understanding, practice new language features, and build confidence in their language abilities.

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
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**	2	10% (10)	5 and 10	
	Assignments	2	10% (10)	2 and 12	
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered

Week 1	**Grammer (1)** (tenses :present , past , future) , question , questions word , **Everyday English** (social expression)
Week 2	**Grammer (2)** :Present tenses(present simpl , present continuous (have and have got) **Everyday English** (Making conversation)
Week 3	**Grammer(3)** Past tenses (past simple , past continuous) **Vocabulary** (Regular and Irregular verbs) , Adverbs **Everyday English** (Saying when)
Week 4	**Grammer (4):** Quantity , articles **Everyday English** (Can you came for dinner , Requests
Week 5	**Grammer (5) :** Verbs patterns , future forms **Vocabulary** : Phrasal verb (literal , Idiomatic) **Everyday English** (Expressing doubt and certainty)
Week 6	**Grammer**(6) :what like , Comparative and superlative adjective **Everyday English** : What's on
Week 7	**Grammer(7)** : Present perfect , Indefinite past , ever and never **Everyday English** : Agree with me , word with two meaning , go together, prepositions.
Week 8	**Vocabulary** (right word , wrong word , verbs with similar meaning , adjective and noun that go together , Synonyms , Antonyms
Week 9	Writing practice: narrative or descriptive essays
Week 10	Midterm Exam
Week 11	**Speaking**: speaking a technical report , a seminar , **Team work activities** (discussion and conversation) **Seminar skills**
Week 12	Grammar review: passive voice and relative clauses.
Week 13	Error analysis and correction exercises

Week 14	**Translation** : a technical report from English to Arabic and from Arabic to English Computer engineering terms .
Week 15	Preparatory week before the final Exam
Week 16	Final Exam

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Textbooks	1. New Headway for Beginner / Student book 4th edition 2. New Headway Elementary / Student book 4th edition	Yes
Recommended Texts	New Headway of Oxford / Pre- Intermediate / Student's Book Fourth edition	-
Websites		

Grading Scheme

مخطط الدرجات

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	Human Rights and Democracy			**Module Delivery**	
Module Type	**S**			**☒Theory**	
Module Code	HRAD103			**☐ Lecture**	
ECTS Credits	**2**			**☐ Lab**	
SWL (hr/sem)	**50**			**☐Tutorial** **☐Practical** **☐Seminar**	
Module Level		UGI	**Semester of Delivery**		1
Administering Department		Computer engineering	**College**	Collage of engineering	

Module Leader	Asmaa falih jassm		**e-mail**	asmaafalih2@gmail.com	
Module Leader's Acad. Title		assistant teacher	**Module Leader's Qualification**		Ph.D.
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name		Name	**e-mail**	E-mail	
Scientific Committee Approval Date		01/06/2023	**Version Number**		1.0

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. Familiarize students with human rights and duties towards the individual and society 2. Highlighting the importance of the individual knowing his rights to carry out his duties to the fullest 3. Encouraging the student to study human rights, which contributes to the development of his thinking skills about human rights and freedom, and informs him of its bright side. 4. Introducing the student to how to deal with international and regional treaties and their internal legislation and to derive knowledge related to those rights and how to reflect them and their real and civilized role in the lives of peoples
Module Learning Outcomes	Important: Write at least 6 Learning Outcomes, better to be equal to the number of study weeks. 7. Study theories of human rights and democracy

مخرجات التعلم للمادة الدراسية	8. Clarification of the historical stages of human rights and their development 9. Clarification of the most important rights and duties granted to the individual and guaranteed constitutionally, which contribute to changing his life for the better 10. Promoting the idea of social justice for all individuals without discrimination on the basis of religion, race or color 11. Emphasizing and raising the spirit of citizenship, promoting the idea of belonging to the land and the homeland, and adhering to laws and regulations 12. Enhancing the student's thinking skill and creating his confidence during the dialogue on human rights 13. Introducing him to the method and mechanism of real dealing between the international and domestic community with human rights 14. Developing knowledge related to human rights and how they are reflected and their true civilized role in the lives of peoples
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Linguistic definition of the term human rights, its concept and origin Examples of the views of Arab and foreign scholars on the term human rights Definition of the French Declaration of the Rights of Man and of the Citizen The historical development of the idea of human rights, which we start with human rights in the civilization of Mesopotamian and Clarifying the structure of the social system in the Mesopotamian civilization The Universal Declaration of Human Rights, its history and provisions The phenomenon of administrative corruption and its repercussions on the human rights of the individual and society and ways to combat it and protect the individual and society from it Types of public rights and freedoms, which are divided into basic, intellectual and political rights Statement of basic rights, which include the right to life, dignity, liberty and personal safety, as well as the right to privacy, residence, movement and nationality A statement of intellectual rights and freedoms, which include freedom of belief and religion, freedom of expression, freedom of assembly and assembly, the right not to assemble, freedom of the press, as well as freedom of radio, television, cinema, theater, freedom of education, and the right to form associations and political parties

	A statement of political rights, which includes the right to equality and election The concept of democracy, its definition, and its types
Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Giving theoretical lectures in an interactive way between the professor and the student in a direct way Using the method of direct discussion, asking questions, opening dialogue, setting examples, and interacting with students Giving students space to manage part of the lecture time to improve and expand critical thinking skills at the same time as applying a human right to presenting and defending his opinion without exposure to the opinion of others Assign students to prepare reports and billboards on the subject of human rights

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
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**	2	20% (20)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.				
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	**Meaning of right in the Arabic language and The concept of human rights**
Week 2	**Definition of human rights and the Universal Declaration of Human Rights**
Week 3	**The wisdom of God Almighty granting human rights and the French Declaration of Human and Citizen Rights**
Week 4	**Human rights in the Mesopotamian civilization**
Week 5	**The Social System in Mesopotamia Civilization**
Week 6	**the Universal Declaration of Human Rights**
Week 7	**The phenomenon of administrative corruption and its repercussions and successful solutions to combat administrative corruption and protect society from it**
Week 8	**semester exam**
Week 9	**Fundamental rights and freedoms: the right to life and the right to dignity, liberty and personal**

	safety
Week 10	**The right to privacy, freedom of residence and movement, and the right to nationality**
Week 11	**Intellectual rights and freedoms: freedom of belief and religion, freedom of opinion and expression, the right to assembly and assembly, and the right not to assemble**
Week 12	**Freedom of the press, freedom of radio, television, cinema and theatre, freedom of education and the right to form associations and political parties**
Week 13	**Political rights: the right to equality and election**
Week 14	**Democracy concept and definition**
Week 15	**Types of democracy**
Week 16	**Preparatory week before the final Exam**

Grading Scheme

مخطط الدرجات

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية		
Module Title	**Fundamentals of Computer Organization**	**Module Delivery**
Module Type	**C**	☒Theory ☐Lecture ☒Lab ☐Tutorial ☐Practical ☐Seminar
Module Code	**FUCO110**	
ECTS Credits	**5**	
SWL (hr/sem)	**150**	

Module Level	UGI	**Semester of Delivery**	2
Administering Department	Computer engineering	**College**	College of engineering
Module Leader	Name	**e-mail**	@aliraqia.edu.iq
Module Leader's Acad. Title	Prof.	**Module Leader's Qualification**	Ph.D.
Module Tutor		**e-mail**	
Peer Reviewer Name		**e-mail**	
Scientific Committee Approval Date	01/06/2023	**Version Number**	1.0

Relation with other Modules العلاقة مع المواد 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	- To understand the structure, function and characteristics of computer systems. - To understand the design of the various functional units and components of computers. - To Understand basic machine organization, including processors, Storage, memory, and input/output architecture. - Understand the basics of the operating system and their types, the concept and techniques. - Understand the computer networks fundamentals just like topology and

	components and basic testing command. - To explain the function of each element of a memory hierarchy. - To identify and compare different methods for computer I/O.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	On completion of the course, student will be able to: 1. Understand the structure, function and characteristics of computer systems. 2. Understand the concept, Purpose, and characteristic of CPUs. 3. Learn the concepts of motherboards and its types. 4. Identify the names, Purposes, and characteristics of ROM and RAM 5. Identify the names, purpose, and characteristics of storage device (floppy, hard disk, optical, Blu-ray, flash drive, SSD, USB flash, Secure Digital Cards) 6. Learn the concepts of input and output devices. 7. Understand the fundamentals of operating system 8. Learn the fundamentals laptops and portable device
Indicative Contents المحتويات الإرشادية	Indicative content includes the following: • Introduction of Computer • Development of Computer • Computer Communication • Introduction to Hardware, Software and operating system • Categories of computers • Identify the names, Purpose, and characteristic of CPUs • CPU types and techniques • Select CPU • Intel and AMD CPU development • CPU connection and interface • Identify the names, Purpose, and characteristic of motherboards • Motherboard components and form factors • BIOS, CMOS • Select a motherboard • Upgrade and configure a motherboard • Upgrade and configure BIOS • Identify the names, Purposes, and characteristics of ROM and RAM • RAM Basics and Types of RAM • Cache Memory • Selecting Ram • Upgrade and Configure of memory devices • Identify the names, purpose, and characteristics of storage device (floppy, hard disk, optical, Blu-ray, flash drive, SSD, USB flash, Secure Digital Cards) • Internal cables of storage device • Upgrade and configure storage device. • Fundamentals of operating system • History of OS • Development of OS • Operating Systems part2:

	• Fundamentals of laptops and portable devices • Describe Laptops and other portable devices • Identify common uses of PDAs and Smartphone • Compare and contrast desktop and laptop components.
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 reports 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
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	61	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	6
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**150**		

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

Formative assessment	**Quizzes**	2	15% (15)	5 and 10	LO #2, #3 and #5,#6
	Assignments	2	15% (15)	2 and 12	LO #1 and #7, #8
	Report	1	10% (10)	13	LO #5, #6, #7, and #8
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #3
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Fundamental Concepts of computer.
Week 2	Introduction to CPU
Week 3	BIOS and CMOS
Week 4	Introduction Motherboards and its types
Week 5	Memory Organization: Memory Hierarchy, Main memory, secondary memory
Week 6	Introduction to Storage Drives
Week 7	**Mid-term Exam**
Week 8	Introduction to Input and Output Device
Week 9	Types of connection cables
Week 10	Fundamental of operating system

Week 11	Types of OS
Week 12	Fundamentals of laptops and portable device
Week 13	Identify common uses of PDAs and Smartphone
Week 14	Troubleshooting and diagnostics of computer problems - Software troubleshooting
Week 15	Troubleshooting and diagnostics of computer problems - hardware troubleshooting
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Introduction to CPU
Week 2	BIOS and CMOS
Week 3	Introduction Motherboards and its types
Week 4	Memory Organization: Memory Hierarchy, Main memory, secondary memory
Week 5	Introduction to Storage Drives
Week 6	Introduction to Input and Output Device
Week 7	Types of connection cables

Learning and Teaching Resources مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	1. M. Moris Mano, "Computer Systems Architecture", 4th Edition, Pearson/PHI, ISBN:10:0131755633 2. Carl Hamacher, Zvonko Vranesic, Safwat Zaky, "Computer Organization", 5th Edition, McGraw Hill.	Yes
Recommended Texts	1. A.Anandkumar, "Fundamentals of digital circuits", 4th edition, PHI. 2. William Stallings, "Computer Organization and Architecture", 6th Edition, Pearson/PHI, ISBN:10:0-13-609704-9	yes
Websites	https://www.coursera.org/learn/ computer organization fundamentals	

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Fundamentals of Electrical Circuits II**			**Module Delivery**	
Module Type	**C**			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**FUEC111**				
ECTS Credits	**7**				
SWL (hr/sem)	**175**				
Module Level		UGI	**Semester of Delivery**		2
Administering Department		Computer Engineering	**College**	College of Engineering	
Module Leader	Ammar A. Al-Hamadani		**e-mail**	ammar.aladin@aliraqia.edu.iq	
Module Leader's Acad. Title		Lecturer	**Module Leader's Qualification**		Ph.D.

Module Tutor	-	**e-mail**	-
Peer Reviewer Name	DR. Rash T. Mohammed	**e-mail**	E-mail
Scientific Committee Approval Date	01/06/2023	**Version Number**	1.0

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Fundamentals of Electrical Circuits I	**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	11. Understand the concept of impedance and apply it to analyze AC circuits, including calculating voltage and current phasors, and determining impedance values for capacitors and inductors. 12. Apply network theorems such as Thevenin's theorem, Norton's theorem, and superposition theorem to simplify complex AC circuits and calculate unknown quantities. 13. Calculate and analyze power in AC circuits, including real power, reactive power, apparent power, and power factor. Apply power factor correction techniques and calculate power losses and efficiency. 14. Analyze and solve series and parallel resonance circuits, including determining resonant frequency, bandwidth, quality factor, and understanding the frequency response characteristics.		
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	19. AC Circuit Components: Students should learn about AC Generation and circuit components such as capacitors, inductors. They should understand their behavior in AC circuits, including the calculation of reactance, impedance, and power dissipation 20. AC Circuit Analysis: Students should develop a thorough understanding of alternating current (AC) circuits and their analysis. They should be able to apply concepts such as impedance, phasors, and complex numbers to analyze AC circuits, including calculating voltage and current phasors, power factor, and reactive power. 21. Circuit Analysis Techniques: Building upon the skills learned in Electric Circuit I, students should further develop their circuit analysis techniques. They should be able to analyze complex AC circuits using nodal analysis, mesh analysis, and various network theorems such as superposition, Thevenin, and Norton. 22. Power Analysis: Students should learn about power calculations in AC circuits, including real power, reactive power, and apparent power. They should understand power factor correction techniques and be able to calculate power losses and efficiency in AC circuits. 23. Resonance and Frequency Response: Students should understand the concept of resonance in AC circuits and be able to analyze series and parallel resonance circuits. They should be able to calculate resonant frequency, bandwidth, and quality factor,		

	and understand the frequency response of different circuits. 24. Laboratory Skills: Depending on the course, students may have the opportunity to apply their theoretical knowledge through hands-on laboratory experiments. They should further develop skills in using measurement instruments, constructing and analyzing AC circuits, and verifying theoretical concepts through practical experiments.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. 1. Introduction to AC Circuits: [15Hours] - Review of basic concepts: voltage, current, and resistance - Characteristics of AC voltage and current waveforms - RMS, peak, and average values of AC quantities - Phase relationship between voltage and current in AC circuits 2. Impedance and Phasor Analysis: [15Hours] - Definition and calculation of impedance - Representation of AC quantities using phasor diagrams - Complex numbers and their application in AC circuit analysis - Series and parallel impedance combinations in AC circuits 3. AC Circuit Analysis Techniques: [15Hours] - Application of Kirchhoff's laws (KCL and KVL) in AC circuits - Nodal analysis and mesh analysis in AC circuits 4. Power Analysis in AC Circuits: [15Hours] - Real power, reactive power, and apparent power in AC circuits - Power factor and power factor correction techniques - Calculation of power losses and efficiency in AC circuits 5. Resonance and Frequency Response: [15Hours] - Series and parallel resonance in AC circuits - Calculation of resonant frequency, bandwidth, and quality factor - Frequency response of AC circuits and its analysis 6. Review and Assessment: [6Hours] - Review of key concepts and techniques - Practice problems and exercises - Summative assessments (quizzes, tests, or exams)

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The primary approach for implementing this module will involve promoting active student engagement in exercises, as well as enhancing their ability to think critically. This goal will be accomplished through a combination of classroom sessions,

	interactive tutorials, and the incorporation of intriguing sampling-based experiments.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	79	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	96	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	6
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**175**		

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

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered

Week 1	Introduction - Sinusoidal Alternating Current, AC Generation, Average Value
Week 2	RMS value, Response of Basic R, L, and C Elements to a Sinusoidal Voltage or Current
Week 3	Frequency response of the basic elements, Complex Number, Phasors
Week 4	Series Configurations in AC Circuits
Week 5	Parallel Configuration in AC Circuits
Week 6	Mesh & Nodal in AC
Week 7	Mid-course Exam
Week 8	Network Theorems in AC circuits: Superposition ,
Week 9	Thevenin's and Norton's theorems
Week 10	Power in AC circuits: Average power and power factor
Week 11	Reactive power , apparent power, and power triangle
Week 12	Power factor correction
Week 13	Resonance: series resonance, The Quality Factor (Q), resonance bandwidth
Week 14	Parallel resonance, parallel resonance Frequency
Week 15	Parallel resonant bandwidth, examples
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Capacitive and Inductive Reactance
Week 2	Lab 2: Resistor & Inductor in Series
Week 3	Lab 3: Resistor & Capacitor in Series
Week 4	Lab 4: Resistor, Inductor & Capacitor in parallel

Week 5	Lab 5: Series-parallel Resistor, Inductor & Capacitor circuits
Week 6	Lab 6: AC superposition
Week 7	Lab 7: Series Resonance circuits

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Introductory circuit Analysis; by Robert L. Boylestad	Yes
Recommended Texts	Sadiku, Matthew NO, and Charles K. Alexander. Fundamentals of electric circuits. New York: McGraw-Hill, 2009.	No
Websites	https://www.coursera.org/browse/physical-science-and-engineering/electrical-engineering	

Grading Scheme

مخطط الدرجات

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Electronic Physics**			**Module Delivery**	
Module Type	C			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	PHYS101				
ECTS Credits	7				
SWL (hr/sem)	175				
Module Level		UGI	**Semester of Delivery**		2
Administering Department		Computer engineering	**College**	College of engineering	
Module Leader	Sarah waleed		**e-mail**	Sara.waleed@aliraqia.edu.iq	

Module Leader's Acad. Title	Assist.lecturer	**Module Leader's Qualification**	master
Module Tutor		**e-mail**	
Peer Reviewer Name		**e-mail**	
Scientific Committee Approval Date	1/6/2023	**Version Number**	1

Relation with other Modules العلاقة مع المواد 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 Aims أهداف المادة الدراسية	The objective of this course is to: 1- enable the student to have a solid background in electronic physics 2- enable the student to have a solid background in the analysis of the characteristics and circuits of diode and zener diode. 3- the student will learn the specifications and applications of the diode and zener diode.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1- Will be able to tell theory of semiconductors: Explains an atom and basic terms related with an atom. 2- Recognizes conductor, semiconductor, and insulator and explains characteristics of these materials. 3- Recognizes p and n type materials and explains characteristics of these materials. 4- Will be able to recognize types of diode, explain basic terms related with diodes and tell the operating principle of diodes

	5- Will be able to analyze different diode circuits. 6- Recognizes half-wave, full-wave and bridge rectifier circuits and explains the operation of these circuits. 7- Recognizes clipping and clamping circuits, explains the operation of these circuits and analyses these circuits. 8- Analyzes and measures parameters in basic diode circuits.
Indicative Contents المحتويات الإرشادية	1- Will be able to tell theory of semiconductors. - Explains an atom and basic terms related with an atom. - Recognizes conductor, semiconductor, and insulator and explains characteristics of these materials. - Recognizes p and n type materials and explains characteristics of these materials. 2- Will be able to recognize types of diode, explain basic terms related with diodes and tell the operating principle of diodes. - Recognizes types and the construction of diodes. - Explains ideal diode, equivalent circuit and dc characteristic of a diode. - Tells the operating principles of diodes and zener diodes. 3- Will be able to analyze different diode circuits. - Recognizes half-wave, full-wave and bridge rectifier circuits and explains the operation of these circuits. - Recognizes clipping and clamping circuits, explains the operation of these circuits and analyses these circuits. - Analyzes and measures parameters in basic diode circuits.
Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The main strategy that will be adopted to increase the student interest to understand this module is by drawing sketches that can assist the imagination of the student about the certain subject as well as to make the students participate through fast questions and quizzes.

Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	94	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	81	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	175		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	10% (10)	4,9,10	LO #1, 2,3, 4 and 5
	Assignments	2	10% (10)	10,14	LO # 7 and 8
	Lab	1	10%(10)	1-14	All
	Report	1	10%(10)	1-14	All
Summative assessment	**Midterm Exam**	2 hr	10% (10)	6	LO # 1-6
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري	
	Material Covered
Week 1	**Introduction:** Atomic structure & electronic state (orbit, energy and valence) of electron.
Week 2	semiconductors, conductors and isolators, effects of temperature on depletion layer and P-N junction.
Week 3	**Characteristics of Diode:** forward and reverse bias and its relations.
Week 4	the diode operation and its conditions.
Week 5	zener region in terms of voltage and power dissipations, DC & AC resistance.
Week 6	Mid-Term Exam
Week 7	**Specifications of diode:** diode capacitance, reverse recovery time
Week 8	diode measuring and testing
Week 9	**Diode applications:** load line analysis,
Week 10	series diode configuration
Week 11	parallel & series configurations
Week 12	half – wave rectifier and peak reverse voltage
Week 13	full wave rectifier and related circuits (biased, diode clippers and clampers)
Week 14	zener diode and its applications
Week 15	**Review**
Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	diode measuring and testing
Week 2	**Diode applications:** load line analysis,
Week 3	series diode configuration
Week 4	parallel & series configurations

Week 5	half – wave rectifier and peak reverse voltage
Week 6	full wave rectifier and related circuits (biased, diode clippers and clampers)
Week 7	zener diode and its applications

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	"Electronic Devices & Circuit Theory", By R. Boylestad, 11th ed.	yes
Recommended Texts	" Electronic Devices", By Floyd. 9th ed.	yes
Websites		

Grading Scheme

مخطط الدرجات

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Mathematics II**			**Module Delivery**	
Module Type	**B**			☒**Theory** ☐**Lecture** ☐**Lab** ☒**Tutorial** ☐**Practical** ☐**Seminar**	
Module Code	MATH108				
ECTS Credits	**4**				
SWL (hr/sem)	**100**				
Module Level		UGI	**Semester of Delivery**		2
Administering Department		Computer engineering	**College**	College of engineering	
Module Leader			**e-mail**		
Module Leader's Acad. Title		Prof.	**Module Leader's Qualification**		Ph.D.
Module Tutor			**e-mail**		

Peer Reviewer Name		**e-mail**	
Scientific Committee Approval Date	01/06/2023	**Version Number**	1.0

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module		**Semester**	1
Co-requisites module		**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	The objective of this course is to develop an understanding of the basic ideas of mathematics encountered in engineering. Focus will be on the methods for understanding complex numbers and fundamentals of the derivative and integration of inverse trigonometric functions. Students will learn some special integration techniques (Integration by part, partial fraction, and substitution) that are useful for the understanding of different engineering subjects. Another objective is to teach the Engineering student about integration applications such as Area under curve and volume. Finally, the student will learn the concept of polar coordinates and its application.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	On completion of the course, student will be able to: 9. Understand the fundamentals of complex numbers and their properties. 10. Understand the differentiation and integration of inverse trigonometric functions. 11. Understand the differentiation and integration of hyperbolic trigonometric functions. 12. Express the concepts of methods of integration and their different types which can be used in a wide variety of disciplines in engineering. 13. Identify integration applications such as Area under curve and area between two curves. 14. Apply different integration rules to determine the volume of solid using Disk and Washer methods. 15. Understand polar coordinates and their properties.

	16. Apply the concept of polar coordinates to solve integration applications.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following: • Fundamental Concepts of complex numbers. • Complex numbers properties- power and roots • Inverse Trigonometric function and their differentiation • Inverse Trigonometric function Integration • Hyperbolic Trigonometric functions and their differentiation • Hyperbolic Trigonometric functions integration • Methods of integration – Integration by Part • Methods of integration - Partial fraction method • Methods of integration – Integration using substation • Integration applications – Area under curve • Integration applications – Area between two curves • Integration applications – Volume of solid using Disk method • Integration applications – Volume of solid using Washer methods • Polar coordinates and its properties • Area under curve in Polar coordinates • Area between two curves in Polar coordinates • Length of curve in Polar coordinates.
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 reports involving some sampling activities that are interesting to the students.
Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا	

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	3
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	37	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**100**		

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Fundamental Concepts of complex numbers.
Week 2	Complex numbers properties- power and roots
Week 3	Introduction to Inverse Trigonometric function and their differentiation
Week 4	Inverse Trigonometric function Integration
Week 5	Introduction to Hyperbolic Trigonometric functions and their differentiation
Week 6	Hyperbolic Trigonometric functions integration
Week 7	**Mid-term Exam**
Week 8	Methods of integration – Integration by Part and integration using Partial fraction method
Week 9	Methods of integration – Integration using substation
Week 10	Integration applications – Area under curve and Area between two curves

Week 11	Integration applications – Area between two curves
Week 12	Integration applications – Volume of solid using Disk and Washer methods
Week 13	Introduction to polar coordinates and its properties
Week 14	Integral applications using polar coordinates – Area and length of curve
Week 15	**Preparatory week before the final Exam**

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	**Available in the Library?**
Required Texts	Thomas' Calculus, Single Variable, Joel Hass, Christopher Heil, Maurice Weir, Pearson, 2017.	Yes
Recommended Texts	Thomas' Calculus Early Transcendentals, George Thomas, Maurice D. Weir, Joel Hass, Pearson, 2014.	yes
Websites	https://www.coursera.org/learn/ calculus I	

Grading Scheme

مخطط الدرجات

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Workshop**			**Module Delivery**	
Module Type	**B**			☐**Theory** ☐**Lecture** ☒**Lab** ☐**Tutorial** ☐ **Practical** ☐**Seminar**	
Module Code	**WORK110**				
ECTS Credits	**2**				
SWL (hr/sem)	**50**				
Module Level		UGI	**Semester of Delivery**		2
Administering Department		Type Dept. Code	**College**	Type College Code	
Module Leader	1- Mazin Nabih Ali		**e-mail**	Mazinnabih@gmail.com	
Module Leader's Acad. Title		Assistant Lecture	**Module Leader's Qualification**		master
Module Tutor	Nil		**e-mail**	Nil	

Peer Reviewer Name	Dr. Omar hassan hameed	**e-mail**	Eng.ohh.2014@gmail.com
Scientific Committee Approval Date	01/06/2023	**Version Number**	1.0

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	A. Introduce students the basics of electrical and electronic devices, tools and circuits. B. Introduce students the basics of joining; welding and soldering processes. C. Introduce students to the basics of the electrical device and circuits with improving the skills that deal with methods of measurement and standardization. D. Introduce students to the basics of transformers, types and design. E. Introduce students to the basics of capacitors include the charging and dis charging circuits and the methods of test. F. Introduce students to the industrial electrical and skill of using tools and design of electrical circuits and control panels. G. Introduce students to the basics of the welding arts and installation of metal and the types of welding machines and skills to deal with the kinds of welding and measurement methods and standardization. H. Developing student skills in welding and soldering operations. I. Making students dealing with the problem and damage circuits to repair and fix it.
Module Learning Outcomes	1- Acquire knowledge and understanding 2- Preparation of practical engineers in the field of electrical, network and computer engineering who are characterizing by a high level of knowledge and technological innovation, and work in with internationally approved

مخرجات التعلم للمادة الدراسية	discreet standards of quality assurance and academic accreditation of corresponding engineering programs with a commitment to ethics of engineering career. 3- learn and understand risk factors surrounding it enabled. 4- learn and understand some of the theoretical principles. 5- To be able subject-specific skills 6- To be able discussion and dialogue. 7- Brain storming by encouraging students to produce a large number of ideas about some issue or problem raised during the job. 8- Self-learning by teaching the student by his own according to his special abilities and mental and cognitive levels responding to his preferences and interests to achieve development and integration of his capabilities. 9- Cooperative learning by team working.
Indicative Contents المحتويات الإرشادية	**Indicative content includes the following.** Occupational Safety and importance ;(1 week) Tools and Devices; (1 week) Test methods; (1 week) Design and supply; (2 week) Welding and soldering processes; (2 weeks) Transformers and rectification circuits; (4 weeks) Capacitors and charging and discharging circuits; (3 weeks) Mini projects ; (1 weeks)

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	No two days are the same and what might have worked once in a classroom, might not work again. Switching between teaching strategies to suit the needs of the learners is a great way to ensure that the learners are meaningfully engaged and actively participating in the classroom. 1- Visualization is very simply put, the ability to create mental images based on the words we hear or the text that we read. Some of the methods of implementing this strategy in the classroom include: - Use of audio visual aids like photos, videos, audio clips, songs etc - Diagrams, charts and mind maps - Modeling as you teach for the visual learners who might need to see a visual representation to understand as opposed to hearing the concept being explained. 2- Virtual learning has led educators to understand the importance of a key

	part of the learning process – cooperation. 3- Cooperative learning is an instructional strategy in which a small group of students collaboratively work on a given task. The task can be as simple as solving a quiz or as complex as writing a story.

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
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	**Quizzes**	2	10% (10)	5 and 10	LO #1, #3 and #5, #6

assessment	**Assignments**	2	10% (10)	2 and 12	LO #4 and #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #2 and #8
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #8
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction to the basics occupational Safety and importance and understanding the rules of Electrical Safety Principles.
Week 2	Understanding the principles of resistors and ohms law and design circuits.
Week 3	Understanding the principles of capacitors and the methods of test.
Week 4	Design and supplying charging and dis-charging circuits with required data.
Week 5	Understanding and learning all about AVO meter and how it's used.
Week 6	Understanding the principles of transformer and the methods of test.
Week 7	Design and supplying the rectification circuits.
Week 8	Introduction to; Semiconductors, diode, power diode, zener diode, LED diode; learning about every means
Week 9	Testing all diode types and designing circuits

Week 10	practical work
Week 11	practical work
Week 12	practical work
Week 13	practical work of welding process
Week 14	Work on small mini projects such as design a mini power supply
Week 15	Preparing a report about all subjects including a practical work

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: occupational Safety in workshop
Week 2	Lab 2: how to use tools and devices
Week 3	Lab 3: how to use AVO meter
Week 4	Lab 4: checking the resistors and coding
Week 5	Lab 5: design a parallel and series circuits
Week 6	Lab 6: checking the transformers
Week 7	Lab 7: designing the rectification circuits part 1
Week 8	Lab 8: designing the rectification circuits part 2
Week 9	Lab 9: welding processes: practical exercises
Week 10	Lab 10: soldering processes: practical exercises
Week 11	Lab 11: testing diode and zener diode

Week 12	Lab 12: testing LED diode
Week 13	Lab 13: supplying the mini power supply made by students as a small project

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Technical workshop (Materials & Devices) authored by Mazin N. Ali, 2016. Electrical & Electronics Engineering, Amrita School of Engineering, 2014 Electronics Workshop Lab Manual, Polytechnic, Bilaspur, 2010	yes
Recommended Texts	Engineering Workshop Data. A Book of Reference containing Data, Formulae, Tables, hints and Recipes relating to all Phases of Engineering Workshop Practice. Hardcover – 1 Jan. 1947.	No
Websites	https://www.slideshare.net/JosephKonnully/workshop-practise	

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Engineering Chemistry**			**Module Delivery**	
Module Type	**Basic**			☒**Theory** ☐**Lecture** ☐ **Lab** ☐**Tutorial** ☐**Practical** ☐**Seminar**	
Module Code	**CHIM105**				
ECTS Credits	**3**				
SWL (hr/sem)	**75**				
Module Level	1		**Semester of Delivery**	2	
Administering Department	CE / Computer Engineering		**College**	Engineering Collage / Al-Iraqia University	
Module Leader	Assit. Lec. Zakyea		**e-mail**		
Module Leader's Acad. Title	Asst. Lect		**Module Leader's Qualification**	Ms.C	
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	01/09/2024		**Version Number**	1.0	

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. To understand the concepts of atomic structure, solid grounding in the key principles of chemistry, including atomic structure, chemical bonding, thermodynamics, kinetics, and chemical equilibria. 2. To illustrate how these chemical principles are applied in various engineering disciplines, such as materials science, environmental engineering, chemical engineering, and nanotechnology. 3. To develop students' ability to apply chemical principles to solve practical engineering problems, including the analysis and design of processes and materials. 4. To enhance critical thinking and analytical skills by challenging students to think logically about complex chemical systems and processes. 5. To provide hands-on experience with chemical experiments and techniques, fostering skills in observation, data collection, analysis, and interpretation.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	On completion of this module students are expected to: 1. Gain thorough knowledge of the basic principles of chemistry, including atomic structure, chemical bonding, thermodynamics, and chemical kinetics. 2. Understand the chemical processes and reactions that are relevant to various engineering fields, such as chemical production, environmental protection, and energy conversion.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A - chemistry Theory</u> Basic concepts of chemistry, Atomic Structure and Chemical Bonding, Types of chemical reactions . [SSWL=6 hrs] Basic principles of thermodynamics, Applications in chemical engineering [8 hrs] Revision problem classes [SSWL=2 hrs] <u>Part B - Electrochemistry</u>

	Fundamentals Equilibrium and Le Chatelier's Principle, Acids, Bases, and pH. [SSWL=6 hrs] Materials Chemistry, Polymers and Ceramics and Buffer solutions and their importance, pH scale and pH calculations. [SSWL=8 hrs] Total hrs = 33 = SSWL - (Exam hrs) = 33 - 3 = 30 hr (Time table hrs x 15 weeks)

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Studying engineering chemistry can be challenging yet rewarding. Here are some effective strategies to help you succeed in your engineering chemistry course: 1. Understand the Fundamentals: - Ensure you have a strong grasp of basic chemistry concepts such as stoichiometry, chemical bonding, thermodynamics, and kinetics. Reviewing general chemistry can be beneficial. 2. Utilize Visual Aids: - Use diagrams, charts, and molecular models to visualize complex concepts. This can help you better understand structures, reactions, and processes. 3. Practice Problem-Solving: - Engineering chemistry involves a lot of problem-solving. Work through problems systematically and practice different types of chemical calculations, such as molarity, concentration, and reaction yield. 4. Study Regularly:

	- Create a study schedule that allows you to review material consistently rather than cramming before exams. This approach aids retention and understanding. 5. Group Study: - Study with classmates to discuss concepts and work through problems together. Teaching others can reinforce your own understanding. 6. Utilize Online Resources: - Take advantage of online lectures, tutorials, and educational videos. Websites like Khan Academy, Coursera, and YouTube can provide additional explanations and insights. 7. Read the Textbook Thoroughly: - Focus on the textbook during your study sessions. Highlight important points, and summarize chapters to reinforce your understanding. 8. Connect Chemistry to Engineering Applications: - Understand how chemistry principles apply to engineering problems. This will help you appreciate the material's relevance and motivate your studies. 9. Ask Questions: - Don’t hesitate to seek help from professors or peers when you have questions or struggle with a topic. Engaging in class discussions can also clarify concepts. 10. Work on Lab Skills: - If your course includes laboratory work, take it seriously. Practice your lab skills and understand the theoretical principles behind the experiments. 11. Practice Past Exams: - Familiarize yourself with the format and types of questions that may be asked on exams. Practicing past exam papers can be particularly useful. 12. Stay Organized:

	- Keep track of assignments, deadlines, and exam dates. An organized approach to your studies will reduce stress and help you manage your time more effectively. 13. Balance Your Studies: - Maintain a healthy balance between studying and taking breaks to avoid burnout. Engage in physical activity and maintain a healthy diet to support cognitive function. 14. Seek Feedback: - After assignments and exams, review feedback carefully to understand what you did well and where you can improve.

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
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	42	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**75**		

Module Evaluation

تقييم المادة الدراسية

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

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

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	introduction to Engineering Chemistry - Course overview and objectives - Basic concepts of chemistry - Importance of chemistry in engineering
Week 2	Atomic Structure and Chemical Bonding
Week 3	insulators and semiconductors, crystal structure Covalent bonding
Week 4	Stoichiometry and Chemical Reactions - Balancing chemical equations - Mole concept and molar mass - Types of chemical reactions
Week 5	Thermodynamics in Chemistry - Basic principles of thermodynamics - Enthalpy, entropy, and free energy - Applications in chemical engineering
Week 6	Chemical Kinetics

	- Reaction rates and rate laws - Factors affecting reaction rates - Reaction mechanisms and catalysis
Week 7	Mid-term Exam
Week 8	Equilibrium and Le Chatelier's Principle
Week 9	Electrochemistry
Week 10	Acids, Bases, and pH - Definitions and properties of acids and bases - pH scale and pH calculations - Buffer solutions and their importance
Week 11	Corrosion and its Prevention
Week 12	Materials Chemistry
Week 13	Polymers and Ceramics
Week 14	Polymers and Ceramics
Week 15	Preparatory week before the final Exam

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Textbook of Engineering Chemistry (English, Paperback, Dara S.) Publisher: S Chand & Co Ltd, Genre: Science ISBN: 9788121903592, 9788121903592 Pages: 784	Yes
Recommended Texts	Chemistry Essentials For Dummies 1st Edition, Kindle Edition ISBN-13978-1119591146 Publication date April 16, 2019	No
Websites	https://www.coursera.org/browse/physical-science-and-engineering/chemistry	

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	Arabic Language I			**Module Delivery**	
Module Type	B			☒ **Theory** ☐ **Lecture** ☐ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	ARLA101				
ECTS Credits	**2**				
SWL (hr/sem)	**50**				
Module Level		UGI	**Semester of Delivery**		2
Administering Department		Type Dept. Code	**College**	Type College Code	
Module Leader	Dr.Anwar Qutaiba Yahya		**e-mail**	E-mail : 83dr.anwar@gmail.com	
Module Leader's Acad. Title		Lecturer Dr.	**Module Leader's Qualification**		Ph.D.
Module Tutor	Name (if available)		**e-mail**	E-mail : anwar.q.yahya@aliraqia.edu.iq	
Peer Reviewer Name		Ass.lec. Asmaa falih jassm	**e-mail**	E-mail : asmaafalih2@gmail.com	
Scientific Committee Approval Date		01/06/2023	**Version Number**		1.0

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

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

Module Aims أهداف المادة الدراسية	1- تعد اللغة العربية وسيلة للتواصل فهي تحمل رسالة بين المتكلمين ،ولكي تكون هذه الرسالة واضحة ومفهومة يجب ان يكون ترتيب مفرداتها حسب التركيب القواعدي لتلك اللغة . ومن هنا برزت وبشكل جلي ضرورة تدريس القواعد أو النحو في كل اللغات 2- تعرف الطالب على مهارات الكتابية والتعبير والوقوف على مواطن الخطأ لتصويب النطق الصحيح 3- إتقان مهارة الكتابة الصحيحة بمعرفة قواعد الإملاء ولاسيما مواضع الاخطاء الشائعة 4- الحفاظ على اللغة العربية كونها لغة القرآن الكريم 5- التعريف بالمبادئ الاساسية للغة العربية من خلال تنمية المهارات الكتابية والتعبير والمحادثة
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1-اكتساب الطالب معرفة المفاهيم الاساسية للغة العربية وتطبيقها من خلال الأمثلة 2-معرفة كتابة الكلام الصوتي بشكل مضبوط من حيث الاصوات الصحيحة أو المعتلة 3-دراسة الطالب موضوع العدد ومعرفة كيفية كتابة بالشكل الصحيح 4-يمكن الطالب ايجاد الحلول المناسبة الصحيحة للمشاكل الحقيقية المعقدة تنمية الحس الفكري من خلال أعطاء أمثلة للغة العربية وتطبيقها 5- تكليف الطلبة بكتابة البحوث والتقارير لاختبار مدى استيعابهم للقواعد الأساسية للغة العربية وتطبيقها في حياتهم اليومية
Indicative Contents المحتويات الإرشادية	1- ارشاد الطلبة إلى تكوين خزين معرفي من أنظمة اللغة وأحكامها وقواعدها الاساسية 2-ارشاد الطلبة إلى اكتساب مهارات اللغة الاساسية والتدرب عليها من خلال التطبيق العملي كتابة ونطقا 3-ارشاد الطلبة الى الاطلاع على النصوص من الشعر والنثر بمختلف العصور ومحاكاتها في كتابة النصوص التي تعبر عن حياتهم اليومية ومشاعرهم وعواطفهم الذاتية 4-ارشاد الطلبة إلى ما يؤدي الى تعزيز مهاراتهم والانتقال به الى مستوى التفكير العالي 5-ارشاد الطلبة من خلال تعبير عن افكارهم من خلال تكوين مجموعات والتنافس بينهم

Learning and Teaching Strategies استراتيجيات التعلم والتعليم

Strategies	1-افضل طريقة في تعليم الطلبة النحو العربي لاهميته في تعلم هذه اللغة واهميته في الترجمة، هي اتباع مبدأ التعاون في التعلم . على ان يتعاون الطلاب في تهيأة مادة الدرس وتقديمها بعد تقسيمهم الى مجاميع تهتم كل مجموعة بجانب مادة الدرس . 2-القاء المحاضرات النظرية بشكل افتراضي مباشرة على السبورة 3-عمل بحوث وتوزيعها على مجاميع طلابية لمعرفة فهمهم للمادة او ادراكهم لها 4-ان الطريقة الاستقرائية باستنباط القاعدة من الامثلة تعد ناجحة في تدريس النحو 5-اهم طرائق التعلم والتعليم هي استراتيجية مهارات التفكير ضمن مجموعة 6- استراتيجية التفكير الناقد في التعلم ، ايضا من اهم طرائقه العصف الذهني

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
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	17	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	50		

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	مقدمة عن علامات الترقيم والتعرف على أنواعها
Week 2	كتابة أنواع الهمزة (همزة القطعوالوصل ، همزة المتوسطة ، همزة المتطرفة)
Week 3	مكملات ضوابط الكتابة (التنوين ،والشدة ، المدة) والتعرف على أنواع الأخطاء اللغوية
Week 4	موضوع العدد وطريقة كتابته
Week 5	الخط العربي وأنواعه
Week 6	المشتقات (اسم الفاعل ، اسم المفعول ، اسما الزمان والمكان ، اسم الآلة)
Week 7	الفعل وأنواعه
Week 8	الفاعل والمفعول به
Week 9	أنواع المفاعيل امتحان مد

Week 10	المبتدأ والخبر
Week 11	المثنى والجمع وأنواعه
Week 12	الفرق بين التاء والهاء
Week 13	التذكير والتأنيث وأنواعها
Week 14	المعلقات
Week 15	مراجعة للطلاب قبل المتحان النهائي
Week 16	الاختبارات النهائية

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	الوجيز في اللغة العربية ، محي هلال سرحان ، شرح قطر الندى وبل الصدى،لابن هشام الانصاري ، الاجرومية ابي عبدالله محمد الصنهاجي الاملاء والترقيم في الكتابة العربية ،عبد العليم ابراهيم ، اللغة العربية لغير المختصين ،مصطفى جطل وصلاح كزارة	Yes
Recommended Texts	جامع الدروس العربية ، مصطفى الغيلاني ،معاني النحو ، فاضل السامرائي دراسة في قواعد الاملاء د.عبد الجواد الطيب ، موسوعة الشامل في الكتابة والاملاء ،موسى حسن الهديب	No
Websites	1. https://shamela.ws/ 2. https://waqfeya.net/	

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Chemistry**			**Module Delivery**	
Module Type	**B**			☒**Theory** ☐**Lecture** ☐ **Lab** ☐**Tutorial** ☐**Practical** ☐**Seminar**	
Module Code	**CHIM105**				
ECTS Credits	**3**				
SWL (hr/sem)	**75**				
Module Level	1		**Semester of Delivery**	2	
Administering Department	CE / Computer Engineering		**College**	Engineering Collage / Al-Iraqia University	
Module Leader	Ammar A. AL-HAMMADANI		**e-mail**	Ammar.aladin@aliraqia.edu.iq	
Module Leader's Acad. Title	Asst. Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	01/09/2024		**Version Number**	1.0	

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	6. To understand the concepts of atomic structure, solid grounding in the key principles of chemistry, including atomic structure, chemical bonding, thermodynamics, kinetics, and chemical equilibria. 7. To illustrate how these chemical principles are applied in various engineering disciplines, such as materials science, environmental engineering, chemical engineering, and nanotechnology. 8. To develop students' ability to apply chemical principles to solve practical engineering problems, including the analysis and design of processes and materials. 9. To enhance critical thinking and analytical skills by challenging students to think logically about complex chemical systems and processes. 10. To provide hands-on experience with chemical experiments and techniques, fostering skills in observation, data collection, analysis, and interpretation.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	On completion of this module students are expected to: 3. Gain thorough knowledge of the basic principles of chemistry, including atomic structure, chemical bonding, thermodynamics, and chemical kinetics. 4. Understand the chemical processes and reactions that are relevant to various engineering fields, such as chemical production, environmental protection, and energy conversion.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A - chemistry Theory</u> Basic concepts of chemistry, Atomic Structure and Chemical Bonding, Types of chemical reactions . [SSWL=6 hrs] Basic principles of thermodynamics, Applications in chemical engineering [8 hrs] Revision problem classes [SSWL=2 hrs] <u>Part B - Electrochemistry</u> Fundamentals Equilibrium and Le Chatelier’s Principle, Acids, Bases, and pH. [SSWL=6 hrs] Materials Chemistry, Polymers and Ceramics and Buffer solutions and their importance, pH scale and pH calculations. [SSWL=8 hrs]

	Total hrs = 33 = SSWL - (Exam hrs) = 33 - 3 = 30 hr (Time table hrs x 15 weeks)

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Studying engineering chemistry can be challenging yet rewarding. Here are some effective strategies to help you succeed in your engineering chemistry course: 1. Understand the Fundamentals: - Ensure you have a strong grasp of basic chemistry concepts such as stoichiometry, chemical bonding, thermodynamics, and kinetics. Reviewing general chemistry can be beneficial. 2. Utilize Visual Aids: - Use diagrams, charts, and molecular models to visualize complex concepts. This can help you better understand structures, reactions, and processes. 3. Practice Problem-Solving: - Engineering chemistry involves a lot of problem-solving. Work through problems systematically and practice different types of chemical calculations, such as molarity, concentration, and reaction yield. 4. Study Regularly: - Create a study schedule that allows you to review material consistently rather than cramming before exams. This approach aids retention and understanding. 5. Group Study: - Study with classmates to discuss concepts and work through problems together. Teaching others can reinforce your own understanding.

	6. Utilize Online Resources: - Take advantage of online lectures, tutorials, and educational videos. Websites like Khan Academy, Coursera, and YouTube can provide additional explanations and insights. 7. Read the Textbook Thoroughly: - Focus on the textbook during your study sessions. Highlight important points, and summarize chapters to reinforce your understanding. 8. Connect Chemistry to Engineering Applications: - Understand how chemistry principles apply to engineering problems. This will help you appreciate the material's relevance and motivate your studies. 9. Ask Questions: - Don’t hesitate to seek help from professors or peers when you have questions or struggle with a topic. Engaging in class discussions can also clarify concepts. 10. Work on Lab Skills: - If your course includes laboratory work, take it seriously. Practice your lab skills and understand the theoretical principles behind the experiments. 11. Practice Past Exams: - Familiarize yourself with the format and types of questions that may be asked on exams. Practicing past exam papers can be particularly useful. 12. Stay Organized: - Keep track of assignments, deadlines, and exam dates. An organized approach to your studies will reduce stress and help you manage your time more effectively. 13. Balance Your Studies: - Maintain a healthy balance between studying and taking breaks to avoid burnout. Engage in physical activity and maintain a healthy diet to support cognitive function.

	14. Seek Feedback: - After assignments and exams, review feedback carefully to understand what you did well and where you can improve.

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
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	42	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**75**		

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

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	introduction to Engineering Chemistry - Course overview and objectives - Basic concepts of chemistry - Importance of chemistry in engineering
Week 2	Atomic Structure and Chemical Bonding
Week 3	insulators and semiconductors, crystal structure Covalent bonding
Week 4	Stoichiometry and Chemical Reactions - Balancing chemical equations - Mole concept and molar mass - Types of chemical reactions
Week 5	Thermodynamics in Chemistry - Basic principles of thermodynamics - Enthalpy, entropy, and free energy - Applications in chemical engineering
Week 6	Chemical Kinetics - Reaction rates and rate laws - Factors affecting reaction rates - Reaction mechanisms and catalysis
Week 7	Mid-term Exam
Week 8	Equilibrium and Le Chatelier's Principle
Week 9	Electrochemistry

Week 10	Acids, Bases, and pH - Definitions and properties of acids and bases - pH scale and pH calculations - Buffer solutions and their importance
Week 11	Corrosion and its Prevention
Week 12	Materials Chemistry
Week 13	Polymers and Ceramics
Week 14	Polymers and Ceramics
Week 15	Preparatory week before the final Exam

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Textbook of Engineering Chemistry (English, Paperback, Dara S.) Publisher: S Chand & Co Ltd, Genre: Science ISBN: 9788121903592, 9788121903592 Pages: 784	Yes
Recommended Texts	Chemistry Essentials For Dummies 1st Edition, Kindle Edition ISBN-13978-1119591146 Publication date April 16, 2019	No
Websites	https://www.coursera.org/browse/physical-science-and-engineering/chemistry	

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.

وصف مقررات مواد المرحلة الثانية

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Communication Fundamentals I**			**Module Delivery**	
Module Type	**C**			**☒Theory**	
Module Code	COFU202			**☐Lecture**	
ECTS Credits	**5**			**☒Lab**	
SWL (hr/sem)	**125**			**☒Tutorial**	
				☐Practical	
				☐Seminar	
Module Level	UGII2		**Semester of Delivery**	3	
Administering Department	Computer engineering		**College**	College of engineering	
Module Leader	Mushtaq Ahmed Ali		**e-mail**	Dr.mushtaq@aliraqia.edu.iq	
Module Leader's Acad. Title	Asst. Prof.		**Module Leader's Qualification**	Ph.D.	
Module Tutor			**e-mail**		
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date	01/06/2023		**Version Number**	1.0	

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	5. Understanding Communication Systems: The subject aims to provide a fundamental understanding of analog communication systems. Students learn about the key components, concepts, and principals involved in the transmission and reception of signals in communication systems. 6. Signal Representation and Analysis: The subject focuses on the study of different signal representations, including continuous-time signals. Students learn to analyze signals using techniques such as Fourier transform. 7. Analog Communication Systems: The subject covers the principles and techniques used in analog communication systems. Students learn about modulation techniques, such as amplitude modulation (AM), frequency modulation (FM), and phase modulation (PM). They also study demodulation techniques and the impact of noise on analog signals.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Understanding of Communication Systems: Gain a comprehensive understanding of the basic concepts and principles underlying analog communication systems. 2. Knowledge of Signal Representation: Acquire knowledge of various methods for representing analog signals, including time-domain and frequency-domain representations. 3. Familiarity with Analog Modulation Techniques: Gain an understanding of different analog modulation techniques such as amplitude modulation (AM), frequency modulation (FM), and phase modulation (PM). Understand the advantages, disadvantages, and applications of each technique. 4. Understanding of Noise and Channel Capacity: Learn about the effects of noise on communication systems and methods for mitigating its impact. Gain an

	understanding of channel capacity, bandwidth, and signal-to-noise ratio (SNR) calculations.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Analog Communication Fundamentals: 1. Introduction to Analog Communication 2. Basic Concepts of Signals and Systems 3. Amplitude Modulation (AM) a. Amplitude Modulation Process b. Frequency Spectrum of AM Signal c. Modulation Index and Power Relations d. Demodulation Techniques for AM 4. Frequency Modulation (FM) a. Frequency Modulation Process b. Frequency Spectrum of FM Signal c. Deviation Ratio and Power Relations d. Demodulation Techniques for FM 5. Phase Modulation (PM) a. Phase Modulation Process b. Phase Spectrum of PM Signal c. Phase Modulation Index and Power Relations d. Demodulation Techniques for PM 6. Noise and Distortion in Analog Communication a. Types of Noise and Their Characteristics b. Signal-to-Noise Ratio (SNR) c. Noise Figure and Noise Temperature

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Analog Communication Strategies: 1. Signal Conditioning: Analog signals are susceptible to noise and interference. Signal conditioning techniques such as filtering, amplification, and modulation can be used to enhance the quality and integrity of the analog signal before transmission. 2. Bandwidth Optimization: Analog signals require a certain amount of bandwidth for transmission. By employing techniques such as frequency division multiplexing (FDM) or time division multiplexing (TDM), multiple analog signals can be transmitted simultaneously, optimizing the available bandwidth. 3. Noise Reduction: Analog signals are prone to noise, which can degrade the signal quality. Strategies like shielding, grounding, and balanced transmission lines can be used to minimize noise and interference during transmission.

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

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction - Introduction to Communication Systems
Week 2	Elements of a Communication System and Mode of operations
Week 3	Fundamental Limitations and Modulation and Coding
Week 4	Review of Signal Classifications and Transmission of Signals through Linear Systems
Week 5	Linear modulation strategies that constitute the amplitude modulation family: Amplitude Modulation (AM)
Week 6	Double Sideband-Suppressed Carrier (DSB-SC): modulation and demodulation techniques
Week 7	Single Sideband (SSB): modulation and demodulation techniques
Week 8	super heterodyne receiver
Week 9	Mid-term Exam (from week 1 to week 8)

Week 10	Angle Modulation concepts and the Relationship between PM and FM Waves:
Week 11	Narrow-Band Frequency Modulation
Week 12	Wide-Band Frequency Modulation
Week 13	Transmission Bandwidth of FM Waves and Generation of FM Waves
Week 14	Demodulation of FM Signals
Week 15	Commercial FM transmitter
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Introduction and Overview of the lab equipment
Week 2	Lab 2: Representation of Signals
Week 3	Lab 3: Amplitude Modulation
Week 4	Lab 4: Demodulation of an Amplitude Modulated Signal
Week 5	Lab 5: Generation of Frequency Modulation Signal
Week 6	Lab 6: Demodulation of Frequency Modulation Signal
Week 7	Lab 7: Review for all labs

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	F.G. Stremler, Introduction to Communication Systems, 2nded, 1982 A. B. Carlson, Communication Systems, McGraw Hill, 4thed, 2002	Yes
Recommended Texts	S.S. Haykin, Communication Systems, Wiley, 2001.B Behrouz A. Forouzan, Data communications and networking, 4thed, 2007	yes
Websites	https://www.coursera.org/learn/ analog communication fundamentals	

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Digital Systems Design I**			**Module Delivery**	
Module Type	**C**			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**DISD203**				
ECTS Credits	**5**				
SWL (hr/sem)	**125**				
Module Level		UGII	**Semester of Delivery**		3
Administering Department		Computer Engineering	**College**	College of Engineering	
Module Leader	Rasha Thabit Mohammed		**e-mail**	rasha.thabit@aliraqia.edu.iq	
Module Leader's Acad. Title		Lecturer	**Module Leader's Qualification**		Ph.D.
Module Tutor	-		**e-mail**	-	
Peer Reviewer Name		Ammar A. Al Hamadani	**e-mail**	ammar.aladin@aliraqia.edu.iq	
Scientific Committee Approval Date		01/06/2023	**Version Number**	1.0	

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	15. Understand the basics of distinguishing sequential logic from combinational logic. 16. Learn the basics of storage elements such as SR Latch and D Latch. 17. Learn the basics of Flip-Flops such as Edge-Triggered D Flip-Flop and other types of Flip-Flops. 18. Understand the behavior of a clocked sequential circuit which is determined from the inputs, the outputs, and the state of its flip-flops. 19. To distinguish between two models of sequential circuits: the Mealy model and the Moore model. 20. Learn the HDL basics which describes the functionality differently, by language constructs that represent the operations of registers in a machine. 21. Learn the state reduction and assignment design procedure 22. Understand the principles of different types of registers and counters, their working, and their storage characteristics.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Understanding of basic of sequential logic: Students should gain a solid understanding of sequential logic circuit and their difference from combinational logic circuits that have been studied in the previous level. 2. Analysis of sequential logic circuits: Students should be able to analyze and write the truth tables, the output equations, and final results of sequential logic circuits. 3. Logic circuit components and their behavior: Students should learn about various circuit components such as Flip-Flops and registers. 4. Circuit analysis techniques: Students should develop skills in circuit analysis techniques, including using circuit diagrams, identifying circuit elements, and applying systematic problem-solving approaches. They should be able to analyze simple and complex logic circuits to determine output. 5. Laboratory skills: Depending on the course, students may have the opportunity to apply their theoretical knowledge through hands-on laboratory experiments. They should develop skills in using measurement instruments, constructing circuits, and verifying theoretical concepts through practical experiments.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. 11. Introduction to Synchronous Sequential Logic [5Hours] 12. Storage Elements: Latches [5Hours] 13. Storage Elements: Flip-Flops [5Hours] 14. Analysis of Clocked Sequential Circuits [5Hours] 15. Synthesizable HDL Models of Sequential Circuits [5Hours] 16. State Reduction and Assignment [5Hours] 17. Design Procedure [5Hours] 18. Mid-course Exam [2Hours for theoretical exam and 1 hour for practical exam] 19. Registers [5Hours]

	20. Shift Registers [5Hours] 21. Universal Shift Register [5Hours] 22. Ripple Counters [5Hours] 23. Synchronous Counters [5Hours] 24. Other Counters [5Hours] 25. HDL for Registers and Counters [5Hours] 26. Review and Assessment: [5Hours]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The primary approach for implementing this module will involve promoting active student engagement in exercises, as well as enhancing their ability to think critically. This goal will be accomplished through a combination of classroom sessions, interactive tutorials, and the incorporation of intriguing sampling-based experiments.

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

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction to Synchronous Sequential Logic
Week 2	Storage Elements: Latches
Week 3	Storage Elements: Flip-Flops
Week 4	Analysis of Clocked Sequential Circuits
Week 5	Synthesizable HDL Models of Sequential Circuits
Week 6	State Reduction and Assignment
Week 7	Design Procedure
Week 8	Mid-course Exam
Week 9	Registers

Week 10	Shift Registers
Week 11	Universal Shift Register
Week 12	Ripple Counters
Week 13	Synchronous Counters
Week 14	Other Counters
Week 15	HDL for Registers and Counters
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Introduction to VHDL and ModelSim
Week 2	Lab 2: Design of AND, OR, and NOT logic gates using VHDL in ModelSim
Week 3	Lab 3: Design of NAND, NOR, XOR, and XNOR logic gates using VHDL in ModelSim
Week 4	Lab 4: Design of flop-flops using VHDL in ModelSim
Week 5	Lab 5: Design of shift register using VHDL in ModelSim
Week 6	Lab 6: Design of counter using VHDL in ModelSim
Week 7	Lab 7: Design of ripple counter using VHDL in ModelSim

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Digital Design: with an introduction to Verilog HDL by M. Morris Mano and Mechael D. Ciletti, 5th Edition, Pearson Education, 2013.	Yes
Recommended Texts	Thomas L. Floyd, Digital Fundamentals, 11th Edition, Pearson Prentice Hall, 2015.	Yes
Websites	https://onlinecourses.nptel.ac.in/noc21_ee39/preview	

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information

معلومات المادة الدراسية

Module Title	**Engineering Biology**	**Module Delivery**	
Module Type	**Basic**	☒**Theory** ☐**Lecture** ☐ **Lab** ☐**Tutorial** ☐**Practical** ☐**Seminar**	
Module Code	**BIOL202**		
ECTS Credits	**3**		
SWL (hr/sem)	**75**		
Module Level	2	**Semester of Delivery**	1
Administering Department	CE / Computer Engineering	**College**	Engineering Collage / Al-Iraqia University
Module Leader	Dr. Noor Fouad	**e-mail**	Noor.Fouad@aliraqia.edu.iq
Module Leader's Acad. Title	Lect.	**Module Leader's Qualification**	Ph.D.
Module Tutor	Name (if available)	**e-mail**	E-mail
Peer Reviewer Name	Name	**e-mail**	E-mail
Scientific Committee Approval Date	01/09/2024	**Version Number**	1.0

Relation with other Modules

العلاقة مع المواد الدراسية الأخرى

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

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Objectives أهداف المادة الدراسية	11. Introduction to Basics of Biology which includes cell, the unit of life, Different types of cells and classification of living organisms. 12. To understand Biological concepts from an engineering perspective 13. To understand the inter-connection between biology and future technologies 14. To motivate technology application for biological and life science challenges 15. Understanding what are biomolecules present in a cell, their structure function and their role in a living organism. Application of certain bio molecules in Industry. 16. Brief introduction to human physiology, which is essential for bioengineering field. 17. Understanding the hereditary units, that is genes and genetic materials (DNA and RNA) present in living organisms and how they replicate and pass and preserve vital information in living organisms. 18. Understand How biology can be applied in our daily life using different technology, for production of medicines to transgenic plants and animals to designing new biotechnological products
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	On completion of this module students are expected to: 1. Understand the biological concepts from an engineering perspective 2. Understand the concepts of biological sensing and its challenges 3. Understand development of artificial systems mimicking human action 4. Integrate biological principles for developing next generation technologies
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A - Biology Theory</u> Basic concepts of Biology, Importance of biology in engineering, Introduction to Basic Biology; Cell: What is a Cell, Cell theory, Cell shapes, structure of a Cell, Cell cycle chromosomes . [SSWL=6 hrs] HUMAN ORGAN SYSTEMS AND BIO DESIGNS: Brain as a CPU system (architecture, CNS and Peripheral Nervous System, signal transmission, EEG, Robotic arms for prosthetics. Engineering solutions for Parkinson's disease). Eye as a Camera system (architecture of rod and cone cells, optical corrections, cataract, lens materials, bionic eye).Heart as a pump system (architecture, electrical signalling - ECG monitoring and heart related issues, reasons

	for blockages of blood vessels, design of stents, pace makers, defibrillators). [8 hrs] Revision problem classes [SSWL=2 hrs] <u>Part B - Biology in Next Generation Technology Development</u> Role of Biology in Next Generation Technology Development – Cell Structure – Cell Potential – Action Potential – ECG and other common signals. [SSWL=6 hrs] Sensing Techniques: – Understanding of Sense organs working – Sensing mechanisms – Sensor Development issues – Discussion Topics: Digital Camera – Eye Comparison, electronic nose, electronic tongue, electronic skin. [SSWL=8 hrs] Total hrs = 33 = SSWL - (Exam hrs) = 33 - 3 = 30 hr (Time table hrs x 15 weeks)

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Studying an engineering biology course can be an exciting endeavor that combines principles of biology with engineering concepts. Here are some effective strategies to help you succeed in your engineering biology studies: 1. Master the Basics: - Ensure a solid understanding of fundamental biology concepts, including cell biology, genetics, microbiology, and biochemistry. This foundation will help you grasp more complex topics. 2. Integrate Engineering Concepts: - Learn how engineering principles apply to biological systems. Understand how

	tools and methodologies used in engineering (e.g., systems modeling, process optimization) intersect with biological processes. 3. Utilize Visual Learning: - Use diagrams, flowcharts, and visual aids to understand processes such as metabolic pathways, genetic engineering techniques, and ecological interactions. Visualization can enhance comprehension. 4. Conduct Experiments: - If your course includes laboratory work, take it seriously. Hands-on experience with experiments can reinforce theoretical concepts and provide practical insights into biological engineering. 5. Engage in Active Learning: - Instead of passively reading or listening to lectures, engage actively by summarizing information, asking questions, and discussing concepts with peers. 6. Study Regularly: - Set a consistent study schedule. Breaking down the material into manageable chunks and reviewing regularly can enhance retention and understanding. 7. Form Study Groups: - Collaborate with classmates to discuss challenging topics, solve problems together, and share resources. Teaching each other can deepen your understanding. 8. Utilize Online Resources: - Supplement your learning with online lectures, tutorials, and educational platforms (like Khan Academy, Coursera, or edX) that cover relevant biological concepts and engineering applications. 9. Connect Theory to Real-World Applications: - Explore case studies and current advancements in biotechnology, biomedical engineering, and other related fields. Relating your studies to real-world applications can increase your interest and motivation.

	10. Practice Problem-Solving: - Work on problems that require you to apply biological and engineering principles. This could include case studies or hypothetical scenarios related to biological systems. 11. Stay Organized: - Keep track of lecture notes, assignments, and deadlines. Use a planner to manage your time effectively and prevent overwhelming yourself with work. 12. Ask Questions: - Be proactive in seeking help from your instructors or peers if you find certain topics challenging. Engaging in class discussions and office hours can provide additional insights. 13. Review Past Exams and Quizzes: - Familiarize yourself with the format of questions and common topics. This practice can help prepare you for upcoming assessments. 14. Balance Your Study Environment: - Create a comfortable and distraction-free study environment. Tools like flashcards or study apps can also help keep your study sessions focused and engaging. 15. Take Care of Yourself: - Maintain a healthy lifestyle by getting enough sleep, eating well, and managing stress. A healthy body and mind are crucial for effective studying.

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

Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	42	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**75**		

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	introduction to Engineering Biology - Course overview and objectives - Basic concepts of biology - Importance of biology in engineering

Week 2	Introduction to Basic Biology; Cell: What is a Cell, Cell theory, Cell shapes, structure of a Cell, Cell cycle chromosomes
Week 3	Introduction to Basic Biology; The Plant Cell and animal Cell, protoplasm, prokaryotic and eukaryotic Cell, Plant Tissue and Animal Tissue. Brief introduction to five kingdoms of classification.
Week 4	HUMAN ORGAN SYSTEMS AND BIO DESIGNS : Brain as a CPU system (architecture, CNS and Peripheral Nervous System, signal transmission, EEG, Robotic arms for prosthetics. Engineering solutions for Parkinson's disease).Eye as a Camera system (architecture of rod and cone cells, optical corrections, cataract, lens materials, bionic eye).Heart as a pump system (architecture, electrical signalling - ECG monitoring and heart related issues, reasons for blockages of blood vessels, design of stents, pace makers, defibrillators).- Balancing chemical equations - Mole concept and molar mass - Types of chemical reactions
Week 5	Role of Biology in Next Generation Technology Development – Cell Structure – Cell Potential – Action Potential – ECG and other common signals
Week 6	Potassium channels – Neuron function – Central Nervous Systems – Discussion Topics: Evolution of Artificial Neural Networks, Machine Learning techniques.
Week 7	Mid-term Exam
Week 8	Sensing Techniques: – Understanding of Sense organs working – Sensing mechanisms – Sensor Development issues – Discussion Topics: Digital Camera – Eye Comparison, electronic nose, electronic tongue, electronic skin.
Week 9	Physiological Assist Device: Artificial Organ Development: Kidney, Liver, Pancreas, heart valves – Design Challenges and Technological Developments
Week 10	NATURE-BIOINSPIRED MATERIALS AND MECHANISMS : Echolocation (ultrasonography, sonars), Photosynthesis (photovoltaic cells, bionic leaf). Bird flying (GPS and aircrafts), Lotus leaf effect (Super hydrophobic and self-cleaning surfaces), Plant burrs (Velcro), Shark skin (Friction reducing swim suits), Kingfisher beak (Bullet train). Human Blood substitutes - hemoglobin-based oxygen carriers (HBOCs) and perflourocarbons (PFCs).
Week 11	TRENDS IN BIOENGINEERING:

	Bioprinting techniques and materials, 3D printing of ear, bone and skin. 3D printed foods. Electrical tongue and electrical nose in food science, DNA origami and Biocomputing,
Week 12	Bioimaging and Artificial Intelligence for disease diagnosis. Self-healing Bioconcrete (based on bacillus spores, calcium lactate nutrients and biomineralization processes)
Week 13	Bioremediation and Biomining via microbial surface adsorption (removal of heavy metals like Lead, Cadmium, Mercury, Arsenic).
Week 14	Bioremediation and Biomining via microbial surface adsorption (removal of heavy metals like Lead, Cadmium, Mercury, Arsenic).
Week 15	Preparatory week before the final Exam

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	1. N. A. Campbell, J. B. Reece, L. Urry, M. L. Cain and S. A. Wasserman, “Biology: A global approach”, Pearson Education Ltd, 2018. 2. T Johnson, Biology for Engineers, CRC press, 2011 Molecular Biology and Biotechnology 2nd ed. J.M. Walker and E.B. Gingold. Panima Publications. PP 434. 3. Leslie Cromwell, Biomedical Instrumentation, Prentice Hall 2011.	Yes
Recommended Texts	1. AlbertsEt.Al. The molecular biology of the cell, 6/e, Garland Science, 2014 2. Thyagarajan S., Selvamurugan N., Rajesh M.P., Nazeer R.A., Thilagaraj W., Barathi S., and Jaganthan M.K., Biology for Engineers, Tata McGraw-Hill, New Delhi, 2012.	No
Websites		

Grading Scheme

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية		
Module Title	**Electronics I**	**Module Delivery**
Module Type	c	☒ **Theory** ☐ **Lecture** ☒ **Lab** ☒ **Tutorial** ☐ **Practical**
Module Code	ELEC204	
ECTS Credits	5	

SWL (hr/sem)	125			☐ **Seminar**	
Module Level	UGII		**Semester of Delivery**	3	
Administering Department	Computer engineering		**College**	College of engineering	
Module Leader	Sarah waleed		**e-mail**	Sara.waleed@aliraqia.edu.iq	
Module Leader's Acad. Title	Assist.lecturer		**Module Leader's Qualification**	master	
Module Tutor			**e-mail**		
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date	1/6/2023		**Version Number**	1	

Relation with other Modules

العلاقة مع المواد الدراسية الأخرى

Prerequisite module	**Electronic Physics**	**Semester**	Two
Co-requisites module	-	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	This course aims to: 1- enable the student to have a solid background in physical structure of BJT 2- enable the student to have a solid background in physical structure of FET transistors 3- enable the student to analyze the circuits of the BJT and FET transistors.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	9- the student will be able to tell the structure and the operation of transistors 10- the student will recognize the different types of transistors. 11- The student will recognizes the different configurations of circuits with transistors and the characteristics of these circuits and compares these circuits. 12- Analyzes transistor dc biasing. 13- Explains the operation of transistor dc biasing circuits.

	14- Will be able to explain different circuits with transistors.
Indicative Contents المحتويات الإرشادية	- Will be able to tell the structure and the operation of transistors and recognize the different types of transistors. - Recognizes the different configurations of circuits with transistors and the characteristics of these circuits and compares these circuits. - Analyzes transistor dc biasing. - Explains the operation of transistor dc biasing circuits. - Will be able to explain different circuits with transistors.
Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The main strategy that will be adopted to increase the student interest to understand this module is by drawing sketches that can assist the imagination of the student about the certain subject as well as to make the students participate through fast questions and quizzes.

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
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	46	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
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**	3	30% (30)	3,5,12	LO #2,3 and 5
	Assignments	2	10% (10)	6,13	LO # 3 and 6
Summative assessment	**Midterm Exam**	2 hr	10% (10)	7	LO # 1-6
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	**Introduction to transistor structure**
Week 2	transistor structure and its operations
Week 3	Analysis of currents.
Week 4	**Configuration of transistor:** bias configuration of a common- base
Week 5	bias configuration of a common- emitter
Week 6	bias configuration of a common- collector

Week 7	Mid-Term Exam
Week 8	**Transistor amplifications, The operation of transistor and its limitations.**
Week 9	**DC biasing circuit and its characteristics.**
Week 10	**Voltage divider, emitter stabilize and voltage feedback,**
Week 11	**Common- base and emitter follower configurations,**
Week 12	**Saturation level of transistor,**
Week 13	**Transistor switching configuration.**
Week 14	**FET construction, and biasing circuits**
Week 15	**review**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: dc analysis of common emitter transistor
Week 2	Lab 2: dc analysis of voltage divider transistor
Week 3	Lab 3: dc analysis of emitter follower transistor
Week 4	Lab 4: dc analysis of common base transistor
Week 5	Saturation level of transistor,
Week 6	Transistor switching configuration.
Week 7	FET construction, and biasing circuits

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	"Electronic Devices & Circuit Theory", By R. Boylestad, 11th ed.	yes
Recommended Texts	" Electronic Devices", By Floyd. 9th ed.	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

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MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية		
Module Title	**Engineering Mathematics**	**Module Delivery**
Module Type	**B**	**☒ Theory**
Module Code	ENMA201	

ECTS Credits	4			☐ **Lecture** ☐ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
SWL (hr/sem)	**100**				
Module Level		UGII	**Semester of Delivery**		3
Administering Department		Computer engineering	**College**	College of engineering	
Module Leader	Name		**e-mail**	E-mail	
Module Leader's Acad. Title			**Module Leader's Qualification**		
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name		Name	**e-mail**	E-mail	
Scientific Committee Approval Date		01/06/2023	**Version Number**	1.0	

Relation with other Modules

العلاقة مع المواد الدراسية الأخرى

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

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Objectives أهداف المادة الدراسية	9. Partial derivatives are useful in analyzing surfaces for maximum and minimum points and give rise to partial differential equations in next stage. 10. Learn basics of vectors for many engineering quantities, such as forces, displacements, velocities, and accelerations, will need to be represented as vectors for analysis. 11. The major applications of multiple integrals in engineering is the determination of properties of plane, and whenever an area or a volume under a 2D curve (a surface) needs to be measured 12. Build a mathematical toolkit: The course introduces various mathematical tools and techniques necessary for engineering analysis. This includes

	• impart the knowledge of sequences and summation of series • Represent functions as Taylor and Maclaurin series. 13. Understand their engineering application
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	13. To evaluate partial derivatives and can implement to estimate maxima and minima of multivariable function 14. Understand the formula for the chain rule 15. Use the chain rule to find derivatives of composite functions 16. Apply the chain rule to a composition of three or more functions 17. View vectors geometrically 18. Find magnitude and direction 19. Perform vector addition and scalar multiplication 20. Find the component form of a vector 21. Find the unit vector in the direction of v 22. Perform operations with vectors in terms of i and j 23. Find the dot product of two vectors 24. Finding the equations of a line and of a plane 25. Evaluate a double integral 26. Setting up triple integrals for a region 27. Understanding the definition of a sequence 28. define what it means for a series to converge or diverge 29. Classifying a sequence as finite or infinite 30. Classifying a sequence as geometric, or neither 31. Learn to represent functions as Taylor and Maclaurin series.
Indicative Contents المحتويات الإرشادية	• PARTIAL DERIVATIVES Functions of Two or More Variables The Chain Rule Directional Derivatives and Gradients Tangent Planes and Normal Vectors Local Maxima and Minima of Functions of Two Variables • VECTORS Dot Product Cross Product Planes in Space • VECTOR-VALUED FUNCTIONS Introduction to Vector-Valued Functions • MULTIPLE INTEGRALS Double Integrals Double Integrals in Polar Coordinates Triple Integrals • Sequences Infinite Series Geometric Series Convergence Tests The Comparison, Ratio, and Root Tests

	Maclaurin and Taylor Series

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1- Giving theoretical lectures 2- Solve many problems 3- Using illustration methods such as drawing 4- Direct discussion by asking questions and opening dialogue and interaction with students. 5- Giving video lecture if need

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
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	52	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**100**		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	2	20% (20)	Continuous	All
	Assignments	2	10% (10)	Continuous	All

	Report	1	10% (10)	11,12	LO #13 , LO #14
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Fourier series - introduction.
Week 2	Half range Fourier series
Week 3	Partial derivatives
Week 4	Chain rule
Week 5	Maxima, minima, and saddle points
Week 6	Vectors: Introduction
Week 7	Vectors: properties, dot product
Week 8	Vectors: cross product
Week 9	(Mid-term Exam)
Week 10	Equations of lines and planes in space
Week 11	Vector function
Week 12	Multiple Integrals: Double Integrals
Week 13	Double Integrals using polar coordinate
Week 14	Triple integrals
Week 15	Taylor and Maclaurin series
Week 16	**Preparatory week before the final Exam**

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Calculus By Thomas	Yes
Recommended Texts	CALCULUS EARLY TRANSCENDENTALS, By HOWARD ANTON, IRL BIVENS , STEPHEN DAVIS	yes
Websites		

Grading Scheme مخطط الدرجات				
Group	**Grade**	التقدير	**Marks %**	**Definition**
Success Group (50 - 100)	**A -** Excellent	امتياز	90 - 100	Outstanding Performance
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	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
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Fail Group (0 – 49)	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
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MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Object Oriented Programming**			**Module Delivery**	
Module Type	**C**			**☒Theory**	
Module Code	**OBOP201**			**☐Lecture**	
ECTS Credits	**6**			**☒Lab**	
SWL (hr/sem)	**150**			**☐Tutorial** **☐Practical** **☐Seminar**	
Module Level	UGII	**Semester of Delivery**	3		
Administering Department	Computer engineering	**College**	Collage of engineering		
Module Leader		**e-mail**			
Module Leader's Acad. Title	Professor	**Module Leader's Qualification**	Ph.D.		
Module Tutor		**e-mail**			
Peer Reviewer Name		**e-mail**			
Scientific Committee Approval Date	01/06/2023	**Version Number**	1.0		

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. Understand Object-Oriented Programming concepts and techniques. 2. Understand the principles of software engineering in Object-Oriented languages. 3. Understand the fundamentals of programming in C++. 4. Ability to design and implement Object-Oriented software to solve moderately complex problems. 5. Ability to write good program documentation. 6. Become familiar with the relationship between classes and objects. 7. Understand and learn how to create functions with different types.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Know the basic characteristics of C++ programming. 2. Analyze the problem and solve it with object oriented programming. 3. Understand the role that functions play in an object-oriented program. 4. Enable the student to know the principle of Classes and the benefits of the objects. 5. Enabling the student to know the principle of inheritance and a simple degree of polymorphism. 6. Enabling the student to acquire overload skills 7. Enable the student to acquire the skills of writing a private function and Public Function writing. 8. Analyze a problem and determine what problem elements to represent as functions or objects. 9. Apply object-oriented Programming fundamental techniques to develop small scale applications. 10. Trace, analyze, validate and deduce the output of given program code of different complexities.
Indicative Contents المحتويات الإرشادية	1. Giving the theoretical lectures. 2. Attendance education in laboratory lessons and implementation of the prescribed programs. 3. Using illustrations through lectures. 4. Direct discussion by asking questions and opening the door for dialogue and interaction with students. 5. Analysis of a computer program to solve real-world problems based on object-oriented principles. 6. Develop and enhance the student's thinking skill and move him to a higher level of thinking. 7. Creating confidence in the student to design and implement object-oriented programming to solve practical applied problems. 8. Raise the spirit of cooperation and work within a team. 9. Bring out creative ideas among students by raising the spirit of competition. 10. Group thinking skill strategy. 11. Critical thinking strategy in learning.

	12. Brainstorming. 13. Application software. 14. Student feedback.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1. Work effectively as an individual and as a member of a team 2. Demonstrate efficient IT capabilities 3. Developing capabilities and skills to gain the required level of experience and knowledge for the purposes of employment and personal development. 4. Enable the student to link the course outcomes with practical life. 5. Organized and effective planning for program design.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	79	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	71	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**150**		

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

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

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction C++ basics, Loops, and decisions.
Week 2	Arrays, Multidimensional Arrays, C-Strings, and The Standard C++ String.
Week 3	Structures, and The Address-of Operator &, and Pointer Variables.
Week 4	Functions, Overloaded Functions, and Inline Functions.
Week 5	C++/Object-Oriented concepts: objects, classes, reusability, inheritance, information hiding, encapsulation, and polymorphism.
Week 6	Objects, Classes, Member Functions
Week 7	Private Member Functions, Constructors and Destructors.
Week 8	Mid-course Exam
Week 9	Friend Function, Friend Class, and Array of Object.
Week 10	Operator Overloading, and this Pointer.
Week 11	Inheritance, Public and Private Inheritance, Class Hierarchies, and Multiple Inheritances.
Week 12	Encapsulation: Private, Public, and Protected Members Variables and Functions.
Week 13	C++ legacy code topics, C++ Templates, and standard template library.
Week 14	Fundamental Algorithms in C++ for searching and sorting such as find, sort, search, count, and merge.

Week 15	Member Functions with Vector: push_back(), size(), swap(), empty(), back(), and pop_back().
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: C++ Programming Basics and Loops and Decisions
Week 2	Lab 2: Arrays, Strings, Structures, and Pointers.
Week 3	Lab 3: Functions.
Week 4	Lab 4: Objects and Classes.
Week 5	Lab 5: Friend Function and Operator Overloading.
Week 6	Lab 6: Inheritance.
Week 7	Lab 7: C++ Templates and Algorithms.

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Robert Lafore, Object-Oriented Programming in C++ , Sams Publishing, 4th Edition,	No
Recommended Texts	- Stanley B. Lippman, Josee Lajoie, Barbara E. Moo, C++ Primer, Addison-Wesley Professional; 5th edition, ISBN-10: 0321714113, or ISBN-13: 978-0321714114 - Bjarne Stroustrup, The C++ Programming Language, Addison-Wesley Professional, 4th Edition, ISBN-10: 0321563840 ISBN-13: 978-0321563842	No
Websites	https://www.w3schools.com/cpp/default.asp https://www.geeksforgeeks.org/object-oriented-programming-in-cpp/	

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Communication Fundamentals II**			**Module Delivery**	
Module Type	**Core**			**☒Theory**	
Module Code	COFU212			**☐Lecture**	
ECTS Credits	**4**			**☒Lab**	
SWL (hr/sem)	**100**			**☒Tutorial** **☐Practical** **☐Seminar**	
Module Level	UGII		**Semester of Delivery**	4	
Administering Department	Computer engineering		**College**	College of engineering	
Module Leader	Mushtaq Ahmed Ali		**e-mail**	Dr.mushtaq@aliraqia.edu.iq	
Module Leader's Acad. Title	Asst. Prof.		**Module Leader's Qualification**	Ph.D.	
Module Tutor			**e-mail**		
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date	01/06/2023		**Version Number**	1.0	

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	8. Digital Communication Systems: The subject introduces students to digital communication systems and the underlying concepts. They learn about various modulation schemes used in digital communications, such as phase shift keying (PSK), frequency shift keying (FSK), and frequency shift keying (FSK). The subject also covers, digital modulation, and demodulation. 9. Channel Capacity and Information Theory: Students gain an understanding of channel capacity, which measures the maximum data rate that can be reliably transmitted over a communication channel. 10. Performance Analysis: The subject includes the analysis of communication system performance metrics, such as signal-to-noise ratio (SNR), bit error rate (BER), and bandwidth efficiency. Students learn how to evaluate and compare the performance of different modulation schemes and communication system configurations.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Understanding of Communication Systems: Gain a comprehensive understanding of the basic concepts and principles underlying digital communication systems. 2. Understanding of Digital Modulation Techniques: Learn about digital modulation techniques such as amplitude shift keying (ASK), frequency shift keying (FSK), phase shift keying (PSK), and quadrature amplitude modulation (QAM). Understand the principles behind these techniques and their applications in digital communication systems. 3. Familiarity with Digital Demodulation: Acquire knowledge of demodulation techniques used to extract the original information from modulated analog and digital signals. Understand the principles behind envelope detection, frequency demodulation, and phase demodulation. 4. Understanding of Noise and Channel Capacity: Learn about the effects of noise on communication systems and methods for mitigating its impact. Gain an understanding of channel capacity, bandwidth, and signal-to-noise ratio (SNR) calculations.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Digital Communication Fundamentals:

	1. Pulse Modulation Techniques a. Introduction to Pulse Modulation b. Pulse Amplitude Modulation (PAM) c. Pulse Width Modulation (PWM) d. Pulse Position Modulation (PPM) 2. Noise and Distortion in Analog Communication a. Types of Noise and Their Characteristics b. Signal-to-Noise Ratio (SNR) c. Noise Figure and Noise Temperature 3.Introduction to Digital Communication a. Binary Code Representations b. Pulse Code Modulation (PCM) c. Differential Pulse Code Modulation (DPCM) d. Delta Modulation (DM) 4. Baseband and Bandpass Digital Transmission a. Line Coding Techniques b. Baseband Transmission Schemes c. Bandpass Transmission Schemes d. Nyquist Criteria for Zero Intersymbol Interference 5.Digital Modulation Techniques a. Amplitude Shift Keying (ASK) b. Frequency Shift Keying (FSK) c. Phase Shift Keying (PSK) d. Quadrature Amplitude Modulation (QAM) 6.Error Detection and Correction a. Types of Errors in Digital Communication b. Parity Check and Hamming Code c. Cyclic Redundancy Check (CRC) d. Forward Error Correction (FEC) Techniques 7. Multiplexing Techniques

	a. Frequency Division Multiplexing (FDM) b. Time Division Multiplexing (TDM) c. Code Division Multiplexing (CDM) d. Orthogonal Frequency Division Multiplexing (OFDM) 8. Digital Communication Channels and Noise a. Channel Capacity and Shannon's Theorem b. Bit Error Rate (BER) and Signal-to-Noise Ratio (SNR) c. Error Performance Analysis in Digital Communication Systems d. Equalization Techniques for Mitigating Inter-symbol Interference (ISI)
Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Digital Communication Strategies: 4. Signal Conditioning: Digital signals are susceptible to noise and interference. Signal conditioning techniques such as filtering, amplification, and modulation can be used to enhance the quality and integrity of the analog signal before transmission. 5. Bandwidth Optimization: Digital signals require a certain amount of bandwidth for transmission. By employing techniques such as frequency division multiplexing (FDM) or time division multiplexing (TDM), multiple analog signals can be transmitted simultaneously, optimizing the available bandwidth. 6. Noise Reduction: Digital signals are prone to noise, which can degrade the signal quality. Strategies like shielding, grounding, and balanced transmission lines can be used to minimize noise and interference during transmission.

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

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	79	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	21	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**100**		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	20% (20)	1, 2 and 3	LO #1, #2 and #3
	Assignments	2	10% (10)	2, 3 and 4	LO #2, #3 and #4
	Projects / Lab.	1	10% (10)	Continuous	All
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #3
	Final Exam	3hr	50% (50)	15	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction – Digital communication system
Week 2	Transition from Analog to Digital Communications
Week 3	The sampling Theorem, Pulse-amplitude modulation, The quantization process
Week 4	Pulse-code modulation, Delta modulation
Week 5	Multiplexing Systems
Week 6	Frequency-Division Multiplexing, Time-Division Multiplexing
Week 7	Mid-term Exam
Week 8	Digital Band-pass Modulation Techniques
Week 9	Binary Amplitude-Shift Keying
Week 10	Coherent Detection of ASK Signals
Week 11	Noncoherent Detection of ASK Signals
Week 12	Phase-Shift Keying
Week 13	Binary Frequency-Shift Keying (BFSK)
Week 14	FSK Bit Rate, Baud, and Bandwidth
Week 15	Continuous-Phase Frequency-Shift Keying
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Introduction and Overview of the lab equipment
Week 2	Lab 2: Sampling Theory and Aliasing
Week 3	Lab 3: Pulse Code Modulation
Week 4	Lab 4: DELTA MODUALATION
Week 5	Lab 5: Amplitude Shift Keying Generation
Week 6	Lab 6: Phase Shift Keying Generation
Week 7	Lab 7: frequency Shift Keying Generation

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	F.G. Stremler, Introduction to Communication Systems, 2nded, 1982 A. B. Carlson, Communication Systems, McGraw Hill, 4thed, 2002	Yes
Recommended Texts	S.S. Haykin, Communication Systems, Wiley, 2001.B Behrouz A. Forouzan, Data communications and networking, 4thed, 2007	No
Websites	https://www.coursera.org/learn/ analog communication fundamentals	

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Data structures and algorithms**			**Module Delivery**	
Module Type	**C**			☒**Theory**	
Module Code	**DASA215**			☐**Lecture**	
ECTS Credits	**4**			☒**Lab**	
SWL (hr/sem)	**100**			☐**Tutorial** ☐**Practical** ☐**Seminar**	
Module Level	UGII		**Semester of Delivery**	4	
Administering Department	Computer Engineering		**College**	College of Engineering	
Module Leader			**e-mail**		
Module Leader's Acad. Title	Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor			**e-mail**		
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date	01/06/2023		**Version Number**	1.0	

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	8. An overview of programming concepts and discrete mathematics. 9. Teaching the student how to represent data in computer memory. 10. Teaching the student linear and non-linear data structures and their types and programming addition, deletion, and search algorithms. 11. Efficiently perform operations on lists, stack and queues. 12. Understand the non-linear data structures represented by trees, their synthesis and programming. 13. Ability to distribute data by Hashing table and Priority Queues (Heaps). 14. Teaching the student the various methods and techniques of searching and arranging data in each of the data structures.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	11. Understand the principle of recursion function in solving problems. 12. Enable the student to acquire overwrite skills. 13. Problem analysis and solution using data structures and Understand the role data structures play in storing information. 14. How to efficiently perform operations on Linked Lists, Linked Stacks, and Linked Queues. 15. Enabling the student to understand three types of tree traversal techniques. 16. How to estimate the time required for a program. 17. How to reduce the running time of a program from days or years to fractions of a second. 18. How to choose one operation to be more efficient if another less efficient. 19. Analyze a problem and determine what problem elements to represent by data structures and algorithms. 20. Apply data structures and algorithms fundamental techniques to develop small scale applications. 21. Trace, analyze, validate and deduce the output of given program code of different complexities.
Indicative Contents المحتويات الإرشادية	15. Giving theoretical lectures. 16. Attendance education in laboratory lessons and implementation of the prescribed programs. 17. Using illustrations through the lectures. 18. Direct discussion by asking questions and opening the door for dialogue and interaction with students. 19. Participation during the electronic lecture and answer the questions. 20. Application of software on the computer for the practical laboratory. 21. Analysis of a computer program to solve real-world problems based on data structures and algorithms principles. 22. Develop and enhance the student's thinking skill and move him to a higher level of thinking. 23. Creating confidence in the student to design and implement data

	structures and algorithms to solve practical applied problems. 24. Raise the spirit of cooperation and work within a team. 25. Bring out creative ideas among students by raising the spirit of competition. 26. Group thinking skill strategy. 27. Critical thinking strategy in learning. 28. Brainstorming. 29. Application software. 30. Student feedback.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	6. Work effectively as an individual and as a member of a team 7. Demonstrate efficient IT capabilities 8. Developing capabilities and skills to gain the required level of experience and knowledge for the purposes of employment and personal development. 9. Enable the student to link the course outcomes with practical life. 10. Organized and effective planning for program design.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	79	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	21	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	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 and 10	LO #2, #3 and #5, #7
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5 and #11
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #2 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction to Data structures and Algorithms, Abstract Data Type, Linear and non-Linear data structures
Week 2	A General Overview on recursion function and algorithm analysis
Week 3	Linked Lists, three type of Insertion and Deletion on Linked Lists, Double Linked List
Week 4	The Stack, The functions associated with stack, Linked Stack, Applications of Stack: Expressions Calculator (Infix, Prefix, and Postfix notation)
Week 5	The Queue and Linked Queue
Week 6	The Tree, Binary Tree
Week 7	Tree Traversals: Inorder, Preorder, and Postorder Traversal
Week 8	Mid-course Exam

Week 9	The Search Tree ADT–Binary Search Trees, AVL Trees, Splay Trees, B-Trees, Sets and Maps in the Standard Library
Week 10	Hashing: General Idea, Hash Function, Separate Chaining
Week 11	Priority Queues (Heaps), Model, Simple Implementations, Binary Heap
Week 12	Applications of Priority Queues, d-Heaps, Leftist Heaps, Skew Heaps, Binomial Queues, Priority Queues in the Standard Library
Week 13	Sorting: Preliminaries, Insertion Sort, Shellsort, Heapsort, Mergesort
Week 14	Quick sort, Bucket Sort, External Sorting
Week 15	Algorithm Design Techniques: Greedy Algorithms, Divide and Conquer, Dynamic Programming, Randomized Algorithms, Backtracking Algorithms
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: A General Overview
Week 2	Lab 2: Linked Lists
Week 3	Lab 3: Stacks, Linked Stack
Week 4	Lab 4: Queue, Linked Queue
Week 5	Lab 5: Sets and Maps
Week 6	Lab 6: Hashing, Priority Queues (Heaps)
Week 7	Lab 7: Sorting

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Data Structures and Algorithm Analysis in C++ (Fourth Edition), by M. A. Weiss. Addison-Wesley, ISBN-10: 032144146X & ISBN-13: 9780321441461	No
Recommended Texts	C++ How to Program (5th Edition), by (Harvey & Paul) Deitel & Associates. Prentice Hall, ISBN-10: 0131857576 & ISBN-13: 9780131857575	No
Websites	https://www.w3schools.in/data-structures-tutorial/intro/ https://www.geeksforgeeks.org/data-structures/	

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Operating system**			**Module Delivery**	
Module Type	**Core**			☒**Theory** ☐**Lecture** ☐**Lab** ☐**Tutorial** ☐**Practical** ☐**Seminar**	
Module Code	**OPSY214**				
ECTS Credits	**6**				
SWL (hr/sem)	**150**				
Module Level	UGII		**Semester of Delivery**	4	
Administering Department	Computer Engineering		**College**	Collage of engineering	
Module Leader	-		**e-mail**	E-mail	
Module Leader's Acad. Title	Assist prof		**Module Leader's Qualification**	Ph.D.	
Module Tutor			**e-mail**	E-mail	
Peer Reviewer Name			**e-mail**	E-mail	
Scientific Committee Approval Date			**Version Number**	1.0	

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	11. provide an understanding of the fundamental concepts, principles, and functions of operating systems. 12. To explore the various components and mechanisms involved in managing computer hardware and software resources. 13. To develop knowledge and skills related to process management, memory management, file systems, and other key aspects of operating systems. 14. To foster critical thinking and problem-solving abilities in the context of operating system design and implementation. 15. To prepare students for advanced studies or professional careers in operating systems, systems programming, or related fields. 16. To explore advanced topics such as distributed systems, real-time systems, and virtualization. 17. To develop skills in analyzing and designing complex operating system architectures. 18. To explore emerging trends and technologies in the field of operating systems. 19. To prepare students for advanced research or professional careers in operating systems or related areas.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Upon completion of the course, students should be able to: 1. Explain the basic concepts, types, and functions of operating systems. 2. Understand process management, including process creation, scheduling, and synchronization. 3. Analyze and apply memory management techniques, including virtual memory and page replacement algorithms. 4. Describe file system concepts, file organization, and access methods. 5. Understand input/output (I/O) management, including device drivers and I/O operations. 6. Discuss protection and security mechanisms in operating systems. 7. Understand the principles of multi-programming, multi-tasking, and CPU scheduling. 8. Explain the basics of distributed operating systems and networking. 9. Analyze and troubleshoot common issues related to operating systems. 10. Understand and design distributed systems and inter-process communication mechanisms. 11. Analyze and design real-time operating systems for time-critical applications. 12. Understand and apply virtualization technologies and techniques. 13. Explore emerging trends and technologies in the field of operating systems. 14. Conduct research, analyze and critically evaluate operating system research papers.

Indicative Contents المحتويات الإرشادية	The following are indicative topics that may be covered in an operating systems course: 1. Introduction to Operating Systems: • Definition, types, and functions of operating systems. • Historical overview and evolution of operating systems. • Operating system structures and components. 2. Process Management: • Process concepts, process states, and process control block (PCB). • Process creation, scheduling, and context switching. • Interprocess communication and synchronization. 3. Memory Management: • Memory hierarchy and memory management techniques. • Address spaces, logical vs. physical memory, and memory allocation. • Paging, segmentation, and virtual memory. 4. File Systems: • File concepts, file organization, and access methods. • Directory structures and file allocation methods. • File system implementation, disk management, and file I/O operations. 5. Input/Output Systems: • I/O devices, device controllers, and device drivers. • I/O operations, buffering, and spooling. • Interrupt handling and I/O scheduling algorithms. 6. CPU Scheduling: • CPU scheduling algorithms and their evaluation. • Process coordination, synchronization, and deadlock prevention. • Multi-programming and multi-tasking concepts. 7. Distributed Operating Systems: • Introduction to distributed systems and networking. • Distributed system architectures and models. • Distributed file systems, distributed process management, and synchronization. • Communication protocols and distributed resource allocation. • Fault tolerance and replication in distributed systems. 8. Real-Time Operating Systems: • Characteristics and requirements of real-time systems. • Real-time scheduling algorithms and analysis. • Resource management and synchronization in real-time systems. • Real-time operating system design considerations. 9. Virtualization: • Virtualization concepts and techniques. • Virtual machine management and resource allocation. • Virtualization security and performance considerations.

	10. Advanced Memory Management: • Advanced memory management techniques, such as segmentation and paging. • Memory protection and access control mechanisms. • Memory virtualization and memory ballooning. • Memory management in virtualized environments. 11. Advanced Process and Thread Management: • Multi-core and multi-threaded systems. • Thread scheduling algorithms and techniques. • Process migration and load balancing. • Thread synchronization and concurrency control mechanisms. 12. Security in Operating Systems: • Security threats and vulnerabilities in operating systems. • Access control mechanisms, including mandatory and discretionary access control. • Intrusion detection and prevention systems. • Security in virtualized environments. 13. Emerging Trends in Operating Systems: • Cloud computing and operating systems. • Edge computing and Internet of Things (IoT) operating systems. • Containerization and container orchestration systems. • Operating systems for specialized architectures (e.g., GPUs, mobile devices).

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1. Interactive Demonstrations: Conduct interactive demonstrations of operating system functionalities and features. Use visual aids, interactive tools, or live demonstrations to engage students and enhance their understanding of complex concepts. 2. Online Resources and Tutorials: Recommend online resources, tutorials, and interactive platforms that offer supplementary materials and exercises for self-paced learning. This allows students to explore topics at their own pace and reinforce their understanding of operating systems. 3. Formative Assessments and Feedback: Provide regular formative assessments, such as quizzes or short assignments, to gauge students' understanding of operating system concepts. Provide prompt feedback to address misconceptions and guide students towards a deeper understanding of the subject.

	4. Group Projects and Collaborative Learning: Assign group projects that require students to work collaboratively to solve operating system-related problems. This encourages teamwork, communication, and the exchange of ideas, and allows students to learn from each other's experiences. 5. Discussions and Debates: Engage students in discussions and debates on operating system-related topics. Encourage critical thinking, analysis of different viewpoints, and the exploration of alternative approaches to operating system design and implementation. 6. Case Studies and Real-World Examples: Use case studies and real-world examples to illustrate the application of operating system concepts. This helps students understand how operating systems are used in practical scenarios and reinforces their understanding of the subject matter. 7. Stay Updated with Technology Advances: Stay informed about the latest advancements in operating systems and related technologies. Incorporate current trends and emerging technologies into the curriculum to ensure students are exposed to relevant and up-to-date knowledge.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	87	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**150**		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	2,6,9 and 11	LO #1, #2 ,#6and #9, #12,#13
	Assignments	2	10% (10)	5,7 and 10	LO #5, #7 and #10, #11
	Projects / Lab.	1	10% (10)	Continuous	
	Report	1	10% (10)	9	LO #14and #15
Summative assessment	Midterm Exam	2hr	10% (10)	8	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction to Operating Systems, Computer-System Organization, Computer-System Architecture, Operating-System types, functions Structure and components
Week 2	Operating-System Operations, Process Management, Memory Management, Storage Management
Week 3	Operating System Structure, Operating System Services, User Operating System Interface, System Calls, Types of System Calls, System Programs
Week 4	Operating System Design and Implementation, Operating System Structure, Operating System Debugging, Operating System Generation, System Boot
Week 5	Process, Process Concept, Process Scheduling , Operations on Processes, Inter-process Communication
Week 6	File concepts, organization, access methods, Directory structures ,file allocation methods ,File system implementation, disk management and file I/O operations..
Week 7	I/O devices, device controllers, , device drivers.I/O operations, buffering, spooling, Interrupt handling and I/O scheduling algorithms

Week 8	**Midterm Exam**
Week 9	Introduction to distributed systems ,Distributed file systems, distributed process management, and synchronization , distributed resource allocation,Fault tolerance and replication
Week 10	Real-time systems Characteristics and requirements, scheduling algorithms and analysis, Resource management and synchronization and system design considerations.
Week 11	Virtualization concepts and techniques , Virtual machine management and resource allocation ,Virtualization security and performance considerations
Week 12	Advanced memory management techniques , Memory protection Memory virtualization
Week 13	Advanced Process and Thread Management: Process migration and load balancing. Thread scheduling, synchronization and control
Week 14	Security in Operating Systems
Week 15	Emerging Trends in Operating Systems:
Week 16	**Preparatory week before the final Exam**

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	• William stallings "operating systems - internals and design principles" 7th edition,2011 • "Modern Operating Systems" by Andrew S. Tanenbaum and Herbert Bos	Yes
Recommended Texts	• "Distributed Systems: Principles and Paradigms" by Andrew S. Tanenbaum and Maarten Van Steen • "Real-Time Systems" by Jane W. S. Liu	No
Websites	https://learn.saylor.org/course/view.php?id=94 https://www.classcentral.com/subject/operating-systems	

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Engineering Analysis**			**Module Delivery**	
Module Type	**B**			**☒Theory**	
Module Code	ENAN208			**☐ Lecture**	
ECTS Credits	**3**			**☐Lab**	
SWL (hr/sem)	**75**			**☒Tutorial** **☐Practical** **☐Seminar**	
Module Level	UGII		**Semester of Delivery**	4	
Administering Department	Computer engineering		**College**	College of engineering	
Module Leader	Omar Hassan Hameed		**e-mail**	Omar.Hassan @aliraqia.edu.iq	
Module Leader's Acad. Title	lecture		**Module Leader's Qualification**	Ph.D.	
Module Tutor			**e-mail**		
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date	01/06/2023		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد 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	The objective of this course is to develop an understanding of the basic ideas of mathematics encountered in engineering. Focus will be on the methods for understanding complex numbers and fundamentals of the derivative and integration of inverse trigonometric functions. Students will learn some special integration techniques (Integration by part, partial fraction, and substitution) that are useful for the understanding of different engineering subjects. Another objective is to teach the Engineering student about integration applications such as Area under curve and volume. Finally, the student will learn the concept of polar coordinates and its application.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	On completion of the course, student will be able to: 1. Understand the fundamentals of complex numbers and their properties. 2. Understand the differentiation and integration of inverse trigonometric functions. 3. Understand the differentiation and integration of hyperbolic trigonometric functions. 4. Express the concepts of methods of integration and their different types which can be used in a wide variety of disciplines in engineering. 5. Identify integration applications such as Area under curve and area between two curves. 6. Apply different integration rules to determine the volume of solid using Disk and Washer methods. 7. Understand polar coordinates and their properties. 8. Apply the concept of polar coordinates to solve integration applications.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following: • Fundamental Concepts of complex numbers. • Complex numbers properties- power and roots • Inverse Trigonometric function and their differentiation • Inverse Trigonometric function Integration • Hyperbolic Trigonometric functions and their differentiation • Hyperbolic Trigonometric functions integration • Methods of integration – Integration by Part • Methods of integration - Partial fraction method • Methods of integration – Integration using substation • Integration applications – Area under curve • Integration applications – Area between two curves • Integration applications – Volume of solid using Disk method • Integration applications – Volume of solid using Washer methods • Polar coordinates and its properties • Area under curve in Polar coordinates

	• Area between two curves in Polar coordinates • Length of curve in Polar coordinates.

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 reports involving some sampling activities that are interesting to the students.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	48	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	3
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	27	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**75**		

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

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

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Ordinary differential equation – first order- variable separable
Week 2	Ordinary differential equation – first order- homogenous
Week 3	Ordinary differential equation – first order- Exact
Week 4	Ordinary differential equation – first order - Linear
Week 5	Ordinary differential equation – second order – undetermined coefficient
Week 6	Ordinary differential equation – second order – variation of parameter
Week 7	Ordinary differential equation – higher order
Week 8	**Mid-term Exam**
Week 9	Laplace transform - properties
Week 10	Inverse Laplace transform
Week 11	Solving Ordinary differential equation using Laplace transform
Week 12	Z - transform
Week 13	Z - transform properties
Week 14	Inverse Z - transform
Week 15	**Preparatory week before the final Exam**

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Thomas' Calculus, Single Variable, Joel Hass, Christopher Heil, Maurice Weir, Pearson, 2017.	Yes
Recommended Texts	Thomas' Calculus Early Transcendentals, George Thomas, Maurice D. Weir, Joel Hass, Pearson, 2014.	yes
Websites	https://www.coursera.org/learn/ calculus I	

Grading Scheme

مخطط الدرجات

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Electronics II**			**Module Delivery**	
Module Type	core			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	ELEC210				
ECTS Credits	5				
SWL (hr/sem)	125				
Module Level	UGII		**Semester of Delivery**	4	
Administering Department	Computer engineering		**College**	College of engineering	
Module Leader	Sarah waleed		**e-mail**	Sara.waleed@aliraqia.edu.iq	
Module Leader's Acad. Title	Assist.lecturer		**Module Leader's Qualification**	master	
Module Tutor			**e-mail**		
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date	1/6/2023		**Version Number**	1	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Electronics I	**Semester**	3
Co-requisites module	-	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	This course aims to: 4- enable the student to have a solid background in physical structure of BJT 5- enable the student to have a solid background in physical structure of FET transistors 6- enable the student to analyze the circuits of the BJT and FET transistors.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	- Explains the amplification in amplifier circuits with transistors. - Analyzes and Calculates the hybrid parameters and performs measurements in different amplifier circuits. - Calculates the hybrid parameters of the equivalent circuit of a transistor. - Explains cascade amplifier circuits - Calculates parameters in cascade amplifier circuits. - Understand the Frequency Response
Indicative Contents المحتويات الإرشادية	- Explains the amplification in amplifier circuits with transistors. - Analyzes and performs measurements in different amplifier circuits. - Calculates the hybrid parameters of the equivalent circuit of a transistor. - Explains cascade amplifier circuits - Calculates parameters in cascade amplifier circuits.
Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The main strategy that will be adopted to increase the student interest to understand this module is by drawing sketches that can assist the imagination of the student about the certain subject as well as to make the students participate through fast questions and quizzes.

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
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	46	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

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

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction : Amplification in the AC Domain
Week 2	BJT Transistor Modeling :The Important Parameters: Zi, Zo, Av, Ai, The re Transistor Model
Week 3	The Hybrid Equivalent Model Graphical Determination of the h-parameters Variations of Transistor Parameters
Week 4	Multistage Amplifier
Week 5	FET Circuit Analysis
Week 6	Introduction :Two-Port Systems , Effect of a Load Impedance (*RL*)
Week 7	Effect of a Source Impedance (*Rs*) Combined Effect of *Rs* and *RL*
Week 8	BJT CE Networks , BJT Emitter-Follower Networks
Week 9	BJT CB Networks
Week 10	**Mid exam**
Week 11	General Frequency Considerations Low-Frequency Analysis—Bode Plot Low-Frequency Response—BJT Amplifier
Week 12	Low-Frequency Response—FET Amplifier
Week 13	Miller Effect Capacitance
Week 14	High-Frequency Response—BJT Amplifier High-Frequency Response—FET Amplifier Multistage Frequency Effects
Week 15	**review**

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: Ac analysis of common emitter transistor
Week 2	Lab 2: Ac analysis of voltage divider transistor
Week 3	Lab 3: Ac analysis of emitter follower transistor
Week 4	Lab 4: Ac analysis of common base transistor
Week 5	
Week 6	
Week 7	

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	"Electronic Devices & Circuit Theory", By R. Boylestad, 11th ed.	yes
Recommended Texts	" Electronic Devices", By Floyd. 9th ed.	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
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	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
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MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Digital Systems Design II**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**DISD213**				
ECTS Credits	**4**				
SWL (hr/sem)	**100**				
Module Level		UGII	**Semester of Delivery**		4
Administering Department		Computer Engineering	**College**	College of Engineering	
Module Leader	Rasha Thabit Mohammed		**e-mail**	rasha.thabit@aliraqia.edu.iq	
Module Leader's Acad. Title		Lecturer	**Module Leader's Qualification**		Ph.D.
Module Tutor	-		**e-mail**	-	
Peer Reviewer Name		Ammar A. Al Hamadani	**e-mail**	ammar.aladin@aliraqia.edu.iq	
Scientific Committee Approval Date		01/06/2023	**Version Number**	1.0	

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	23. Understand the basics of Random-Access Memory and how to store binary information in RAM. 24. Understand the Memory Decoding and how to demonstrate the operation of decoding. 25. Understand Error Detection and Correction: An error-correcting code generates manifold parity check bits that are stored with the data word in memory. Each check bit is a parity over a group of bits in the data word. 26. Understand the basics of Read-Only Memory permanent in which binary information is stored. 27. Understand the Programmable Logic Array, the PAL device with a fixed OR array and a programmable AND array. 28. Understand the Sequential Programmable Devices 29. Learn Register Transfer Level in HDL which transfers are specified by means of procedural assignment statements within an edge-sensitive cyclic behavior. 30. Learn Algorithmic State Machines (ASMs) where the operations are implemented with digital hardware components such as adders, decoders, multiplexers, counters, and shift registers. 31. Learn Control Logic and Sequential Binary Multiplier. 32. Learn Design with Multiplexers in which the flip-flops that hold the binary state value, the decoder that generates the control outputs, and the gates that determine the next-state and output signals.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	6. Understanding of basic of memory storage: Students should gain a solid understanding of memory storage such as RAM, ROM, and other circuits. 7. Analysis of sequential programmable devices: Students should be able to analyze and write the truth tables, the output equations, and final results of sequential programmable devices. 8. Algorithmic State Machines and their behavior: Students should learn about command signals that coordinate and execute the various operations in the data section of the machine in order to accomplish the desired data-processing tasks. 9. Circuit analysis techniques: Students should develop skills in circuit analysis techniques, including using circuit diagrams, identifying circuit elements, and applying systematic problem-solving approaches. They should be able to analyze simple and complex logic circuits to determine output. 10. Laboratory skills: Depending on the course, students may have the opportunity to apply their theoretical knowledge through hands-on laboratory experiments. They should develop skills in using measurement instruments, constructing circuits, and verifying theoretical concepts through practical experiments.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. 27. Random-Access Memory: [5Hours] 28. Memory Decoding: [5Hours]

	29. Error Detection and Correction: [5Hours] 30. Read-Only Memory: [5Hours] 31. Programmable Logic Array: [5Hours] 32. Programmable Array Logic: [5Hours] 33. Sequential Programmable Devices: [5Hours] 34. Mid-course Exam: [2Hours theoretical exam + 1hour practical exam] 35. Register Transfer Level Notation: [5Hours] 36. Register Transfer Level in HDL: [5Hours] 37. Algorithmic State Machines (ASMs): [5Hours] 38. Design Example (ASMD Chart): [5Hours] 39. Sequential Binary Multiplier: [5Hours] 40. Control Logic: [5Hours] 41. Design with Multiplexers: [5Hours] 42. Review and Assessment: [5Hours]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The primary approach for implementing this module will involve promoting active student engagement in exercises, as well as enhancing their ability to think critically. This goal will be accomplished through a combination of classroom sessions, interactive tutorials, and the incorporation of intriguing sampling-based experiments.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	79	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	21	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**100**		

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Random-Access Memory
Week 2	Memory Decoding
Week 3	Error Detection and Correction
Week 4	Read-Only Memory
Week 5	Programmable Logic Array
Week 6	Programmable Array Logic
Week 7	Sequential Programmable Devices
Week 8	Mid-course Exam
Week 9	Register Transfer Level Notation

Week 10	Register Transfer Level in HDL
Week 11	Algorithmic State Machines (ASMs)
Week 12	Design Example (ASMD Chart)
Week 13	Sequential Binary Multiplier
Week 14	Control Logic
Week 15	Design with Multiplexers
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Memory Description in Verilog HDL
Week 2	Lab 2: Hamming code (single error correction)
Week 3	Lab 3: Hamming code (double error correction)
Week 4	Lab 4: HDL description of binary multiplier
Week 5	Lab 5: Behavioral (RTL) description of a parallel multiplier
Week 6	Lab 6: Complex programmable logic device (CPLD)
Week 7	Lab 7: Field-programmable gate array (FPGA)

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Digital Design: with an introduction to Verilog HDL by M. Morris Mano and Mechael D. Ciletti, 5th Edition, Pearson Education, 2013.	Yes
Recommended Texts	Thomas L. Floyd, Digital Fundamentals, 11th Edition, Pearson Prentice Hall, 2015.	Yes
Websites	https://onlinecourses.nptel.ac.in/noc21_ee39/preview	

Grading Scheme

مخطط الدرجات

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	Crimes of the Baath Regime in Iraq جرائم نظام البعث في العراق			**Module Delivery**	
Module Type	**S**			**☒Theory**	
Module Code	**CBRI104**			**☐Lecture**	
ECTS Credits	2			**☐Lab**	
SWL (hr/sem)	**50**			**☐Tutorial** **☐Practical** **☐Seminar**	
Module Level	UGII		**Semester of Delivery**	3	
Administering Department	computer engineering		**College**	College of engineering (08)	
Module Leader	Nour Ghassan Ajaj		**e-mail**	baraamalbaker@gmail.com	
Module Leader's Acad. Title	Asst. Lect.		**Module Leader's Qualification**		
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Dr. Ammar Alaadin Noori		**e-mail**	AmmarNoori@aliraqia.edu.iq	
Scientific Committee Approval Date	01/11/2023		**Version Number**	1.0	

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

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

Module Objectives أهداف المادة الدراسية	ارتكب نظام البعث في العراق إبآن حكمه عدداً كبيرا مَن الجرائم المختلفة، واختلافها يلْزم بيان مفاهيم وتعاريف للطالب ليكون على معرفة ودراية بما يمر به مما لها علاقة بمادة المنها ج ، كمفهوم الجريمة وأقسامها، والجرائم الدولية التي حُكِم عليها قيادات وأزلام نظام البعث وفق قانون المحكمة الجنائية العراقية العليا لقد تضمن هذا المنهجُ ما جاء مفاتيحَ معرفية بيدِ الطالبِ الجامعيّ يقَوى بها على كلّ مُرتجَ حَبكَت رواية أكْذوبته أيَادي البعثِ وإعلامُه المزيفِ ، وباعت ضميرَها أنَفسُ ترى أنَ تبقى إلى الآنَ ذليلة أسَيرة ، وذيَلًا تابعاً.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	بث الوعي بين صفوف ابنائنا الطلبة واطلاعهم على الجرائم التي تم ارتكابها ابان حقبة نظام البعث في العراق
Indicative Contents المحتويات الإرشادية	جرائم نظام البعث في العراق

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1- Giving theoretical lectures

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	32	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	18	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	1.2
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	50		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	2	20% (20)	5, 10	All
	Assignments	2	10% (10)	3, 12	All
	Report	1	10% (10)	14	All
Summative assessment	**Midterm Exam**	1hr	10% (10)	7	All
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	جرائم نظام البعث وفق قانون المحكمة الجنائية العراقية العليا عام ٢٠٠٥ م
Week 2	مفهوم الجرائم وأقسامها
Week 3	جرائم نظام البعث وفق توثيق قانون المحكمة الجنائية العراقية العليا عام ٢٠٠٥ م .
Week 4	الجرائم النفسية والاجتماعية وأثارها، وأبرز انتهاكات النظام البعثي في العراق
Week 5	الجرائم النفسية
Week 6	الجرائم الاجتماعية
Week 7	(Mid-term Exam)

Week 8	تجفيف الأهوار
Week 9	الجرائم البيئية لنظام البعث في العراق
Week 10	التلوث الحربي والإشعاعي وانفجار الالغام
Week 11	تدمير المدن والقرى (سياسة الأرض المحروقة)
Week 12	تجريف بساتين النخيل والأشجار والمزروعات
Week 13	جرائم المقابر الجماعية
Week 14	أحداث مقابر الإبادة الجماعيةّ المرتكبة من النظام البعثي في العرا ق
Week 15	م ٢٠٠٣ – م ١٩٦٣ للمدة العراق في الجماعيةّ الإبادة لمقابر الزمني التصنيف
Week 16	**Preparatory week before the final Exam**

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	**منهاج جرائم نظام البعث البائد 2023، وزارة التعليم العالي والبحث العلمي، دائرة الدراسات والتخطيط والمتابعة، 2023**	Yes
Recommended Texts		
Websites		

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Engineering Biology**			**Module Delivery**	
Module Type	**Basic**			☒**Theory** ☐**Lecture** ☐ **Lab** ☐**Tutorial** ☐**Practical** ☐**Seminar**	
Module Code	**BIOL202**				
ECTS Credits	**3**				
SWL (hr/sem)	**75**				
Module Level	2		**Semester of Delivery**	1	
Administering Department	CE / Computer Engineering		**College**	Engineering Collage / Al-Iraqia University	
Module Leader	Ammar A. AL-HAMMADANI		**e-mail**	Ammar.aladin@aliraqia.edu.iq	
Module Leader's Acad. Title	Asst. Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	01/09/2024		**Version Number**	1.0	

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	19. Introduction to Basics of Biology which includes cell, the unit of life, Different types of cells and classification of living organisms. 20. To understand Biological concepts from an engineering perspective 21. To understand the inter-connection between biology and future technologies 22. To motivate technology application for biological and life science challenges 23. Understanding what are biomolecules present in a cell, their structure function and their role in a living organism. Application of certain bio molecules in Industry. 24. Brief introduction to human physiology, which is essential for bioengineering field. 25. Understanding the hereditary units, that is genes and genetic materials (DNA and RNA) present in living organisms and how they replicate and pass and preserve vital information in living organisms. 26. Understand How biology can be applied in our daily life using different technology, for production of medicines to transgenic plants and animals to designing new biotechnological products
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	On completion of this module students are expected to: 1. Understand the biological concepts from an engineering perspective 2. Understand the concepts of biological sensing and its challenges 3. Understand development of artificial systems mimicking human action 4. Integrate biological principles for developing next generation technologies
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A - Biology Theory</u> Basic concepts of Biology, Importance of biology in engineering, Introduction to Basic Biology; Cell: What is a Cell, Cell theory, Cell shapes, structure of a Cell, Cell cycle chromosomes . [SSWL=6 hrs] HUMAN ORGAN SYSTEMS AND BIO DESIGNS: Brain as a CPU system (architecture, CNS and Peripheral Nervous System, signal transmission, EEG, Robotic arms for prosthetics. Engineering solutions for Parkinson's disease). Eye as a Camera system (architecture of rod and cone cells, optical corrections, cataract, lens materials, bionic eye).Heart as a pump system (architecture, electrical signalling - ECG monitoring and heart related issues, reasons

	for blockages of blood vessels, design of stents, pace makers, defibrillators). [8 hrs] Revision problem classes [SSWL=2 hrs] <u>Part B - Biology in Next Generation Technology Development</u> Role of Biology in Next Generation Technology Development – Cell Structure – Cell Potential – Action Potential – ECG and other common signals. [SSWL=6 hrs] Sensing Techniques: – Understanding of Sense organs working – Sensing mechanisms – Sensor Development issues – Discussion Topics: Digital Camera – Eye Comparison, electronic nose, electronic tongue, electronic skin. [SSWL=8 hrs] Total hrs = 33 = SSWL - (Exam hrs) = 33 - 3 = 30 hr (Time table hrs x 15 weeks)

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Studying an engineering biology course can be an exciting endeavor that combines principles of biology with engineering concepts. Here are some effective strategies to help you succeed in your engineering biology studies: 1. Master the Basics: - Ensure a solid understanding of fundamental biology concepts, including cell biology, genetics, microbiology, and biochemistry. This foundation will help you grasp more complex topics. 2. Integrate Engineering Concepts: - Learn how engineering principles apply to biological systems. Understand how

	tools and methodologies used in engineering (e.g., systems modeling, process optimization) intersect with biological processes. 3. Utilize Visual Learning: - Use diagrams, flowcharts, and visual aids to understand processes such as metabolic pathways, genetic engineering techniques, and ecological interactions. Visualization can enhance comprehension. 4. Conduct Experiments: - If your course includes laboratory work, take it seriously. Hands-on experience with experiments can reinforce theoretical concepts and provide practical insights into biological engineering. 5. Engage in Active Learning: - Instead of passively reading or listening to lectures, engage actively by summarizing information, asking questions, and discussing concepts with peers. 6. Study Regularly: - Set a consistent study schedule. Breaking down the material into manageable chunks and reviewing regularly can enhance retention and understanding. 7. Form Study Groups: - Collaborate with classmates to discuss challenging topics, solve problems together, and share resources. Teaching each other can deepen your understanding. 8. Utilize Online Resources: - Supplement your learning with online lectures, tutorials, and educational platforms (like Khan Academy, Coursera, or edX) that cover relevant biological concepts and engineering applications. 9. Connect Theory to Real-World Applications: - Explore case studies and current advancements in biotechnology, biomedical engineering, and other related fields. Relating your studies to real-world applications can increase your interest and motivation.

	10. Practice Problem-Solving: - Work on problems that require you to apply biological and engineering principles. This could include case studies or hypothetical scenarios related to biological systems. 11. Stay Organized: - Keep track of lecture notes, assignments, and deadlines. Use a planner to manage your time effectively and prevent overwhelming yourself with work. 12. Ask Questions: - Be proactive in seeking help from your instructors or peers if you find certain topics challenging. Engaging in class discussions and office hours can provide additional insights. 13. Review Past Exams and Quizzes: - Familiarize yourself with the format of questions and common topics. This practice can help prepare you for upcoming assessments. 14. Balance Your Study Environment: - Create a comfortable and distraction-free study environment. Tools like flashcards or study apps can also help keep your study sessions focused and engaging. 15. Take Care of Yourself: - Maintain a healthy lifestyle by getting enough sleep, eating well, and managing stress. A healthy body and mind are crucial for effective studying.

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

Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	42	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**75**		

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	introduction to Engineering Biology - Course overview and objectives - Basic concepts of biology - Importance of biology in engineering
Week 2	Introduction to Basic Biology;

	Cell: What is a Cell, Cell theory, Cell shapes, structure of a Cell, Cell cycle chromosomes
Week 3	Introduction to Basic Biology; The Plant Cell and animal Cell, protoplasm, prokaryotic and eukaryotic Cell, Plant Tissue and Animal Tissue. Brief introduction to five kingdoms of classification.
Week 4	HUMAN ORGAN SYSTEMS AND BIO DESIGNS : Brain as a CPU system (architecture, CNS and Peripheral Nervous System, signal transmission, EEG, Robotic arms for prosthetics. Engineering solutions for Parkinson's disease).Eye as a Camera system (architecture of rod and cone cells, optical corrections, cataract, lens materials, bionic eye).Heart as a pump system (architecture, electrical signalling - ECG monitoring and heart related issues, reasons for blockages of blood vessels, design of stents, pace makers, defibrillators).- Balancing chemical equations - Mole concept and molar mass - Types of chemical reactions
Week 5	Role of Biology in Next Generation Technology Development – Cell Structure – Cell Potential – Action Potential – ECG and other common signals
Week 6	Potassium channels – Neuron function – Central Nervous Systems – Discussion Topics: Evolution of Artificial Neural Networks, Machine Learning techniques.
Week 7	Mid-term Exam
Week 8	Sensing Techniques: – Understanding of Sense organs working – Sensing mechanisms – Sensor Development issues – Discussion Topics: Digital Camera – Eye Comparison, electronic nose, electronic tongue, electronic skin.
Week 9	Physiological Assist Device: Artificial Organ Development: Kidney, Liver, Pancreas, heart valves – Design Challenges and Technological Developments
Week 10	NATURE-BIOINSPIRED MATERIALS AND MECHANISMS : Echolocation (ultrasonography, sonars), Photosynthesis (photovoltaic cells, bionic leaf). Bird flying (GPS and aircrafts), Lotus leaf effect (Super hydrophobic and self-cleaning surfaces), Plant burrs (Velcro), Shark skin (Friction reducing swim suits), Kingfisher beak (Bullet train). Human Blood substitutes - hemoglobin-based oxygen carriers (HBOCs) and perflourocarbons (PFCs).
Week 11	TRENDS IN BIOENGINEERING: Bioprinting techniques and materials, 3D printing of ear, bone and skin. 3D printed foods. Electrical

	tongue and electrical nose in food science, DNA origami and Biocomputing,
Week 12	Bioimaging and Artificial Intelligence for disease diagnosis. Self-healing Bioconcrete (based on bacillus spores, calcium lactate nutrients and biomineralization processes)
Week 13	Bioremediation and Biomining via microbial surface adsorption (removal of heavy metals like Lead, Cadmium, Mercury, Arsenic).
Week 14	Bioremediation and Biomining via microbial surface adsorption (removal of heavy metals like Lead, Cadmium, Mercury, Arsenic).
Week 15	Preparatory week before the final Exam

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	1. N. A. Campbell, J. B. Reece, L. Urry, M. L. Cain and S. A. Wasserman, “Biology: A global approach”, Pearson Education Ltd, 2018. 2. T Johnson, Biology for Engineers, CRC press, 2011 Molecular Biology and Biotechnology 2nd ed. J.M. Walker and E.B. Gingold. Panima Publications. PP 434. 3. Leslie Cromwell, Biomedical Instrumentation, Prentice Hall 2011.	Yes
Recommended Texts	1. AlbertsEt.Al. The molecular biology of the cell, 6/e, Garland Science, 2014 2. Thyagarajan S., Selvamurugan N., Rajesh M.P., Nazeer R.A., Thilagaraj W., Barathi S., and Jaganthan M.K., Biology for Engineers, Tata McGraw-Hill, New Delhi, 2012.	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
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MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	Arabic Language 2			**Module Delivery**	
Module Type	S			☒ **Theory**	
Module Code	ARLA201			☐ **Lecture**	
ECTS Credits	**2**			☐ **Lab**	
SWL (hr/sem)	**50**			☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Level	UGI		**Semester of Delivery**	2	
Administering Department	Type Dept. Code		**College**	Type College Code	
Module Leader	Dr.Anwar Qutaiba Yahya		**e-mail**	E-mail : 83dr.anwar@gmail.com	
Module Leader's Acad. Title	Lecturer Dr.		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Name (if available)		**e-mail**	E-mail : anwar.q.yahya@aliraqia.edu.iq	
Peer Reviewer Name			**e-mail**	E-mail : asmaafalih2@gmail.com	
Scientific Committee Approval Date	01/06/2023		**Version Number**	1.0	

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1- تعد اللغة العربية وسيلة للتواصل فهي تحمل رسالة بين المتكلمين ،ولكي تكون هذه الرسالة واضحة ومفهومة يجب ان يكون ترتيب مفرداتها حسب التركيب القواعدي لتلك اللغة . ومن هنا برزت وبشكل جلي ضرورة تدريس القواعد أو النحو في كل اللغات 2- تعرف الطالب على مهارات الكتابية والتعبير والوقوف على مواطن الخطأ لتصويب النطق الصحيح 3- إتقان مهارة الكتابة الصحيحة بمعرفة قواعد الإملاء ولاسيما مواضع الاخطاء الشائعة 4- الحفاظ على اللغة العربية كونها لغة القرآن الكريم 5- التعريف بالمبادئ الاساسية للغة العربية من خلال تنمية المهارات الكتابية والتعبير والمحادثة
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1-اكتساب الطالب معرفة المفاهيم الاساسية للغة العربية وتطبيقها من خلال الأمثلة 2-معرفة كتابة الكلام الصوتي بشكل مضبوط من حيث الاصوات الصحيحة أو المعتلة 3-دراسة الطالب موضوع العدد ومعرفة كيفية كتابة بالشكل الصحيح 4-يمكن الطالب ايجاد الحلول المناسبة الصحيحة للمشاكل الحقيقية المعقدة تنمية الحس الفكري من خلال أعطاء أمثلة للغة العربية وتطبيقها 5- تكليف الطلبة بكتابة البحوث والتقارير لاختبار مدى استيعابهم للقواعد الأساسية للغة العربية وتطبيقها في حياتهم اليومية
Indicative Contents المحتويات الإرشادية	1- ارشاد الطلبة إلى تكوين خزين معرفي من أنظمة اللغة وأحكامها وقواعدها الاساسية 2-ارشاد الطلبة إلى اكتساب مهارات اللغة الاساسية والتدرب عليها من خلال التطبيق العملي كتابة ونطقا 3-ارشاد الطلبة الى الاطلاع على النصوص من الشعر والنثر بمختلف العصور ومحاكاتها في كتابة النصوص التي تعبر عن حياتهم اليومية ومشاعرهم وعواطفهم الذاتية 4-ارشاد الطلبة إلى ما يؤدي الى تعزيز مهاراتهم والانتقال به الى مستوى التفكير العالي 5-ارشاد الطلبة من خلال تعبير عن افكارهم من خلال تكوين مجموعات والتنافس بينهم

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1-افضل طريقة في تعليم الطلبة النحو العربي لاهميته في تعلم هذه اللغة واهميته في الترجمة، هي اتباع مبدأ التعاون في التعلم . على ان يتعاون الطلاب في تهيأة مادة الدرس وتقديمها بعد تقسيمهم الى مجاميع تهتم كل مجموعة بجانب مادة الدرس . 2-القاء المحاضرات النظرية بشكل افتراضي مباشرة على السبورة 3-عمل بحوث وتوزيعها على مجاميع طلابية لمعرفة فهمهم للمادة او ادراكهم لها 4-ان الطريقة الاستقرائية باستنباط القاعدة من الامثلة تعد ناجحة في تدريس النحو 5-اهم طرائق التعلم والتعليم هي استراتيجية مهارات التفكير ضمن مجموعة 6- استراتيجية التفكير الناقد في التعلم ، ايضا من اهم طرائقه العصف الذهني

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
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	17	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	50		

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Speech and its Parts
Week 2	Division of words in terms of construction and syntactic expression
Week 3	Construction signs
Week 4	Signs of Inflection
Week 5	Mid-term Exam

Week 6	Fixed Noun
Week 7	In Constructing the Verb, its Inflection and Divisions
Week 8	Subject and Object
Week 9	The absolute object and direct object
Week 10	Inflected Noun and its Divisions
Week 11	Sound Masculine Plural, Sound Feminine Plural, and Broken Plural
Week 12	Linguistic Errors
Week 13	Masculinity and Femininity
Week 14	Review for students before the final exam
Week 15	Review for students before the final exam
Week 16	**Final Exam**

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	الوجيز في اللغة العربية ، محي هلال سرحان ، شرح قطر الندى وبل الصدى،لابن هشام الانصاري ، الاجرومية ابي عبدالله محمد الصنهاجي الاملاء والترقيم في الكتابة العربية ،عبد العليم ابراهيم ، اللغة العربية لغير المختصين ،مصطفى جطل وصلاح كزارة	Yes
Recommended Texts	جامع الدروس العربية ، مصطفى الغيلاني ،معاني النحو ، فاضل السامرائي دراسة في قواعد الاملاء د.عبد الجواد الطيب ، موسوعة الشامل في الكتابة والاملاء ،موسى حسن الهديب	No
Websites	3. https://shamela.ws/ 4. https://waqfeya.net/	

Grading Scheme

مخطط الدرجات

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**English Language II**			**Module Delivery**	
Module Type	**S**			☒ **Theory** ☐**Lecture** ☐**Lab** ☐**Tutorial** ☐**Practical** ☐**Seminar**	
Module Code	ENLA202				
ECTS Credits	**2**				
SWL (hr/sem)	**50**				
Module Level	1		**Semester of Delivery**	1	
Administering Department			**College**	Engineering	
Module Leader			**e-mail**		
Module Leader's Acad. Title	Professor or Asst. Prof.		**Module Leader's Qualification**	Ph.D.	
Module Tutor			**e-mail**		
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date	01/06/2023		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد 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	7. Language Proficiency: English language materials aim to enhance learners' proficiency in the language by developing their skills in reading, writing, listening, and speaking. The materials provide opportunities for learners to practice and improve their grammar, vocabulary, pronunciation, and comprehension abilities. 8. Communication Skills: English language materials focus on developing learners' ability to communicate effectively in various contexts. This includes practicing conversation skills, giving presentations, writing emails and reports, and engaging in discussions and debates. 9. Cultural Understanding: English language materials often incorporate cultural content to provide learners with insights into English-speaking countries' cultures, traditions, and societal norms. This helps learners understand and navigate cross-cultural interactions. 10. Exam Preparation: Many English language materials are designed to prepare learners for standardized tests like TOEFL, IELTS, or Cambridge English exams. These materials provide test-taking strategies, practice exercises, and sample questions to familiarize learners with the exam format and improve their performance. 11. Professional and Academic Skills: Some English language materials cater to learners who require English proficiency for specific professional or academic purposes. These materials focus on developing specialized vocabulary, writing research papers, delivering professional presentations, and enhancing critical thinking and analytical skills. 12. Self-Study and Autonomy: English language materials often aim to empower learners to become independent and autonomous language learners. They provide self-study resources, interactive exercises, and feedback mechanisms that allow learners to track their progress and take control of their learning journey.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	8. Language Proficiency: By engaging with English language materials, learners should demonstrate improved language proficiency across various skills such as reading, writing, listening, and speaking. They should be able to comprehend and produce English texts with increased accuracy, fluency, and complexity. 9. Effective Communication: Learners should develop the ability to communicate effectively in English, both orally and in writing. They should be able to express ideas, opinions, and information clearly and coherently, adapting their language to different contexts and audiences. 10. Cultural Awareness: Engaging with English language materials should foster cultural awareness and sensitivity. Learners should gain an understanding of cultural practices, perspectives, and norms of English-speaking countries, enabling them to engage in cross-cultural communication with respect and

	understanding. 11. Critical Thinking and Analysis: English language materials often aim to develop learners' critical thinking and analytical skills. They should be able to analyze and evaluate information, identify main ideas, make connections, and draw conclusions from English texts. 12. Exam Readiness: If the materials are geared towards exam preparation, the learning outcomes may include achieving a specific score or level in standardized English proficiency tests such as TOEFL, IELTS, or Cambridge exams. Learners should demonstrate the necessary skills and strategies to succeed in these exams. 13. Independent Learning: English language materials often aim to promote independent learning skills. Learners should become self-directed and motivated language learners who can set goals, manage their learning process, and use resources effectively to continue improving their English proficiency beyond the module. 14. Academic or Professional Skills: Depending on the module's focus, the learning outcomes may include specific academic or professional skills. These may include academic writing, research skills, presentation skills, business communication, or specific English language skills required in a professional field.
Indicative Contents المحتويات الإرشادية	11. Vocabulary: English language materials often include vocabulary lessons and exercises to expand learners' word knowledge. This may involve learning new words, idioms, phrasal verbs, and collocations, as well as practicing their usage in context. 12. Grammar: English language materials typically cover various grammar topics and rules. They provide explanations, examples, and exercises to help learners understand and apply grammatical structures correctly. This may include topics like tenses, articles, prepositions, verb forms, and sentence structure. 13. Reading Comprehension: English language materials incorporate reading passages of different genres, such as fiction, non-fiction, news articles, and academic texts. Learners engage in activities like reading for gist, scanning for specific information, and comprehending main ideas, supporting details, and inference. 14. Writing Skills: English language materials focus on developing learners' writing skills, including sentence construction, paragraph development, essay structure, and formal writing styles. They may cover various types of writing, such as descriptive, narrative, argumentative, and persuasive writing. 15. Listening Comprehension: English language materials include listening activities to improve learners' listening skills and comprehension. These may involve listening to dialogues, conversations, lectures, interviews, and audio recordings, followed by tasks to assess understanding, inference, and note-taking. 16. Speaking Skills: English language materials provide opportunities for learners to practice speaking and develop their oral communication skills. This may include role-plays, discussions, presentations, and speaking tasks that simulate real-life situations and promote fluency, pronunciation, and accuracy.

	17. Pronunciation and Intonation: English language materials often address pronunciation and intonation patterns to improve learners' spoken English. They may include exercises for practicing individual sounds, stress patterns, rhythm, and intonation to enhance clarity and naturalness in speaking. 18. Cultural and Societal Context: English language materials may incorporate cultural content to provide learners with insights into English-speaking countries' cultures, customs, and societal norms. This helps learners understand cultural context and improve their intercultural communication skills. 19. Test Preparation: If the materials are designed for exam preparation, they may include sections dedicated to practicing test-taking strategies, familiarizing learners with the format and types of questions in standardized English proficiency exams, and providing sample tests for practice. 20. Authentic Materials: English language materials often include authentic materials like newspaper articles, blogs, videos, and audio recordings to expose learners to real-life language usage and promote their understanding of English in authentic contexts.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	6. English language materials often follow a structured progression, starting with simpler concepts and gradually increasing the complexity. This scaffolding approach helps learners build upon their existing knowledge and skills, ensuring a smooth and gradual learning curve. 7. English language materials provide contextualized examples and practice exercises to help learners understand how language is used in real-life situations. By presenting language in meaningful contexts, learners can grasp its practical application and improve their comprehension and usage. 8. English language materials incorporate interactive activities like group discussions, role-plays, pair work, and language games to foster active participation and engagement. These activities promote communication, collaboration, and the application of language skills in authentic situations. 9. English language materials aim to integrate the four language skills (reading, writing, listening, and speaking) to promote holistic language development. By connecting these skills, learners can enhance their overall language proficiency and ability to communicate effectively. 10. English language materials provide a variety of practice exercises that gradually increase in difficulty. This progressive practice allows learners to reinforce their understanding, practice new language features, and build confidence in their language abilities.

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
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**	2	10% (10)	5 and 10	
	Assignments	2	10% (10)	2 and 12	
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري

	Material Covered
Week 1	**Grammer (1)** (tenses : past, present , future) , Auxiliary Verbs , questions and negatives, **Everyday English** (everyday situation)
Week 2	**Grammer (2)** :Present tenses(simple cointinus, state verbs, passive, and how often. **Vocabulary** (positive and negative adjectives). **Everyday English** (Making small talking)
Week 3	**Grammer(3)** Past tenses (simple, continuous), past perfect, and used to **Vocabulary** (spelling and pronunciation) , lost sounds **Everyday English** (Saying when)
Week 4	**Grammer (4):** Advice, Obligation, and permission modal. **Vocabulary** : Phrasal verbs **Everyday English** (Polite request and offer).
Week 5	**Grammer (5):** Future forms (Present continues and Future possibilities). **Vocabulary**: Word building (Suffixes and Prefixes). **Everyday English** (Arranging to meeting).
Week 6	**Grammer** (6) : Information questions. **Vocabulary**: Descripting people, places and things. **Everyday English** : In a department store
Week 7	**Grammer (7)** : Present Perfect (simple and continues), passive and Adverbs. **Vocabulary**: Likes and Dislikes. **Everyday English**: Making the right noises.
Week 8	**Grammer (5): Verb patterns.** **Vocabulary**: Body language. **Everyday English** (Travel and Numbers).
Week 9	Writing practice: narrative or descriptive essays

Week 10	Midterm Exam
Week 11	**Speaking**: speaking a technical report , a seminar ,
Week 12	**Team work activities** (discussion and conversation) **Seminar skills**
Week 13	Grammar review: passive voice and relative clauses.
Week 14	**Translation**: a technical report from English to Arabic and from Arabic to English Computer engineering terms.
Week 15	Preparatory week before the final Exam
Week 16	Final Exam

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Textbooks	1. New Headway for Beginner / Student book 4th edition 2. New Headway Elementary / Student book 4th edition	Yes
Recommended Texts	New Headway of Oxford / Intermediate / Student's Book Fourth edition	-
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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وصف مقررات مواد المرحلة الثالثة

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**English language II**			**Module Delivery**	
Module Type	**S**			☒**Theory** ☐**Lecture** ☐**Lab** ☐**Tutorial** ☐**Practical** ☐**Seminar**	
Module Code	ENLA302				
ECTS Credits	**2**				
SWL (hr/sem)	**50**				
Module Level	3		**Semester of Delivery**	5	
Administering Department			**College**	Engineering	
Module Leader			**e-mail**		
Module Leader's Acad. Title	Professor or Asst. Prof.		**Module Leader's Qualification**	Ph.D.	
Module Tutor			**e-mail**		
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date	01/06/2023		**Version Number**	1.0	

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
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Indicative Contents المحتويات الإرشادية	21. Vocabulary: English language materials often include vocabulary lessons and exercises to expand learners' word knowledge. This may involve learning new words, idioms, phrasal verbs, and collocations, as well as practicing their usage in context. 22. Grammar: English language materials typically cover various grammar topics and rules. They provide explanations, examples, and exercises to help learners understand and apply grammatical structures correctly. This may include topics like tenses, articles, prepositions, verb forms, and sentence structure. 23. Reading Comprehension: English language materials incorporate reading passages of different genres, such as fiction, non-fiction, news articles, and academic texts. Learners engage in activities like reading for gist, scanning for specific information, and comprehending main ideas, supporting details, and inference. 24. Writing Skills: English language materials focus on developing learners' writing skills, including sentence construction, paragraph development, essay structure, and formal writing styles. They may cover various types of writing, such as descriptive, narrative, argumentative, and persuasive writing. 25. Listening Comprehension: English language materials include listening activities to improve learners' listening skills and comprehension. These may involve listening to dialogues, conversations, lectures, interviews, and audio recordings, followed by tasks to assess understanding, inference, and note-taking. 26. Speaking Skills: English language materials provide opportunities for learners to practice speaking and develop their oral communication skills. This may include role-plays, discussions, presentations, and speaking tasks that simulate real-life situations and promote fluency, pronunciation, and accuracy. 27. Pronunciation and Intonation: English language materials often address pronunciation and intonation patterns to improve learners' spoken English. They may include exercises for practicing individual sounds, stress patterns, rhythm, and intonation to enhance clarity and naturalness in speaking. 28. Cultural and Societal Context: English language materials may incorporate cultural content to provide learners with insights into English-speaking countries' cultures, customs, and societal norms. This helps learners understand cultural context and improve their intercultural communication

	skills. 29. Test Preparation: If the materials are designed for exam preparation, they may include sections dedicated to practicing test-taking strategies, familiarizing learners with the format and types of questions in standardized English proficiency exams, and providing sample tests for practice. Authentic Materials: English language materials often include authentic materials like newspaper articles, blogs, videos, and audio recordings to expose learners to real-life language usage and promote their understanding of English in authentic contexts.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	**1.** English language materials often follow a structured progression, starting with simpler concepts and gradually increasing the complexity. This scaffolding approach helps learners build upon their existing knowledge and skills, ensuring a smooth and gradual learning curve. 2. English language materials provide contextualized examples and practice exercises to help learners understand how language is used in real-life situations. By presenting language in meaningful contexts, learners can grasp its practical application and improve their comprehension and usage. 3. English language materials incorporate interactive activities like group discussions, role-plays, pair work, and language games to foster active participation and engagement. These activities promote communication, collaboration, and the application of language skills in authentic situations. 4. English language materials aim to integrate the four language skills (reading, writing, listening, and speaking) to promote holistic language development. By connecting these skills, learners can enhance their overall language proficiency and ability to communicate effectively. 5. English language materials provide a variety of practice exercises that gradually increase in difficulty. This progressive practice allows learners to reinforce their understanding, practice new language features, and build confidence in their language abilities.

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

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**	2	10% (10)	5 and 10	
	Assignments	2	10% (10)	2 and 12	
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 01	Unit 01
Week 2	Unit 2
Week 3	Unit 3
Week 4	Unit 4

Week 5	Unit 5
Week 6	Unit 6
Week 7	Unit 7
Week 8	Unit 8
Week 9	Unit 9
Week 10	Midterm Exam
Week 11	Unit 10
Week 12	Unit 11
Week 13	Unit 12
Week 14	Unit 13
Week 15	Unit 14
Week 16	Prepare to Final Exam

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	**Available in the Library?**
Required Textbooks	1. New Headway Pre-Intermediate / Student book 4th edition 2. New Headway Intermediate / Student book 4th edition	Yes
Recommended Texts		-
Websites		

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Computer Architecture I**			**Module Delivery**	
Module Type	**Core**			☒**Theory** ☐**Lecture** ☒**Lab** ☐**Tutorial** ☐**Practical** ☐**Seminar**	
Module Code	**COAR303**				
ECTS Credits	5				
SWL (hr/sem)	**125**				
Module Level		UGIII	**Semester of Delivery**		5
Administering Department		CE	**College**	E	
Module Leader			**e-mail**		
Module Leader's Acad. Title		Lecturer	**Module Leader's Qualification**		Ph.D., M.Sc.
Module Tutor			**e-mail**		
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date		01/06/2023	**Version Number**		1.0

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1- Register Transfer and Microoperations 2- Basic Computer Organization and Design 3- Microprogrammed Control Introduction 4- Central Processing Unit 5- Pipeline
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1- understand Register Transfer 2- understand Computer Instructions 3- understand Address Sequencing 4- understand Instruction Formats 5- understand Pipelining 6- Learn Microprogram 7- Learn Data Transfer and Manipulation
Indicative Contents المحتويات الإرشادية	1- Register Transfer and Microoperations Register Transfer Language Bus and Memory Transfers Arithmetic Microoperations Logic Microoperations Shift Microoperations 2- Basic Computer Organization and Design Instruction Codes Computer Registers Timing and Control Instruction Cycle Memory-Reference Instructions Input-Output and Interrupt Complete Computer Description 3- Microprogrammed Control Introduction Control Memory Microprogram Example 4- Central Processing Unit Introduction Central Processing Unit General Register Organization Stack Organization

	Addressing Modes Data Transfer and Manipulation Reduced Instruction Set Computer 5 Pipeline Parallel Processing Arithmetic Pipeline Instruction Pipeline

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1- Ability to do arithmetic Logic Shift Unit 2- Ability to Design of Basic Computer 3- Ability to Design of Accumulator Logic 4- Ability to Design of Control Unit 5- Ability to Design Program Control 6- Ability to Design RISC Pipeline

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
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	77	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**125**		

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Register Transfer Language Register Transfer Bus and Memory Transfers Arithmetic Microoperations
Week 2	Logic Microoperations Shift Microoperations Arithmetic Logic Shift Unit
Week 3	Instruction Codes Computer Registers

	Computer Instructions
Week 4	Timing and Control Instruction Cycle Memory-Reference Instructions
Week 5	Input-Output and Interrupt Complete Computer Description
Week 6	Design of Basic Computer Design of Accumulator Logic
Week 7	Control Memory Address Sequencing
Week 8	Mid-course Exam
Week 9	Microprogram Example Design of Control Unit
Week 10	Introduction Central Processing Unit General Register Organization
Week 11	Stack Organization Instruction Formats
Week 12	Addressing Modes Data Transfer and Manipulation
Week 13	Program Control Reduced Instruction Set Computer
Week 14	Parallel Processing Pipelining

	Arithmetic Pipeline
Week 15	**Instruction Pipeline** **RISC Pipeline**
Week 16	**Preparatory week before the final Exam**

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

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Computer Organization And Architecture, William Stallings 2015	No
Recommended Texts		No
Websites		

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Microprocessor I**			**Module Delivery**	
Module Type	core			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	MICR304				
ECTS Credits	6				
SWL (hr/sem)	150				
Module Level	UGIII		**Semester of Delivery**	5	
Administering Department	Computer engineering		**College**	College of engineering	
Module Leader	Sarah waleed		**e-mail**	Sara.waleed@aliraqia.edu.iq	
Module Leader's Acad. Title	Assist.lecturer		**Module Leader's Qualification**	master	
Module Tutor			**e-mail**		
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date	1/6/2023		**Version Number**	1	

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

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1- understanding the architecture of the microprocessor 2- understanding the internal architecture of the 8086 microprocessor 3- understanding the addressing modes of 8086 microprocessor 4- understanding the instruction sets of 8086 microprocessor 5- enabling the student to write a code in assembly languag
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1- the student Understand the architecture of the microprocessor 2- the student Understand the internal architecture of the 8086 microprocessor 3- the student distinguish the different between the microprocessors 4- the student can explain how the content of some registers calculated 5- the student can explain the addressing modes of 8086 microprocessor 6- the student understand the instruction sets of 8086 microprocessor 7- the student enable to write a code in assembly language
Indicative Contents المحتويات الإرشادية	• Explain the general construction of microcomputer system. - Explain that a microcomputer system consists of CPU, RAM and ROM memories, input /output interfaces and peripheral units. And explain how to make receiving and sending of data explain the terms of 'address and data bus' • Examine the units in microcomputer system. - Draw a simple memory schema, explain the planning of memory of microcomputer system. - Examine the construction of CPU, know registers and bus systems. - Show their knowledge and ability of software which will be used for programming of process in assembly or advanced level. • Explain the information of introduction to programming. - Explain the arranging of the typical assembly language programme and its structure. Explain that this programme should be written in a general form consists of blocks 'Label Area" Instruction Area" "Explaining Area ". - Apply programming. • Realize the data transfer • Write the programme by using the instructions of conditioned branching. - Explain what the LOOP is. Know how to write instructions which have to be repeated in the programme, in the loop. - Write and apply programmes consist of arithmetic and logical works and shift work. -

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم	
Strategies	The main strategy that will be adopted to increase the student interest to understand this module is by drawing sketches that can assist the imagination of the student about the certain subject as well as to make the students participate through fast questions and quizzes.

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
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	71	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	2	10% (10)	3,6,10	LO #1, 2, 4 and 7
	Assignments	2	10% (10)	9,10	LO # 5 and 7
	Projects	1	10% (10)	All	All
	Report	1	10% (10)	All	All

Summative assessment	**Midterm Exam**	2 hr	10% (10)	11	LO # 1-7
	Final Exam	3hr	50% (50)	15	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction to the microprocessor and computer.
Week 2	Main structural component of a computer system
Week 3	Intel 8086 microprocessor - Internal Architecture
Week 4	The 8086 Hardware Specifications. Pin-outs and the pin functions.
Week 5	Internal registers of 8086 microprocessor
Week 6	Addressing Modes. Register, immediate, direct, register indirect, based-plus-index, register relative, and base relative-plus-index addressing. Unsigned and signed numbers
Week 7	Instruction Set and Programming - Data Movement Instructions.
Week 8	Instruction Set and Programming – Arithmetic and Logical Instructions.
Week 9	Instruction Set and Programming – shift and rotate instructions
Week 10	Assembly language examples
Week 11	Mid exam
Week 12	The 8086/8088 microprocessor Architecture and pin configuration Minimum mode: Bus timing. e- Ready and the wait state
Week 13	The 8086/8088 microprocessor Architecture and pin configuration Maximum mode: Bus timing. e- Ready and the wait state
Week 14	Hardware organization of the memory address space

Week 15	i/o interface
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: introduction and data transfer instructions
Week 2	Lab 2: arithmetic instructions
Week 3	Lab 3: logic and control instructions
Week 4	Lab 4: jump instruction
Week 5	Lab 5:
Week 6	Lab 6:
Week 7	Lab 7:

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Barry B. Brey “The Intel Microprocessors 8th Edition”	yes
Recommended Texts	Triebel, Walter A. “The 8088 and 8086 microprocessors: Programming, interfacing, software, hardware, and applications : including the 80286, 80386, 80486, and Pentium processor families”. 4th ed. Pearson, 2003.	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

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MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Web Development**			**Module Delivery**	
Module Type	**Core**			☒**Theory** ☐ **Lecture** ☒**Lab** ☒ **Tutorial** ☐**Practical** ☐**Seminar**	
Module Code	**WEDE301**				
ECTS Credits	**6**				
SWL (hr/sem)	**150**				
Module Level	**UGIII**		**Semester of Delivery**	5	
Administering Department	CE		**College**	E	
Module Leader	Name		**e-mail**	E-mail	
Module Leader's Acad. Title	Lecturer		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	01/06/2023		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	**Object oriented programming**	**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	20. To provide students with a solid understanding of web development principles, technologies, and best practices. 21. To equip students with the necessary skills to design and build dynamic and interactive websites. 22. To introduce students to the tools and frameworks commonly used in web development. 23. To foster problem-solving and critical thinking skills in the context of web development projects. 24. To prepare students for entry-level web development positions or further studies in the field. 25. By the end of the program participants will become an industry-ready engineer who can be readily deployed in a project
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Understand the fundamentals of web development, including client-side and server-side technologies. 2. Design and implement websites using Python,HTML, CSS, and JavaScript. 3. Utilize front-end frameworks to create interactive user interfaces and responsive designs. 4. Develop server-side applications using a back-end programming language and database integration. 5. Apply web development best practices, including version control, testing, and security considerations. 6. Deploy web applications to servers or cloud platforms and manage domain names and hosting. 7. Utilize Python frameworks such as Django or Flask to develop full-stack web applications. 8. Work with databases and integrate them into Python web applications. 9. Apply web development best practices, including version control, testing, and security considerations. 10. Deploy Python web applications to servers or cloud platforms and manage hosting. 11. Demonstrate an understanding of web design principles and create visually appealing websites. 12. Collaborate effectively in a web development project, from planning to implementation and presentation.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. 1. Introduction to web development • Overview of web technologies and their role in modern applications • Client-side vs. server-side development and the interaction between them • Introduction to web development tools and environments

	2. HTML (Hypertext Markup Language) • Basic HTML syntax and structure • Working with HTML tags, attributes, and semantic elements • Creating forms and implementing input validation • Accessibility considerations in HTML 3. CSS (Cascading Style Sheets) • Introduction to CSS syntax and selectors • Styling HTML elements and controlling layout • Responsive design and media queries • CSS frameworks and pre-processors 4. JavaScript • Introduction to JavaScript syntax, variables, and data types • Control structures (conditionals and loops) • Functions, arrays, and objects • DOM manipulation and event handling 5. Front-end frameworks • Introduction to popular front-end frameworks (e.g., React, Angular, Vue.js) • Building interactive user interfaces with components • Routing and state management in front-end applications 6. Back-end development • Introduction to back-end technologies (e.g., Node.js, Ruby on Rails, Django) • Server-side programming and API development • Handling requests and responses • Database integration and basic CRUD operations 7. Web development best practices • Version control with Git and GitHub • Testing and debugging web applications • Performance optimization and caching techniques • Security considerations (e.g., authentication, input validation) 8. Deployment and hosting • Deploying web applications to servers or cloud platforms • Managing domain names and DNS settings • Continuous integration and deployment (CI/CD) • Exploring different web hosting options 9. Web design principles • User experience (UX) design fundamentals • Color theory and typography in web design • Layout and visual hierarchy • Responsive design and mobile-first approach 10. Introduction to web development with Python • Overview of web development technologies and Python's role • Client-side vs. server-side development using Python • Introduction to web development tools and environments

	11. Python fundamentals • Python syntax, data types, and control structures • Functions, modules, and packages in Python • File handling and data manipulation using Python 12. Introduction to Python web frameworks • Overview of popular Python web frameworks (e.g., Django, Flask) • Setting up a development environment for Python web development • Creating a basic web application using a Python framework 13. Database integration with Python • Working with databases using Python libraries (e.g., SQLAlchemy) • CRUD operations (Create, Read, Update, Delete) with Python and databases • Database modeling and design principles 14. Advanced topics in Python web development • User authentication and authorization in web applications • Handling forms and input validation • API development and integration

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1. Project-Based Learning: Design projects that simulate real-world scenarios and require students to build complete web applications. This approach allows students to apply their knowledge, problem-solve, and gain practical experience. 2. Hands-On Coding: Emphasize practical coding exercises and activities to help students develop their programming skills. Provide coding challenges, assignments, and coding labs that encourage active coding and problem-solving. 3. Collaborative Learning: Encourage group work and collaboration among students. Assign group projects or pair programming exercises where students can learn from each other, share ideas, and work together to complete web development tasks. 4. Online Tutorials and Resources: Incorporate online tutorials, documentation, and resources into the curriculum. Point students to reputable websites, video tutorials, and coding platforms where they can access additional learning materials and practice coding exercises. 5. Code Reviews and Feedback: Conduct code reviews to provide constructive feedback on students' code and project implementations. This helps students

	improve their coding practices, learn from their mistakes, and understand best practices in web development. 6. Demonstrations and Presentations: Conduct live demonstrations of coding techniques, tools, and frameworks. Show examples and explain the concepts and code implementation. Encourage students to present their projects or solutions to the class, fostering communication and presentation skills. 7. Hands-On Tools and Environments: Use web development tools and integrated development environments (IDEs) that provide a user-friendly interface and facilitate coding and debugging. Introduce students to popular tools and frameworks used in the industry to give them exposure to real-world development environments. 8. Practical Exercises and Mini-Projects: Provide coding exercises and mini-projects that target specific web development skills and concepts. These hands-on activities allow students to reinforce their learning and gain practical experience in different aspects of web development. 9. Peer Learning and Mentoring: Encourage peer learning and mentoring by pairing advanced students with beginners or organizing study groups. This helps create a supportive learning environment where students can learn from each other's experiences and provide guidance to their peers. 10. Continuous Assessment and Feedback: Implement regular assessments throughout the course to evaluate students' understanding and progress. Provide timely feedback on assignments, projects, and assessments to guide students' learning and address any gaps or misconceptions. 11. Stay Updated with Industry Trends: Stay abreast of the latest trends, tools, and technologies in web development. Incorporate current industry practices and emerging technologies into the curriculum to ensure students are equipped with relevant and up-to-date skills.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	79	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	71	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**150**		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	3	10% (10)	2,5 and 11	LO #1, #2, #4 and #10, #11
	Assignments	2	10% (10)	3 and 12	LO #3, #5 and #8, #11
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	15	LO #6, #10 and #12
Summative assessment	**Midterm Exam**	2hr	10% (10)	9	LO #1 - #8
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	**Introduction to HTML :** Introduction to Internet programming, HTML language, Description and running through IE, How to write codes in HTML?, Headings, titles. The body in HTML language, background colors, pages and breaks
Week 2	**Lists & Tables in HTML language :** Ordered list and unordered list, creating table, table attributes and features
Week 3	**Images** : Images , Combining paragraphs with table and images. **Forms in HTML** I : Command buttons, Textboxes and text areas, Checkboxes and radio buttons, Select lists in Forms, combining Forms with images and tables, Introduction to dynamic programming, client side versus server side
Week 4	Introduction to CSS syntax and selectors & Styling HTML elements and controlling layout
Week 5	Responsive design and media queries & CSS frameworks and pre-processors

Week 6	Client-Side Programming and Server-Side Programming : Client-Side Programming and Server-Side Programming, JavaScript, The Script Tag, Handling older browsers, JavaScript Statements, Script statement execute, JavaScript data types, Variables, Data type conversions, Arithmetic operators, Comparison operators,Control Structures, Loops , Arrays and Functions.
Week 7	Window and Document objects ,the window object, creating window, properties and methods
Week 8	Forms and Form elements, creating a form, form properties Passing form data to functionsand Submitting forms
Week 9	**Midterm Exam**
Week 10	Front-end frameworks : Building interactive user interfaces with components Back-end development: Server-side programming and API development
Week 11	Introduction to web development with Python, Client-side vs. server-side development using Python Python fundamentals: syntax, data types, control structures Functions, modules, and packages
Week 12	Introduction to Python web frameworks
Week 13	Database integration with Python
Week 14	Advanced topics in Python web development: Working with databases using Python libraries (e.g., SQLAlchemy) CRUD operations (Create, Read, Update, Delete) with Python and databasesDatabase modeling and design principles
Week 15	**Advanced topics in Python web development:** User authentication, Handling forms and input validation, API development and integration
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Web page creation using HTML
Week 2	Lab 2: Applying CSS styles to HTML elements, including layout and positioning
Week 3	Lab 3: Writing JavaScript functions to perform simple calculations,events handlers and handling user interactions
Week 4	Lab 4: Creating database models and defining relationships between entities and Performing data validation and handling database errors

Week 5	Lab 5: Introduction to Python web frameworks (e.g., Flask, Django), Flask Web Framework, Connecting Python applications to databases
Week 6	Lab 6: Django Web Framework, Building RESTful APIs using Flask or Django Rest Framework.
Week 7	Lab 7: Front-End Development with JavaScript and Python

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Learning Web Design: A Beginner's Guide to HTML, CSS, JavaScript, and Web Graphics" by Jennifer Niederst Robbins	Yes
Recommended Texts	• "Flask Web Development with Python Tutorial" by Miguel Grinberg • "Django for Beginners: Build websites with Python and Django" by William S. Vincent	No
Websites	https://developer.mozilla.org/ https://www.w3schools.com/ https://www.fullstackpython.com/	

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Probability**			**Module Delivery**	
Module Type	B			☒ **heory** ☐ **Lecture** ☐**Lab** ☒**Tutorial** ☐**Practical** ☐**Seminar**	
Module Code	PROB300				
ECTS Credits	**4**				
SWL (hr/sem)	**100**				
Module Level	UGIII		**Semester of Delivery**	5	
Administering Department	computer engineering		**College**	College of engineering	
Module Leader			**e-mail**	@aliraqia.edu.iq	
Module Leader's Acad. Title			**Module Leader's Qualification**		
Module Tutor	Nil		**e-mail**	Nil	
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date	01/06/2023		**Version Number**	1.0	

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	16. Understanding Basic Probability Concepts: The primary aim is to help students understand the fundamental principles of probability. This includes the interpretation of probability, random variables, probability mass/density functions, cumulative distribution functions, expected values, variance, and other basic concepts. Describing the AutoCAD program and Its icons, knowing what's new in AutoCAD version. 17. Probability Distributions: Engineers should understand various discrete and continuous probability distributions, their properties, and how they can be used to model various phenomena. Examples include Binomial, Poisson, Uniform, Normal, Exponential, and Gamma distributions. Reading plans of projects . 18. Modeling Uncertainty: One of the primary uses of probability in engineering is to model uncertainty. This includes understanding how to model random phenomena, from simple things like coin flips to complex systems with many interacting parts. Auto desk AutoCAD software provide powerful ,integrated 2D modeling, drawing ,and layers tools that enable designers to focus more energy on creative ,rather than technical challenges 19. Stochastic Processes: For time-dependent or sequence-dependent phenomena, understanding stochastic processes such as Markov chains, Poisson processes, and queuing theory can be crucial. 20. Problem-Solving Skills: Lastly, a core aim is to develop problem-solving skills, i.e., the ability to apply theoretical knowledge to practical problems, an essential trait for any engineer.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	7. Understand Fundamental Concepts: Students will understand fundamental concepts of probability theory, including events, sample spaces, probability axioms, random variables, and types of probability (e.g., conditional, marginal, joint). 8. Proficiency with Probability Distributions: Students will be able to identify, describe, and use different types of probability distributions (both discrete and continuous) and will know how to apply these to engineering problems. 9. Statistical Analysis: Students will be able to perform basic statistical analyses using probabilistic methods. This includes calculating measures of central tendency (mean, median, mode) and dispersion (variance, standard deviation), as well as understanding more advanced concepts such as covariance and correlation. 10. Application of Probability to Real-World Engineering Problems: Students will be able to apply the principles of probability to analyze real-world engineering problems, assessing risks, reliability, and uncertainties in engineering systems. 11. Understanding Stochastic Processes: Students will have a basic understanding of key stochastic processes like Markov chains, Poisson processes, and queuing theory, and will know how to apply these to relevant engineering problems. 12. Critical Thinking and Problem-Solving Skills: Students will enhance their ability to think critically and solve complex problems using probabilistic methods.

Indicative Contents المحتويات الإرشادية	Indicative content includes the following. 1. Introduction to probability and statistics. 2. Basic counting principles: permutation and Combination . 3. Frequency distribution. 4. Measures of Tendency. 5. Measures of dispersion. 6. Elementary probability and Conditional probability . 7. Probability distribution Functions. 8. Expected and variance. 9. Distributions. 10. Joint probability distribution Function. 11. Expected, covariance, correlation.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Emphasize the underlying concepts and principles of probability and statistics rather than focusing solely on calculations and formulas. Help students grasp the fundamental ideas behind probability, statistical inference, and data analysis to build a solid.

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
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	52	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**100**		

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction to probability and statistics Sample space Events Experiment Basic counting principles: permutation
Week 2	Combination Mixed between permutation and combination
Week 3	Frequency distribution Frequency table Cumulative frequency Histogram O-gives
Week 4	Measures of Tendency Mean Median Mode

Week 5	Measures of dispersion Range Average deviation Variance
Week 6	Measures of dispersion Variance Standard deviation
Week 7	Probability Elementary probability
Week 8	Probability Conditional probability
Week 9	Mid exam
Week 10	Probability distribution Functions Discrete and continuous variables Probability distribution Function
Week 11	Expected and variance
Week 12	Distributions Binomial distribution Normal distribution
Week 13	Joint probability distribution Function Marginal Functions Independent variables
Week 14	Expected, covariance, correlation
Week 15	Preparatory week before the final Exam

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

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Probability and statistics for engineering and scientists By : Walpole and Myers	I don't know?????
Recommended Texts	1. Probability and statistics for engineers By : Miller and Freund's 2. Applied mathematics journals, schaum series in Probability and statistics	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

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MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Software Engineering**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☐ **Lecture** ☐ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**SOFT300**				
ECTS Credits	**4**				
SWL (hr/sem)	**100**				
Module Level	UGIII		**Semester of Delivery**	5	
Administering Department	Computer Engineering		**College**	College of Engineering	
Module Leader			**e-mail**		
Module Leader's Acad. Title	Lecturer		**Module Leader's Qualification**	Ph.D.	
Module Tutor	-		**e-mail**	-	
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date	01/06/2023		**Version Number**	1.0	

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	33. Software Development Life Cycle (SDLC): Understand the various phases of the software development process, including requirements gathering, system design, implementation, testing, deployment, and maintenance. 34. Software Requirements Engineering: Learn techniques for eliciting, analyzing, documenting, and managing software requirements. Explore methods to ensure that requirements are complete, consistent, and feasible. 35. Software Design and Architecture: Study principles and practices of designing software systems and their architectures. Learn about software design patterns, modularization, coupling and cohesion, and trade-offs between different architectural styles. 36. Programming Principles and Practices: Gain proficiency in programming languages, coding standards, and best practices for developing reliable and maintainable software. Learn about code refactoring, code reviews, and code quality assurance techniques. 37. Software Testing and Quality Assurance: Understand testing techniques, strategies, and methodologies to validate software functionality, reliability, and performance. Learn about different types of testing, such as unit testing, integration testing, system testing, and acceptance testing. 38. Software Maintenance and Evolution: Learn strategies for managing software maintenance, bug fixing, and system upgrades. Understand the importance of documentation, version control, and change management in the software maintenance process. 39. Software Project Management: Explore project management methodologies and techniques specific to software development projects. Learn about project planning, scheduling, resource allocation, risk management, and team coordination. 40. Software Configuration Management: Understand the principles and practices of managing software configurations, including version control, release management, and software baselining. Learn about tools and techniques for configuration management. 41. Software Engineering Ethics and Professionalism: Discuss ethical issues and responsibilities in software engineering, including intellectual property, privacy, and software piracy. Understand the importance of professional conduct, legal obligations, and social implications of software development. 42. Software Engineering Tools and Environments: Familiarize yourself with various software engineering tools, such as integrated development environments (IDEs), bug tracking systems, and software modeling tools. Learn how to effectively use these tools to enhance productivity and collaboration.
Module Learning Outcomes	1. Understanding of Software Engineering Principles: Gain a comprehensive understanding of the fundamental principles and concepts of software engineering, including software development methodologies, best practices, and industry standards. 2. Ability to Apply Software Development Processes: Apply the knowledge of

مخرجات التعلم للمادة الدراسية	software development life cycles and processes to analyze, design, implement, test, and maintain software systems effectively and efficiently. 3. Proficiency in Requirements Engineering: Acquire skills to elicit, analyze, and document software requirements accurately, ensuring that they meet the needs of stakeholders and are feasible to implement. 4. Competence in Software Design and Architecture: Develop the ability to design software systems and architectures that are modular, scalable, and maintainable. Apply design patterns and principles to create robust and flexible software solutions. 5. Skill in Programming and Coding Practices: Demonstrate proficiency in programming languages and apply coding practices, such as code readability, code reuse, and code optimization, to develop high-quality software. 6. Competency in Software Testing and Quality Assurance: Apply testing techniques and methodologies to validate software functionality, detect defects, and ensure software quality. Develop skills in test planning, test case design, and test execution. 7. Knowledge of Software Maintenance and Evolution: Understand the challenges and strategies involved in maintaining and evolving software systems. Acquire skills in bug fixing, system upgrades, and software documentation to support ongoing software maintenance. 8. Ability to Manage Software Projects: Gain knowledge of project management principles and practices specific to software development projects. Develop skills in project planning, scheduling, resource allocation, risk management, and effective communication. 9. Awareness of Software Ethics and Professionalism: Understand ethical issues related to software development, including intellectual property, privacy, and security. Demonstrate professionalism in software engineering practices, adhering to legal and ethical standards. 10. Familiarity with Software Engineering Tools: Gain familiarity with software engineering tools and environments commonly used in the industry, such as IDEs, version control systems, bug tracking systems, and software modeling tools. Develop skills in utilizing these tools effectively for software development tasks
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. 1. Introduction to Software Engineering: • Definition, scope, and goals of software engineering • Historical development and evolution of software engineering • Software engineering principles, methodologies, and practices 2. Software Development Life Cycle (SDLC): • Overview of the different phases of the SDLC, including requirements engineering, system design, implementation, testing, deployment, and maintenance • Introduction to agile methodologies, such as Scrum or Kanban, and their application in software development 3. Requirements Engineering: • Eliciting, analyzing, and documenting software requirements • Techniques for requirements gathering, including interviews, surveys, and

	use case analysis • Requirements validation and verification • Managing requirements changes and scope creep 4. Software Design and Architecture: • Principles and concepts of software design and architecture • Structural and behavioral design patterns • Object-oriented design principles • Design documentation and modeling techniques, such as UML (Unified Modeling Language)

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1. Lectures: Traditional lectures are a common strategy for delivering foundational knowledge and introducing key concepts in software engineering. Instructors provide explanations, examples, and demonstrations to convey information to students. 2. Case Studies: Case studies involve analyzing real-world software engineering projects or scenarios. By studying these cases, students gain insights into practical challenges, decision-making processes, and best practices in software engineering. 3. Group Projects: Assigning group projects allows students to collaborate and apply software engineering principles and practices in a hands-on manner. Working in teams, they can develop software systems, following the entire software development life cycle and solving problems collectively. 4. Code Reviews: Conducting code reviews provides students with opportunities to review and provide feedback on each other's code. This strategy promotes critical thinking, encourages collaboration, and helps students improve their coding practices and quality assurance skills. 5. Practical Exercises and Coding Assignments: Providing practical exercises and coding assignments helps students apply their knowledge and skills in practice. These exercises can involve implementing algorithms, designing software modules, or solving software engineering problems. 6. Demonstrations and Simulations: Instructors can use demonstrations or simulations to showcase software engineering concepts or techniques in action. For example, they may demonstrate the use of a version control system or simulate a software testing scenario to illustrate specific principles.

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
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	67	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**100**		

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

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Software Development process : • Feasibility and planning • Requirements • Design • Implementation • Acceptance and release Operation and maintenance
Week 2	Software Processes: 1.Sequential The Waterfall Model, 2.Iterative Refinement (Evolutionary Development), 3.Phased Development
Week 3	Requirements Analysis and Specification Requirements in Software Development, Requirements in the Waterfall Model, Requirements in Iterative Refinement, Goals During the Requirements Phase, Why are Requirements Important, The Requirements Process, Requirements Analysis, Requirements Documentation. Requirement specification.
Week 4	Modeling Techniques for Requirements Analysis and Definition UML modling, Data-Flow Models, Entity-Relation Model
Week 5	Software Design Design for Usability, User Interface Design, Information Presentation: Separation of Presentation from Content, The Importance of User Interface Design, Special Considerations: (Disabilities, Computer Systems and Networks, Design Tensions in Networked Systems, Device-Aware User Interfaces, Usability and Cost)
Week 6	System Architecture and Design: System and Subsystem Modeling using UML techniques. Object Oriented Design : complete case study
Week 7	Mid - course Exam
Week 8	Reliability and Dependability

	User Perception of Reliability, Reliability Metrics, Requirements Specification of System Reliability, Cost of Improved Reliability, Building Dependable Systems: Three Principles, Reliability: Modified Waterfall Model, Key Factors for Reliable Software.
Week 9	Static and Dynamic Verification, Static Verification(Program Inspections, Inspection Checklist: Common Errors), Static Analysis Tools, Failures and Faults, Fault Avoidance, Defensive Programming, Maintenance, Fault Tolerance, Software Engineering for Real Time
Week 10	Validation and Verification, The Testing Process, Test Design, Testing Strategies, Methods of Testing, Stages of Testing, 1. Unit testing (unit test), 2. System testing(integration test, function test, performance test, installation test, Acceptance testing)
Week 11	Performance of Computer Systems Predicting System Performance, Understand Interactions between Hardware and Software, Look for Bottlenecks, Mathematical Models: Queues, Fixing Bad Performance, Techniques for Eliminating Bottlenecks, Measurements on Operational Systems.
Week 12	Software Development Staff, Managing People, Maslow's Hierarchy of Needs, Administrative Leader (Manager), Group Working, Communication, Hiring Criteria, Staff Retention, Salaries, Firmness, Technical Challenges, product manager, quality assurance.
Week 13	Delivering the System Delivery of Software: Categories of Product, Training, Training and Usability, Help Systems, Documentation, Categories of Documentation, Installation Tools,
Week 14	Risk in Software Engineering Failures and Risks, Managing Risk, Canceling a Project, Failure to Cancel a Project, Time to Complete a Software Project, Changing Requirements and Design, Changes of Leadership
Week 15	Software Development process : • Feasibility and planning • Requirements • Design • Implementation • Acceptance and release Operation and maintenance
Week 16	**Preparatory week before the final Exam**

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts		Yes
Recommended Texts		Yes
Websites		

Grading Scheme

مخطط الدرجات

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Signals and Systems**			**Module Delivery**	
Module Type	**Core**			☒**Theory** ☐**Lecture** ☐**Lab** ☒**Tutorial** ☐**Practical** ☐**Seminar**	
Module Code	SISY302				
ECTS Credits	**5**				
SWL (hr/sem)	**125**				
Module Level		UGII	**Semester of Delivery**		5
Administering Department		Computer engineering	**College**	College of engineering	
Module Leader	Name		**e-mail**	@aliraqia.edu.iq	
Module Leader's Acad. Title		Prof.	**Module Leader's Qualification**		Ph.D.
Module Tutor			**e-mail**		
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date		01/06/2023	**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Mathematics II	**Semester**	2
Co-requisites module		**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	The objective of this course is to develop the understanding of the basic ideas of the Signals & Systems encountered in engineering. The focus will be on the methods for characterizing and analyzing continuous-time signals and systems. Students will learn some transform techniques (Fourier transform) that are useful for the understanding of Digital communication systems, Feedback control systems, Satellite and mobile communications, Digital signal processing and Digital image processing.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	On completion of the course, student will be able to: 1. Express the concepts of signals and systems and their different types which can be used in a wide variety of disciplines in engineering. 2. Identify and report system properties such as causality, stability, linearity, and time invariance etc. 3. Apply the convolution integral formulas to determine the output of continuous time systems. 4. Understand and resolve the signals in frequency domain using Fourier series and Fourier transforms. 5. Understand the limitations of Fourier transform and need for Laplace transform and develop the ability to analyze the system in s- domain. 6. Understand the concept of filters and their design.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following: • Basic signals of continuous time. • Signals and Their Classification - Continuous time (CT) and Discrete Time (DT) signals, Periodic & Aperiodic signals, Deterministic & Random signals, Energy & Power signals. • Properties of continuous time systems. • Linear, time invariant (LTI) systems. • Operations on Signals • Signal convolution - integral formula • Representation of periodic signals as Fourier series. • Continuous time Fourier transform. • Analysis of LTI systems in the field of time and frequency. • The Fourier Transform - Introduction • Properties of Continuous time Fourier Transform • Finite impulse response (FIR) Filter analysis and design • Infinite impulse response (IIR) Filter analysis and design • Butterworth Analog Filters • Cheby-Chev Analog Filters

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 reports involving some sampling activities that are interesting to the students.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	62	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**125**		

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Fundamental Concepts of Signals & Systems - Introduction
Week 2	Signals and Their Classification
Week 3	Operations on Signals
Week 4	Systems and Classification of Systems - Interconnections of Systems
Week 5	Linear Time Invariant Systems - Introduction
Week 6	Properties of Continuous Time LTI System
Week 7	Signal convolution method - integral formula
Week 8	**Mid-term Exam**

Week 9	The Fourier Transform - Introduction
Week 10	Properties of Continuous time Fourier Transform
Week 11	Laplace Transform -Review
Week 12	Filter Analysis and design (FIR & IIR)
Week 13	Butterworth Analog Filters
Week 14	Cheby-Chev Analog Filters
Week 15	Review to Butterworth Analog Filters and Cheby-Chev Analog Filters
Week 16	**Preparatory week before the final Exam**

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

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Alan V. Oppenheim, Signals & Systems 2nd Edition, Pearson Education, 2008.	Yes
Recommended Texts	Signals and Systems, Simon Haykin and Barry Van Veen, 2nd edition, Wiley 2005.	yes
Websites	https://www.coursera.org/learn/ signals and systems fundamentals	

Grading Scheme

مخطط الدرجات

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Computer Architecture II**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☐ **Lecture** ☐**Lab** ☒**Tutorial** ☐**Practical** ☐**Seminar**	
Module Code	**COAR312**				
ECTS Credits	5				
SWL (hr/sem)	**125**				
Module Level		UGIII	**Semester of Delivery**		6
Administering Department		CE	**College**	E	
Module Leader			**e-mail**		
Module Leader's Acad. Title		Lecturer	**Module Leader's Qualification**		Ph.D., M.Sc.
Module Tutor			**e-mail**		
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date		01/06/2023	**Version Number**		1.0

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	6- Vector Processing 7- Computer Arithmetic 8- Input-Output Organization 9- Memory Organization 10- Multiprocessors
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	8- understand Vector Processing 9- understand Computer Arithmetic 10- understand Input-Output Organization 11- understand Memory Organization 12- understand Multiprocessors 13- Learn the major type of Computer Arithmetic 14- Learn the difference type of Memory Organization
Indicative Contents المحتويات الإرشادية	1- Vector Processing Vector Processing Array Processors 2- Computer Arithmetic Introduction Addition and Subtraction Multiplication Algorithms Division Algorithms Floating-Point Arithmetic Operations Decimal Arithmetic Unit Decimal Arithmetic Operations 3- Input-Output Organization Peripheral Devices Asynchronous Data Transfer Modes of Transfer Priority Interrupt Direct Memory Access Serial Communication 4- Memory Organization Memory Hierarchy Main Memory

	Auxiliary Memory Associative Memory Cache Memory Virtual Memory 5 Multiprocessors Characteristics of Multiprocessors Interconnection Structures Interprocessor Arbitration Interprocessor Communication and Synchronization Cache Coherence

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	7- Ability to design Input-Output Interface 8- Ability to read Input-Output Processor 9- Ability to design Memory Management Hardware

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
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	77	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**125**		

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Vector Processing
Week 2	Array Processors
Week 3	Addition and Subtraction Multiplication Algorithms
Week 4	Division Algorithms Floating-Point Arithmetic Operations
Week 5	Decimal Arithmetic Unit Decimal Arithmetic Operations
Week 6	Peripheral Devices

	Input-Output Interface
Week 7	Asynchronous Data Transfer Modes of Transfer Priority Interrupt
Week 8	Mid-course Exam
Week 9	Direct Memory Access Input-Output Processor Serial Communication
Week 10	Memory Hierarchy Main Memory Auxiliary Memory
Week 11	Associative Memory Cache Memory Virtual Memory
Week 12	Memory Management Hardware
Week 13	Characteristics of Multiprocessors
Week 14	Interconnection Structures Interprocessor Arbitration
Week 15	Interprocessor Communication and Synchronization Cache Coherence
Week 16	**Preparatory week before the final Exam**

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

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts		No
Recommended Texts		No
Websites		

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

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MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Digital Signal processing**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☐ **Lecture** ☐**Lab** ☒**Tutorial** ☐**Practical** ☐**Seminar**	
Module Code	DISP311				
ECTS Credits	**4**				
SWL (hr/sem)	**100**				
Module Level		UGIII	**Semester of Delivery**		6
Administering Department		Computer engineering	**College**	College of engineering	
Module Leader	Name		**e-mail**	@aliraqia.edu.iq	
Module Leader's Acad. Title		Prof.	**Module Leader's Qualification**		Ph.D.
Module Tutor			**e-mail**		
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date		01/06/2023	**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Signals and Systems	**Semester**	Five
Co-requisites module		**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	The objective of this course is to develop an understanding of the basic ideas of the Digital Signal encountered in engineering. Focus will be on the methods for characterizing and analyzing Discrete-time signals and systems. Students will learn some transform techniques (Fourier transform, z-transform) that are useful for the understanding of Digital communication systems, Feedback control systems, Satellite and mobile communications, and Digital image processing.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	On completion of the course, student will be able to: 7. Understand the fundamentals of signal sampling. 8. Express the concepts of Discrete signals and systems and their different types which can be used in a wide variety of disciplines in engineering. 9. Identify and report system properties such as causality, stability, linearity, and time invariance etc. 10. Apply the convolution sum formulas to determine the output of discrete time systems. 11. Understand and resolve the Discrete time signals in frequency domain using Fourier series and Fourier transforms, and Fast Fourier Transform. 12. Understand the concept of z-transform and its and develop the ability to analyze the system in z- domain. 13. Understand the concept of digital filter design and develop the ability to design filters using different methods.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following: • Sampling of continuous-time signals. • Basic signals of Discrete time. • Discrete time Signals and Their Classification - Continuous time (CT) and Discrete Time (DT) signals, Periodic & Aperiodic signals, Deterministic & Random signals, Energy & Power signals. • Operations on Discrete time Signals • Properties of Discrete time systems. • Discrete time System Impulse response Evaluation. • Signal convolution methods (Graphical method, Table method, mathematical method). • Representation of Discrete Fourier transform and its properties. • Discrete Fourier series (DFS) • Fast Fourier Transform (FFT) • Introduction to Z-transform and its properties. • Digital FIR Filter Analysis and design • Digital IIR Filter Analysis and design - Butterworth Analog Filters • Digital IIR Filter Analysis and design - Cheby-Chev Analog Filters

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 reports involving some sampling activities that are interesting to the students.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	48	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	3
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	52	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**100**		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	2	20% (20)	5 and 10	LO #1, #2 and #5, #6
	Assignments	2	20% (20)	2 and 12	LO #2, #3 and #6, #7
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #4
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Fundamental Concepts of Discrete Signals and Systems - Introduction
Week 2	Sampling of continuous-time signals: the sampling theorem, Aliasing, Nyquist rate.
Week 3	Discrete time signal types and operations on Discrete time signals.
Week 4	Discrete time system types and properties.
Week 5	Discrete time System Impulse response Evaluation
Week 6	Discrete time System convolution (Graphical method, Table method, mathematical method)
Week 7	**Mid-term Exam**
Week 8	Introduction to Discrete Fourier transform and its properties
Week 9	Discrete Fourier series (DFS)
Week 10	Fast Fourier Transform (FFT)
Week 11	Introduction to Z-transform and its properties.
Week 12	Digital FIR Filter Analysis
Week 13	Digital FIR Filter design
Week 14	Digital IIR Filter Analysis
Week 15	Digital IIR Filter design
Week 16	**Preparatory week before the final Exam**

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

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Digital Signal Processing: Principles, Algorithms and Applications, Prentice Hall John G. Proakis, Dimitris K Manolakis., 1992.	Yes
Recommended Texts	Discrete-Time Signal Processing by A. V. Oppenheim and R. W. Schafer, 1999.	yes
Websites	https://www.coursera.org/learn/ Digital signal processing	

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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MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Microprocessor II**			**Module Delivery**	
Module Type	core			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	MICR314				
ECTS Credits	5				
SWL (hr/sem)	125				
Module Level	UGIII		**Semester of Delivery**	6	
Administering Department	Computer engineering		**College**	College of engineering	
Module Leader	Sarah waleed		**e-mail**	Sara.waleed@aliraqia.edu.iq	
Module Leader's Acad. Title	Assist.lecturer		**Module Leader's Qualification**	master	
Module Tutor			**e-mail**		
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date	1/6/2023		**Version Number**	1	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Microprocessor I	**Semester**	Five
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- enabling the student to write a code in assembly language for interfacing 2- Enabling the student to connect and control the LED 3- Enabling the student to connect and control the 7-segment 4- Enabling the student to connect and control the stepper motor
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1- enabling the student to write a code in assembly language for interfacing 2- Enabling the student to connect and control the LED 3- Enabling the student to connect and control the 7-segment 4- Enabling the student to connect and control the stepper motor 5- Enabling the student to connect and rotate the stepper motor 6- Using Switches As Input To Control Mechanical Press 7- Generating Sine Wave Using DAC
Indicative Contents المحتويات الإرشادية	
Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The main strategy that will be adopted to increase the student interest to understand this module is by drawing sketches that can assist the imagination of the student about the certain subject as well as to make the students participate through fast questions and quizzes.

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
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	46	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
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)	2,4,14	LO #1, 2, 3,5 and 6
	Assignments	2	10% (10)	3,14	LO # 3 and 7
	Projects / Lab.	1	10% (10)	All	All
	Report	1	10% (10)	All	All
Summative assessment	**Midterm Exam**	2 hr	10% (10)	7	LO # 1-5
	Final Exam	3hr	50% (50)	15	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Representing Binary Code With LED Array

Week 2	Representing BCD Code With LED Array
Week 3	Seven Segment Interfacing
Week 4	Square Traffic Light
Week 5	Light Detected Resistor (LDR).
Week 6	IC Tester
Week 7	Stepper Motor
Week 8	Mid-course Exam
Week 9	Rotate The Stepper Motor Bidirectional
Week 10	Reading Switches Status And Output To Leds.
Week 11	Using Switches As Input To Control Mechanical Press
Week 12	Converting Analogue Input (Variable Pot) To Digital
Week 13	Generating Sine Wave Using DAC
Week 14	Motor Control
Week 15	Temperature Control
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

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

Week 7	Lab 7:

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Barry B. Brey "The Intel Microprocessors 8th Edition"	yes
Recommended Texts	Triebel, Walter A. "The 8088 and 8086 microprocessors: Programming, interfacing, software, hardware, and applications : including the 80286, 80386, 80486, and Pentium processor families". 4th ed. Pearson, 2003.	yes
Websites		

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

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Computer Network**			**Module Delivery**	
Module Type	**Core**			☒**Theory** ☐**Lecture** ☒**Lab** ☐**Tutorial** ☐**Practical** ☐**Seminar**	
Module Code	**CONE315**				
ECTS Credits	**6**				
SWL (hr/sem)	**150**				
Module Level	UGIII		**Semester of Delivery**	6	
Administering Department	CE		**College**	E	
Module Leader			**e-mail**		
Module Leader's Acad. Title	Lecturer		**Module Leader's Qualification**	Ph.D., M.Sc.	
Module Tutor			**e-mail**		
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date	01/06/2023		**Version Number**	1.0	

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	As a result of successfully completing this course, students will: 1. Understanding Network Fundamentals: Students should develop a solid understanding of the fundamental concepts and principles of computer networks, including network architecture, protocols, models (such as the OSI model), and network components. 2. Network Design and Implementation: Students should learn how to design and implement computer networks, including planning network topologies, addressing schemes, subnetting, and selecting appropriate networking hardware and software components. 3. Network Protocols and Technologies: Students should gain knowledge about various network protocols and technologies used in modern networks, such as TCP/IP, Ethernet, Wi-Fi, routing protocols (e.g., OSPF, BGP), and network security protocols (e.g., SSL/TLS, IPsec). 4. Network Troubleshooting and Maintenance: Students should learn how to diagnose and troubleshoot network issues, including identifying and resolving common network problems, performance optimization, and network monitoring techniques. 5. Network Security: Students should understand the principles of network security, including authentication, encryption, firewalls, intrusion detection systems (IDS), and network security best practices. 6. Network Management: Students should acquire knowledge of network management concepts, tools, and techniques, including network monitoring, configuration management, performance management, and network documentation. 7. Network Services and Applications: Students should be familiar with various network services and applications, such as DNS, DHCP, email, web servers, file sharing, and virtual private networks (VPNs). These learning objectives provide a foundation for understanding computer networks and preparing students for careers in network administration, network engineering, cybersecurity, and related fields.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Write at least 6 Learning Outcomes, better to be equal to the number of study weeks. 22. Understand the fundamental concepts and principles of computer networks, including network architecture, protocols, and standards . 23. Demonstrate knowledge of the various network components, such as routers, switches, hubs, and network cables, and their functions within a network infrastructure. 24. Design and configure local area networks (LANs) and wide area networks (WANs) using appropriate network topologies, protocols, and addressing schemes. 25. Evaluate different network protocols, such as TCP/IP, Ethernet, and wireless protocols, and understand their advantages, disadvantages, and

	appropriate use cases. 26. Understand the principles of network security, including authentication, encryption, firewalls, and intrusion detection systems, and apply them to secure network infrastructure. 27. Demonstrate knowledge of network management techniques, including network monitoring, performance optimization, and capacity planning. 28. Understand the concepts of network administration and configuration management, including user management, resource sharing, and network documentation.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. 1. Introduction to Computer Networks • Basic concepts and terminology • Network architecture and protocols • Network standards and organizations (e.g., IEEE, IETF) 2. Network Models and Protocols • OSI (Open Systems Interconnection) model • TCP/IP (Transmission Control Protocol/Internet Protocol) suite • Ethernet and LAN protocols • Wireless networking protocols (e.g., Wi-Fi, Bluetooth) 3. Network Components and Devices • Network interface cards (NICs) • Routers, switches, and hubs • Network cables (e.g., Ethernet, fiber optic) • Wireless access points 4. Network Topologies and Architectures • Bus, star, ring, and mesh topologies • Client-server and peer-to-peer architectures • Hybrid and cloud-based network architectures 5. Network Addressing and Subnetting • IP addressing (IPv4 and IPv6) • Subnet masks and subnetting techniques • Address resolution protocols (ARP) 6. Network Routing and Switching • Routing algorithms and protocols (e.g., RIP, OSPF, BGP) • Switching techniques (e.g., VLAN, STP, VTP) 7. Network Security and Authentication • Network vulnerabilities and threats • Firewalls and intrusion detection systems • Virtual private networks (VPNs) • Authentication protocols (e.g., RADIUS, TACACS+) 8. Network Performance and Optimization • Network bandwidth and throughput • Quality of Service (QoS) techniques 9. Network optimization and traffic management • Network Management and Monitoring • Network monitoring tools and techniques • Network management protocols (e.g., SNMP) • Configuration management and backups.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1. Lectures and Presentations: Instructors deliver lectures and presentations to introduce theoretical concepts, explain network protocols, and provide an overview of network architectures. This strategy helps students gain a foundational understanding of computer networks. 2. Hands-on Labs and Simulations: Practical implementation is crucial in computer network subjects. Students participate in hands-on labs where they configure network devices, simulate network scenarios, and troubleshoot network issues. This strategy allows students to apply theoretical knowledge in a practical setting. 3. Group Discussions and Collaborative Learning: Group discussions and collaborative learning activities encourage students to actively engage with the subject matter. They can discuss network design challenges, analyze case studies, and share their insights and experiences. This strategy promotes critical thinking, problem-solving skills, and peer learning. 4. Assignments and Projects: Assignments and projects provide opportunities for students to apply their knowledge to real-world scenarios. They may involve designing network topologies, implementing network security measures, or troubleshooting network problems. This strategy allows students to deepen their understanding and develop practical skills. 5. Online Resources and Self-Study Materials: Instructors provide students with online resources, such as websites, tutorials, and videos, to supplement their learning. Self-study materials, such as textbooks and reference guides, are also recommended. This strategy enables students to explore topics in more depth and at their own pace. 6. Networking Tools and Simulators: Using networking tools and simulators, such as Packet Tracer or GNS3, allows students to practice network configurations and experiment with different network setups. This strategy enhances hands-on learning and provides a safe environment for experimentation. 7. Guest Lectures and Industry Professionals: Inviting guest speakers, such as network engineers or industry professionals, to share their expertise and experiences can provide valuable insights into real-world applications of computer networks. Students can learn about current industry trends, network management practices, and potential career paths. 8. Assessments and Examinations: Regular assessments, such as quizzes, tests, or exams, evaluate students' comprehension of the subject matter. These assessments can be a mix of theoretical questions and practical exercises, allowing students to demonstrate their knowledge and skills. 9. Real-World Examples and Case Studies: Incorporating real-world examples and case studies helps students connect theoretical concepts to practical situations. They can analyze network implementations in various industries, study network failures and their solutions, and understand the impact of network design choices. 10. Continuous Learning and Professional Development: Encouraging students to engage in continuous learning and professional development is important in a rapidly evolving field like computer networking. Instructors can recommend industry publications, online forums, and networking certifications to 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	3
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	86	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**150**		

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

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	**INTRODUCTION:** Historical review
Week 2	Network Architecture, OSI Vs TCP.
Week 3	Network hardware architecture: topologies, devices.
Week 4	Introduction to types of networks - Optical Networks, Sensor networks.
Week 5	**PHYSICAL AND DATA LINK LAYERS:** Basics for Data communications, Transmission Media
Week 6	Guided and unguided, transmission media - Communication satellites -
Week 7	Data link Layer design issues - Error Detection & Correction - Elementary Data link Protocols - Sliding window Protocols.
Week 8	Mid-course Exam
Week 9	**MAC & NETWORK LAYERS:** Media access control and LANs: The channel allocation – Methods and protocols for LANs.
Week 10	IEEE 802 standards and LAN technologies – Ethernet, token ring – hardware addressing - Network layer design issues - Routing Algorithms - Congestion Control Algorithms-Internetworking
Week 11	**TRANSPORT LAYER:** Transport services - Elements of transport Protocols - A simple transport Protocols –UDP –TCP - Performance issues.
Week 12	**APPLICATION LAYER:** DNS - E-mail (SMTP, MIME, POP3, IMAP)
Week 13	WWW-Multimedia - Introduction to Cryptography
Week 14	Symmetric _key Algorithms
Week 15	Public_ key Algorithms—firewalls.
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Introduction to Packet Tracer.
Week 2	Lab 2: creating a first network and establishing a Web Server Connection.
Week 3	Lab 3: Constructing the topology, Static routing , Dynamic routing.
Week 4	Lab 4: OSPF Terminology Introduction, Configure.
Week 5	Lab 5: Interface Configurations for Packet Tracer BGP configuration
Week 6	Lab 6: BGP Verification Commands
Week 7	Lab 7: Static NAT Configuration

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Andrew S. Tanenbaum, "*Computer Networks*", Pearson, Fourth Edition, 2010.	No
Recommended Texts	James F. Kurose and Keith W. Ross, "*Computer Networking: A Top-Down Approach Featuring the Internet*", Pearson Education, Fourth Edition 2011.	No
Websites	https://faculty.ksu.edu.sa/sites/default/files/comnet-a_top-down_approach_3rd_edition.pdf	

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Database Systems**			**Module Delivery**	
Module Type	**Core**			☒**Theory** ☐**Lecture** ☒**Lab** ☐**Tutorial** ☐**Practical** ☐**Seminar**	
Module Code	DASY310				
ECTS Credits	**6**				
SWL (hr/sem)	**150**				
Module Level	UGIII		**Semester of Delivery**	6	
Administering Department	CE		**College**	E	
Module Leader			**e-mail**		
Module Leader's Acad. Title			**Module Leader's Qualification**		
Module Tutor			**e-mail**		
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date	01/06/2023		**Version Number**	1.0	

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. Explain the technical and practical approaches that database designers and developers use in practice. 2. Develop a database system to solve real-world problems and facilitate human daily activities. 3. Understand the Characteristics of the Database Approach, Entity–Relationship (ER) Model, Data Models, Schemas and Instances. 4. Understand the Relational Data Model and Relational Database Constraints. 5. Basics of Functional Dependencies and Normalization for Relational Databases. 6. Recognize optimal database queries and effective SQL to ensure database systems can be efficiently and effectively operated. 7. Develop search and inquiry-based skills that can be used to learn, connect, and develop database systems. 8. Understand the Storage Organization of Databases, Hashing Techniques, Indexing Structures, and Database Security.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	On the successful completion of the course, students will be able to: 21. Describe the fundamental elements of relational database management systems. 22. Explain the basic concepts of relational data model, entity-relationship model, relational database design. 23. Design entity-relationship models to represent simple database application scenarios. 24. Learn the basics of SQL. 25. Convert the entity-relationship model to relational tables, populate relational database and formulate SQL queries on data. 26. Improve the database design by normalization. 27. Explain the basic database storage structures and hashing techniques 28. Apply indexing methods including B tree. 29. Deal with database security and access control.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. 1. Introduction to Databases 2. Database Languages and Architectures 3. Data Modeling Using the Entity–Relationship (ER) Model 4. Refining the ER Design 5. Relational Data Model and Relational Database Constraints 6. SQL: Data Definition and Retrieval Queries 7. SQL Complex Queries 8. SQL Assertions, Triggers, Views, and Schema Modification 9. ER-to-Relational Mapping 10. Functional Dependencies and Normalization for Relational Databases 11. Storage Organization of Databases and Hashing Techniques

	12. Indexing Structures for Files and Physical Database Design 13. Dynamic Multilevel Indexes Using B-Trees and B+-Trees 14. Database Security
Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The main strategy of this module is to equip students with the principles and skillset necessary to design and develop a database system that fulfills the requirements of business operational needs.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	79	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	71	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**150**		

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction to Databases: Characteristics of the Database Approach, Actors on the Scene (Database Administrators, Database Designers, End Users), Advantages of using the DBMS Approach, Workers behind the Scene (DBMS system designers and implementers, Tool developers, Operators and maintenance personnel)
Week 2	Overview of Database Languages and Architectures: Data Models, Schemas and Instances, Three-Schema Architecture and Data Independence, Database Languages and Interfaces, Database System environment, Classification of Database Management Systems
Week 3	Data Modeling Using the Entity–Relationship (ER) Model: High-Level Conceptual Data Models for Database Design, A Sample Database Application, Entity Types, Entity Sets, Attributes and Keys, Relationship Types, Relationship Sets, Roles, and Structural Constraints
Week 4	Weak Entity Types, Refining the ER Design, ER Diagrams, Naming Conventions and Design Issues, UML class diagrams. Example: A UNIVERSITY Database
Week 5	The Relational Data Model and Relational Database Constraints: Relational Model Concepts,

	Relational Model Constraints and Relational Database Schemas. Update Operations, Transactions, and Dealing with Constraint Violations
Week 6	SQL: Data Definition, Data Types, Constraints, and Basic Retrieval Queries, SELECT-FROM-WHERE, INSERT, DELETE, and UPDATE.
Week 7	Mid-term Exam
Week 8	SQL Complex Queries: NULL and Three-Valued Logic Comparisons, Nested Queries, Tuples, and Set/Multiset Comparisons, Correlated Nested Queries, The EXISTS and UNIQUE Functions in SQL, Explicit Sets and Renaming in SQL, Joined Tables in SQL and Outer Joins, Aggregate Functions in SQL, Grouping: The GROUP BY and HAVING Clauses, WITH and CASE, Recursive Queries in SQL
Week 9	SQL: Specifying Constraints as Assertions and Actions as Triggers, Views, and Schema Modification
Week 10	Relational Database Design by ER-to-Relational Mapping
Week 11	Basics of Functional Dependencies and Normalization for Relational Databases: Functional Dependencies, Normal forms based on Primary Keys, First, Second and Third Normal Forms, Boyce-Codd Normal Form, Multi valued Dependencies and Fourth Normal Form.
Week 12	Disk Storage, Basic File Structures and Hashing: Storage Organization of Databases, Hashing Techniques (Internal Hashing, External Hashing, Dynamic Hashing, Linear Hashing)
Week 13	Indexing Structures for Files and Physical Database Design: Types of Single-Level Ordered Indexes, Multilevel Indexes
Week 14	Dynamic Multilevel Indexes Using B-Trees and B+-Trees
Week 15	Database Security: Types of Security, Control Measures, Database Security and the DBA, Access Control, User Accounts, and Database Audits, Access Control Based on Granting and Revoking Privileges (GRANT OPTION)
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Introduction to Oracle MySQL Server and Workbench Software
Week 2	Lab 2: Basic SQL (CREATE Database, SHOW, DROP, USE, CREATE Table, ALTER)
Week 3	Lab 3: SQL Query (SELECT-FROM-WHERE, ORDER-BY, INSERT, DELETE, UPDATE, TRUNCATE)
Week 4	Lab 4: Advanced Querying (JOIN, INNER JOIN, LEFT JOIN, DISTINCT, GROUP BY)
Week 5	Lab 5: Aggregate functions, HAVING, UNION, EXISTS, NOT EXISTS
Week 6	Lab 6: Managing Users and Privileges (root User, Creating and Using New Users, Grant Tables)
Week 7	Lab 7: Modifying and Dropping Users, Privileges

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	1. Ramez Elmasri and Shamkant B. Navathe, "Fundamentals of Database Systems", 7th edition 2016, Pearson Higher Education. 2. Vinicius M. Grippa & Sergey Kuzmichev, "Learning MySQL", 2nd edition 2021, O'Reilly Media, Inc.	No
Recommended Texts	Abraham Silberschatz, Henry F. Korth, and S. Sudarshan "Database System Concepts", 7th edition 2020, McGraw-Hill Education.	No
Websites	https://www.coursera.org/learn/relational-database#syllabus https://www.w3schools.com/mysql/mysql_sql.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

Module Information معلومات المادة الدراسية					
Module Title	**Numerical Analysis**			**Module Delivery**	
Module Type	B			☒ **Theory** ☐ **Lecture** ☐ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	NUAN306				
ECTS Credits	**4**				
SWL (hr/sem)	**100**				
Module Level	UGIII		**Semester of Delivery**	6	
Administering Department	Type Dept. Code		**College**	Type College Code	
Module Leader			**e-mail**		
Module Leader's Acad. Title	lecture		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Nil		**e-mail**	Nil	
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date	01/06/2023		**Version Number**	1.0	

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

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Objectives أهداف المادة الدراسية	1. **Develop computational skills**: Numerical analysis equips engineering students with skills to use and develop numerical methods, algorithms, and computational techniques for solving mathematical problems. This includes solving algebraic and transcendental equations, integration, differentiation, and differential equations, which are commonly encountered in engineering. 2. **Understanding error analysis**: Error analysis is crucial in numerical methods. Engineers need to understand the source of errors, how to minimize them, and how to estimate the error in a given solution. Understanding and managing numerical errors can make a significant difference in the reliability and accuracy of engineering designs. 3. **Modeling and Simulation**: Numerical analysis aids in the development and improvement of mathematical models and simulations. This is critical in engineering as it allows for the prediction of system behavior before implementation, thus saving resources and increasing efficiency. 4. **Interpolation and Approximation**: Engineers often need to work with discrete data points and infer a continuous function. Numerical analysis aims to provide an understanding of various techniques for interpolation and approximation of functions. 5. **Solving complex systems of equations**: Engineers frequently encounter large, complex systems of equations, especially in fields like structural or electrical engineering. Numerical analysis provides efficient methods to solve such systems, which would be difficult or impossible to solve analytically. 6. **Optimization**: Many engineering problems involve finding an optimum solution, such as minimizing costs or maximizing efficiency. Numerical analysis provides the theoretical background for optimization algorithms. 7. **Application of software tools**: Using software tools for numerical computation (like MATLAB, Python, etc.) is integral in modern engineering. One of the aims of teaching numerical analysis is to develop skills in using these tools effectively. 8. **Understanding limitations of numerical methods**: Not every problem can be solved with every method, and every method has its limitations. Numerical analysis aims to help understand when to apply which method and what to expect from it. Overall, numerical analysis in engineering aims to give students and professionals the tools and knowledge they need to apply mathematical principles effectively in their work, to develop and use numerical methods, and to interpret the results correctly and meaningfully.

Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. **Understand the principles of Numerical Analysis**: Students should be able to explain the fundamental concepts of numerical analysis and how they apply to various engineering problems. 2. **Apply numerical methods**: Students should be able to apply appropriate numerical methods to solve algebraic and transcendental equations, integration, differentiation, and differential equations. 3. **Error Analysis**: Students should be able to analyze and quantify the errors that arise in numerical computations and understand how to minimize them. 4. **Use Computational Tools**: Students should be able to use software tools like MATLAB, Python, etc., for numerical computations effectively and efficiently. 5. **Implement Numerical Algorithms**: Students should be capable of implementing various numerical algorithms and methods, such as those for interpolation, approximation, solving systems of equations, and optimization. 6. **Interpret and Evaluate Results**: Students should be able to interpret the results of numerical computations in the context of the original engineering problem. They should also be able to evaluate the accuracy and reliability of these results. 7. **Model Real-world Engineering Problems**: Students should be able to develop and refine mathematical models of real-world engineering problems and simulate their behavior using numerical methods. 8. **Design and Conduct Experiments**: Students should be capable of designing experiments that use numerical methods, conduct these experiments, and analyze the resulting data. 9. **Work Collaboratively**: If applicable, students should be able to work effectively as part of a team to solve complex problems using numerical methods.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. 5. Introduction to Numerical analysis Basic principles in numerical analysis Types and most common errors 6. Roots finding solutions Bisection method Newton – Raphson method Secant method Fixed point method 7. Curve fitting • Least square regression line • Interpolation Newton (Forwards , Backwards , divided differences)

	Lagrange polynomial Hermit interpolation Spline interpolation 8. Numerical Differentiation 9. Numerical Integration (Trapezoidal , Simpson 1⁄3 , Simpson 3⁄8) rules 10. Numerical Solutions of ordinary differential equation (Euler and Runge – Kutta) methods. 7.Numerical Solutions of linear systems (Gauss elimination , Gauss Seidel , Jacobi) .

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Student acquiring a general definition of numerical analysis and how to apply it in other sciences, studying the numerical methods used in the solutions of differential equations and linear and nonlinear systems, being able to deal with functions and their derivatives and integrals in an integrated analytical context, the ability to link vital topics to numerical analysis and find potential solutions for them, real or hypothetical

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	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	52	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	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)	Continuous	All
	Assignments	2	10% (10)	Continuous	All
	Projects / Lab.	1	10% (10)	All	All
	Report	1	10% (10)	All	All
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Literature review, errors , Roots finding (Bisection / Newton – Raphson) methods
Week 2	Roots finding (Secant / Fixed point) methods
Week 3	Curve Fitting : Introduction , Least square regression line
Week 4	Least square regression line : the best fit
Week 5	Interpolation : Newton (Forwards , Backwards , divided differences)
Week 6	Interpolation : Lagrange polynomial , Hermit interpolation
Week 7	Interpolation : Spline interpolation
Week 8	Mid exam
Week 9	Numerical Differentiation
Week 10	Numerical Integration : (Trapezoidal , Simpson 1⁄3 , Simpson 3⁄8) rules

Week 11	Numerical Solutions of ODE^{rs} : Euler Method , Runge - Kutta Method
Week 12	Numerical Solutions of Linear Systems : Gauss – elimination , Gauss – Seidel
Week 13	Numerical Solutions of Linear Systems : Jacobi method
Week 14	Term exam + tutorial
Week 15	**Preparatory week before the final Exam**

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

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	1-Advanced engineering mathematics by Erwin Krizge	yes
Recommended Texts	1. Numerical methods by Babu Ram. 2. Applied mathematics journals, schaum series in numerical analysis	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.

وصف مقررات مواد المرحلة الرابعة

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Control Systems**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☐ **Lecture** ☒**Lab** ☐**Tutorial** ☐**Practical** ☐**Seminar**	
Module Code	COSY404				
ECTS Credits	**5**				
SWL (hr/sem)	**125**				
Module Level		UGIV	**Semester of Delivery**		7
Administering Department		Computer Engineering	**College**	College of Engineering	
Module Leader	Amar A. Mahawish		**e-mail**	amar.mahawish@aliraqia.edu.iq	
Module Leader's Acad. Title		Lecturer	**Module Leader's Qualification**		Master
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name		Name	**e-mail**	E-mail	
Scientific Committee Approval Date		01/06/2023	**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	**Engineering Analysis**	**Semester**	4
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	Study Control System give an Introductory about control systems Feedback. Examples of applications. Differential equations and transfer functions, linear SISO, SIMO, MISO & MIMO systems. Linearization of nonlinear systems. Responses for some basic systems. Poles and zeros. The dilemma between fast response and oscillations/instability. Study Proportional (P-) control. Integral (I-) control and Differential (D-) control. Also explain time domain in open, close and feedback loop. Frequency response of the system.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	30. Provides a background of control principles in various engineering applications. 31. Use Basic mathematical tools such as Laplace transform, transfer function, block diagram, signal flow graph, mathematical modeling of dynamic systems, time response analysis, stability of linear system, root locus, and, frequency domain analysis is utilized. 32. Design and implement Controllable and observable system. 33. Study the stability of linear systems.
Indicative Contents المحتويات الإرشادية	1. Introduction to Control Systems • Definition and basic concepts of control systems • Importance and applications of control systems • Types of control systems (open-loop and closed-loop) • Block diagram representation of control systems 2. Mathematical Modeling of Physical Systems • Differential equations and transfer functions • Laplace transform and its application in control systems • Modeling of mechanical, electrical, and electromechanical systems • State-space representation of systems 3. Feedback Control Systems • Closed-loop control systems and their advantages • Feedback control principles • Stability analysis using root locus method 4. State-Space Analysis and Design • State-space representation and state variables • Stability analysis in state space • Steady State error • State feedback and pole placement • Controllability and observability • PID Controller

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Learning and teaching strategies are approaches and techniques that educators use to facilitate effective learning experiences for students. These strategies aim to engage students, enhance their understanding, and promote their active participation in the learning process. Here are some commonly used learning and teaching strategies: 1. Lecture: The instructor presents information or concepts to the students through a structured talk or presentation. 2. Discussion: Students actively participate in conversations, sharing their thoughts, asking questions, and engaging in critical thinking. 3. Cooperative learning: Students work in small groups to solve problems, complete tasks, or discuss and analyze course material. This strategy promotes collaboration, communication, and teamwork skills. 4. Problem-based learning: Students learn through solving real-world problems or case studies, applying their knowledge and critical thinking skills to find solutions. 5. Inquiry-based learning: Students explore a topic or question, formulate their own inquiries, conduct research, and draw conclusions. This approach fosters curiosity, critical thinking, and independent learning.

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
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 and 10	LO #1, #2 and #3, #4
	Assignments	2	10% (10)	2 and 12	LO #2, #3 and #4
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	All	مم
Summative assessment	Midterm Exam	2hr	10% (10)	8	LO #1 - #3
	Final Exam	3hr	50% (50)	15	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction to control systems
Week 2	Open and Close system
Week 3	Transfer function concept and Block Diagram reduction
Week 4	Feedback system
Week 5	Study Linear systems and its Transfer Function (RLC circuit and AC motor)
Week 6	Block Diagram Algebra
Week 7	Signal flow graphs and Mason's signal-flow Graph Models, Stability of system
Week 8	Mid-Exam
Week 9	Transient Response stability

Week 10	**Steady State error**
Week 11	**Routh's Hurwitz stability**
Week 12	**State Transition Matrix**
Week 13	**Root Locus and zero-pole placement**
Week 14	**PID Controller**
Week 15	**Controllability and Observability**
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Obtaining Cascaded, Parallel, and Feedback (Closed-Loop) Transfer Functions with MATLAB
Week 2	Lab 2: The Transfer Function of Linear Systems
Week 3	Lab 3: Analysis of State Variable Models Using Control Design Software
Week 4	Lab 4: Controllability & Observability of the system using state space
Week 5	Lab 5: System damping ratio and damping frequency with MATLAB.
Week 6	Lab 6: Calculate poles and zeros on s-plane of a system
Week 7	Lab 7: Root locus

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Introduction to Control Systems, Kevin Warwick 2nd Edition	No
	Richard C. Dorf and Robert H. Bishop ”Modern Control Systems”.	No
Recommended Texts	Katsuhiko Ogata “Modern control engineering”, 5th edition.	No
Websites	N/A	

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	Embedded System			**Module Delivery**	
Module Type	**Core**			☒**Theory** ☐**Lecture** ☒**Lab** ☐**Tutorial** ☐**Practical** ☐**Seminar**	
Module Code	**EMSY403**				
ECTS Credits	**5**				
SWL (hr/sem)	**125**				
Module Level	UGIV		**Semester of Delivery**	7	
Administering Department	CE		**College**	E	
Module Leader	Dr. Hassan		**e-mail**		
Module Leader's Acad. Title	Lecturer		**Module Leader's Qualification**	Ph.D.	
Module Tutor	mamun		**e-mail**		
Peer Reviewer Name	Dr. Rasha		**e-mail**		
Scientific Committee Approval Date			**Version Number**	1.0	

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	As a result of successfully completing this course, students will: 1. To provide students with a solid foundation in the fundamental concepts and principles of embedded systems. 2. To develop students' understanding of the hardware and software components of embedded systems. 3. To equip students with the knowledge and skills to design, develop, and program embedded systems using appropriate tools and techniques. 4. To enable students to interface and integrate peripheral devices with embedded systems. 5. To introduce students to real-time operating systems and their role in embedded systems. 6. To familiarize students with debugging and troubleshooting techniques for identifying and resolving issues in embedded systems. 7. To enhance students' ability to analyze the performance of embedded systems and optimize resource utilization. 8. To foster an understanding of hardware and software co-design principles and their application in efficient embedded system development. 9. To provide insights into the limitations and challenges associated with embedded system development. 10. To encourage students to stay updated with emerging trends and technologies in the field of embedded systems.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	By the end of the module, students should be able to: 29. Understand the fundamental concepts and principles of embedded systems. 30. Design and develop embedded systems using appropriate hardware and software components. 31. Program microcontrollers and other embedded devices using suitable programming languages. 32. Interface and integrate peripheral devices with embedded systems. 33. Implement real-time operating systems and understand their role in embedded systems. 34. Apply debugging and troubleshooting techniques to identify and resolve issues in embedded systems. 35. Analyze the performance and optimize the resource utilization of embedded systems. 36. Apply principles of hardware and software co-design to develop efficient embedded systems. 37. Demonstrate an understanding of the limitations and challenges associated with embedded system development. 38. Stay updated with emerging trends and technologies in the field of embedded systems.

Indicative Contents المحتويات الإرشادية	The indicative contents of an embedded systems module may include the following topics: 1. Introduction to Embedded Systems • Definition and characteristics of embedded systems • Embedded system development process • Hardware and software components of embedded systems 2. Microcontrollers and Microprocessors • Overview of microcontrollers and microprocessors • Architecture, features, and selection criteria • Interfacing techniques with peripherals 3. Embedded Programming Languages and Tools • Programming languages for embedded systems (e.g., C, C++, assembly language) • Integrated development environments (IDEs) and debugging tools • Cross-compiling and flashing firmware onto embedded devices 4. Real-Time Operating Systems (RTOS) • Introduction to real-time operating systems • Task scheduling and synchronization • Memory management in embedded systems 5. Peripherals and Interfacing • Interfacing with sensors, actuators, displays, and communication modules • Communication protocols (e.g., I2C, SPI, UART) • Device drivers and hardware abstraction layers (HALs) 6. Embedded System Design and Development • System-level design and architecture • Hardware-software co-design considerations • Power management and low-power techniques 7. Embedded System Testing and Debugging • Testing methodologies for embedded systems • Debugging techniques and tools • Performance analysis and optimization 8. Security and Reliability in Embedded Systems • Security threats and countermeasures in embedded systems • Reliability and fault tolerance techniques • Safety considerations in safety-critical embedded systems 9. Applications of Embedded Systems • Embedded systems in consumer electronics, automotive, industrial automation, healthcare, etc. • Case studies and examples of embedded system applications 10. Emerging Trends and Future Directions • Internet of Things (IoT) and connected embedded systems • Machine learning and artificial intelligence in embedded systems • Edge computing and distributed embedded systems

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1. Lectures and Presentations: Instructors can deliver lectures and presentations to introduce theoretical concepts, explain foundational principles, and provide an overview of embedded system architectures, components, and programming techniques. Visual aids, diagrams, and real-world examples can be used to enhance understanding. 2. Hands-on Labs and Projects: Hands-on labs and projects play a crucial role in teaching embedded systems. Students should have opportunities to work with actual hardware, microcontrollers, sensors, and actuators. They can engage in activities such as circuit design, hardware interfacing, programming, and troubleshooting. This hands-on approach helps students develop practical skills and gain experience in working with embedded systems. 3. Simulation and Emulation: In cases where physical hardware may not be accessible or to facilitate rapid prototyping, simulation and emulation tools can be used. Virtual environments or software simulators enable students to design, program, and test embedded systems without requiring physical components. Tools like Proteus, QEMU, or Simulink can be utilized to create a simulated embedded system environment. 4. Group Discussions and Collaborative Learning: Encouraging group discussions and collaborative learning activities allows students to share their knowledge, exchange ideas, and work together on complex embedded system problems. Group projects and case studies can foster teamwork and critical thinking skills. 5. Design and Development Projects: Assigning design and development projects provides students with the opportunity to apply their knowledge and skills in a practical setting. They can work on real-world applications of embedded systems, design custom circuit boards, program microcontrollers, and implement functionalities to meet specific requirements. These projects promote problem-solving skills and creativity. 6. Debugging and Troubleshooting Exercises: Incorporating debugging and troubleshooting exercises helps students develop the ability to identify and resolve issues in embedded systems. Instructors can present students with faulty systems or code and guide them through the process of diagnosing and rectifying the problems. 7. Guest Speakers and Industry Experts: Inviting guest speakers from the industry who have expertise in embedded systems can provide valuable insights into real-world applications, challenges, and best practices. These professionals can share their experiences, case studies, and demonstrate the practical use of embedded systems. 8. Online Resources and Tutorials: Providing students with supplementary online resources, tutorials, and documentation allows them to explore embedded system topics in more depth. Online forums, blogs, and tutorial videos can also serve as valuable self-study materials. 9. Assessments and Feedback: Regular assessments, such as quizzes, tests, and practical assignments, help evaluate students' understanding and progress. Constructive feedback should be provided to students to guide their learning and improvement.

	10. Continuous Learning and Professional Development: Encouraging students to engage in continuous learning and professional development is crucial in the field of embedded systems. Instructors can recommend research papers, industry conferences, and online courses to help students stay updated with the latest trends and emerging technologies.

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
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 and 10	LO#2, #3, #6and #9,#10
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5 and #10
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #2 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction to embedded systems: course intro
Week 2	Embedded system design: Arduino intro, basic circuit diagrams: Microprocessors and microcontrollers:-Basic organization, Address/data bus, Memories, I/O ports, Timing subsystems, Interrupt handling.
Week 3	Instruction sets, registers and memory access, digital I/O: Interfacing techniques:-Basic I/O ports, Memories, Interface support devices, CISC&RISC.
Week 4	Communication Methods: - Serial Parallel, Basic wireless schemes.
Week 5	pulse width modulation (PWM), Analog input
Week 6	CPU bus, communication protocols (UART, SPI, I2C)
Week 7	Embedded System Architecture
Week 8	Mid-course Exam
Week 9	Peripherals, Sensors
Week 10	Communicating with Peripherals
Week 11	Embedded algorithms
Week 12	Embedded Operating Systems
Week 13	Embedded System Applications
Week 14	Embedded Systems Applications
Week 15	Embedded Systems Applications
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Experiment , Arduino Introduction
Week 2	Sensors Introduction , Light Diode Resistance + LED
Week 3	Binary Led, PWM + Led
Week 4	Keypad + password, LCD + ultrasonic
Week 5	Visual Studio .NET (C# language), Arduino + Windows App
Week 6	Led + Serial Communication (APP), Sensors + Windows App
Week 7	Wireless Communication, Bluetooth (App)

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Marilyn Wolf, " Principles of Embedded Computing System Design", Fourth Edition, Elsevier Publishing, 2015, ISBN: 978-0-12-805387-4	No
Recommended Texts	Elecia White," Making Embedded Systems Design Pattern for Great Software", A Publication in the O'Reilly Media Publishers, 2011, ISBN: 978-1-449-30214-6 .	No
Websites		

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Artificial Intelligent**			**Module Delivery**	
Module Type	**Core**			☒**Theory** ☐**Lecture** ☒**Lab** ☒**Tutorial** ☐**Practical** ☐**Seminar**	
Module Code	ARIN400				
ECTS Credits	**6**				
SWL (hr/sem)	**150**				
Module Level		UGIV	**Semester of Delivery**		7
Administering Department		CE	**College**	E	
Module Leader	Dr. duraid		**e-mail**		
Module Leader's Acad. Title		Asst. Prof.	**Module Leader's Qualification**		Ph.D.
Module Tutor	suphian		**e-mail**		
Peer Reviewer Name		Dr. tayseer	**e-mail**		
Scientific Committee Approval Date			**Version Number**		1.0

Relation with other Modules العلاقة مع المواد 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	The aim of the Artificial Intelligence module is to provide students with a comprehensive understanding of the key concepts, techniques, and applications of artificial intelligence. The module aims to develop students' analytical and problem-solving skills in the field of AI, as well as their ability to design and implement intelligent systems. This Aim can be fulfilled by the following objectives 26. Understand the fundamental concepts and theories of artificial intelligence. 27. Gain knowledge of various AI techniques and algorithms used in problem-solving and decision-making. 28. Develop practical skills in implementing AI algorithms and systems. 29. Learn to evaluate and select appropriate AI techniques for different problem domains. 30. Explore the applications of AI in various fields and understand its impact on society. 31. Analyze and address ethical and societal implications associated with the use of AI. 32. Stay informed about the latest developments and emerging trends in the field of AI. 33. Enhance critical thinking and problem-solving skills by applying AI concepts to real-world scenarios. 34. Collaborate effectively in teams to design and implement intelligent systems. 35. Develop a foundation for further study and research in the field of artificial intelligence.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Write at least 6 Learning Outcomes, better to be equal to the number of study weeks. By the end of the module, students should be able to: 34. Understand the fundamental concepts and theories underlying artificial intelligence. 35. Apply various AI techniques and algorithms to solve real-world problems. 36. Evaluate and select appropriate AI techniques for different problem domains. 37. Design and implement intelligent systems using AI frameworks and tools. 38. Critically analyze the ethical and societal implications of artificial intelligence. 39. Stay informed about the latest developments and emerging trends in the field of AI.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Introduction to Artificial Intelligence Definition and brief history of AI Approaches to AI: symbolic AI, machine learning, and deep learning Applications and impact of AI in various domains

	Problem Solving and Search Algorithms Problem formulation and state-space search Uninformed search algorithms: depth-first search, breadth-first search, etc. Heuristic search algorithms: A* search, iterative deepening, etc. Knowledge Representation and Reasoning Propositional and predicate logic Semantic networks, frames, and ontologies Rule-based systems and expert systems Machine Learning Supervised learning: decision trees, naive Bayes, support vector machines, etc. Unsupervised learning: clustering, dimensionality reduction, etc. Neural networks and deep learning: feedforward networks, convolutional networks, etc. Natural Language Processing Syntax and semantics in natural language Language modeling and text classification Named entity recognition and sentiment analysis Planning and Decision Making Planning techniques: STRIPS, hierarchical task networks, etc. Markov decision processes and reinforcement learning Applications of planning and decision-making algorithms Computer Vision Image processing and feature extraction Object detection and recognition Image segmentation and scene understanding Ethical and Social Implications of AI Bias and fairness in AI algorithms Privacy and security concerns Ethical considerations in AI development and deployment Emerging Trends in AI

	Reinforcement learning advancements Generative models and adversarial networks Explainable AI and interpretability

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	**Lectures**: Traditional lectures can be used to introduce and explain key concepts, theories, and algorithms in artificial intelligence. Lectures can also include demonstrations and examples to illustrate the application of AI techniques. **Practical Sessions**: Hands-on practical sessions allow students to apply the concepts learned in lectures. These sessions can involve programming exercises, implementing AI algorithms, and working with AI frameworks and tools. Practical sessions provide students with practical experience and help reinforce their understanding of AI principles. **Case Studies**: Analyzing real-world case studies and examples can help students understand how AI is applied in various domains. Case studies can involve analyzing and solving AI-related problems, discussing ethical considerations, and evaluating the societal impact of AI applications. **Assessments**: Assessments can include quizzes, assignments, programming projects, and examinations to evaluate students' understanding of AI concepts and their ability to apply them. Assessments should be designed to assess both theoretical knowledge and practical skills in AI.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	79	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	71	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**150**		

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

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1 Introduction to Artificial Intelligence	o Overview of the course o Definition and brief history of AI o Approaches to AI: symbolic AI, machine learning, and deep learning
Week 2 Problem Solving and Search Algorithms	o Problem formulation and state-space search o Uninformed search algorithms: depth-first search, breadth-first search, etc. o Heuristic search algorithms: A* search, iterative deepening, etc.
Week 3 Knowledge Representation and Reasoning	o Propositional and predicate logic o Semantic networks, frames, and ontologies o Rule-based systems and expert systems
Week 4 Machine Learning Basics	o Introduction to machine learning o Supervised learning: decision trees, naive Bayes, support vector machines, etc. o Unsupervised learning: clustering, dimensionality reduction, etc.
Week 5 Neural Networks and Deep Learning	o Basics of neural networks o Feedforward networks, activation functions, backpropagation o Convolutional neural networks (CNNs) for image processing
Week 6 Natural Language Processing	o Syntax and semantics in natural language o Language modeling and text classification o Named entity recognition and sentiment analysis
Week 7 Planning and Decision	o Introduction to planning techniques o STRIPS, hierarchical task networks, and planning algorithms

Making	o Markov decision processes and reinforcement learning
Week 8 Computer Vision	o Image processing and feature extraction o Object detection and recognition o Image segmentation and scene understanding
Week 9 Ethics and Social Implications of AI	o Bias and fairness in AI algorithms o Privacy and security concerns o Ethical considerations in AI development and deployment
Week 10	Midterm Exam
Week 11	o Advanced Machine Learning Techniques o Ensemble learning methods: random forests, gradient boosting, etc. o Deep learning architectures: recurrent neural networks (RNNs), generative adversarial networks (GANs), etc.
Week 12 Reinforcement Learning	o Introduction to reinforcement learning o Q-learning, policy gradients, and value-based methods o Applications of reinforcement learning
Week 13 Emerging Trends in AI	o Explainable AI and interpretability o Transfer learning and domain adaptation o Cutting-edge research and recent developments
Week 14 AI Applications and Case Studies	o AI in healthcare, finance, robotics, etc. o Case studies and real-world examples o Guest lectures from industry experts
Week 15	o **Final Exam Review and Wrap-up** o **Review of key concepts and topics** o **Exam preparation and practice questions** o **Summary of the course and future directions in AI** o **Teaching materials: Review materials, sample exam questions**

	o **Mid-term Exam + Unit-Step Forcing, Forced Response, the RLC Circuit**
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	**Lab Introduction and Setup** Introduction to the lab environment and tools Setting up the programming environment for AI projects Familiarization with AI libraries and frameworks (**Python**)
Week 2	Problem Solving Lab Implementing basic problem-solving algorithms Solving simple AI problems using algorithms
Week 3	Machine Learning Basics Lab Introduction to machine learning concepts Implementing a basic machine learning algorithm
Week 4	Neural Networks Lab Introduction to neural networks Building and training a simple neural network
Week 5	Natural Language Processing Lab Introduction to natural language processing Implementing a basic text processing algorithm
Week 6	Computer Vision Lab Introduction to computer vision techniques Implementing a basic image processing algorithm
Week 7	Ethics and Bias in AI Lab Discussion on ethics and bias in AI Analyzing bias in AI algorithms
Week 8	Reinforcement Learning Basics Lab Introduction to reinforcement learning

	Implementing a basic reinforcement learning algorithm
Week 9	AI in Everyday Life Lab Exploring AI applications in daily life Implementing a simple AI application
Week 10	Mid Term exam
Week 11	Project Development Lab Introduction to project development Forming project teams and selecting topics
Week 12	Project Development Lab Hands-on project development with guidance Troubleshooting and improving project functionality
Week 13	Project Presentation Preparation Lab Preparing project presentations and demonstrations
Week 14	Project Presentations and Showcase Lab Presentation of final projects to the class Demonstration of project functionality
Week 15	Lab Review and Conclusion Reminding students of the most important things they've learned in the course.

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Textbooks	artificial Intelligence: A Modern Approach" by Stuart Russell and Peter Norvig	Yes
Recommended Texts	"Artificial Intelligence: Foundations of Computational Agents" by David L. Poole and Alan K. Mackworth - This textbook provides a solid foundation in AI concepts and techniques. It covers topics such as logic and inference, probabilistic reasoning, learning, decision-making, and multi-agent systems. It also includes programming exercises and examples.	-
Websites		

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Digital Multimedia Processing**			**Module Delivery**	
Module Type	**Core**			☒**Theory** ☐**Lecture** ☒**Lab** ☒**Tutorial** ☐**Practical** ☐**Seminar**	
Module Code	**DIMP402**				
ECTS Credits	**6**				
SWL (hr/sem)	**150**				
Module Level		UGIV	**Semester of Delivery**		7
Administering Department		Computer Engineering	**College**	Engineering	
Module Leader	Mamoun Jassim Mohammed		**e-mail**	mamoun.jassim@aliraqia.edu.iq	
Module Leader's Acad. Title		Lecturer	**Module Leader's Qualification**		MSc
Module Tutor	wassem		**e-mail**	E-mail	
Peer Reviewer Name		Dr Ahmed	**e-mail**	E-mail	
Scientific Committee Approval Date			**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد 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	The objectives of digital multimedia processing subject may include: - Understanding the fundamentals of digital multimedia processing - Learning about different multimedia formats and their properties - Gaining knowledge of multimedia compression techniques - Understanding the basics of multimedia transmission and storage - Learning about multimedia processing algorithms and techniques - Gaining practical experience in developing multimedia applications and processing multimedia data.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	The learning outcome of the Digital Multimedia Processing subject is to provide students with 1.an understanding of the fundamental concepts and techniques used in processing digital multimedia data, such as images, audio, and video. 2. Students will learn how to analyze, manipulate, and transform multimedia data using various tools and algorithms. 3.They will also gain experience in designing and implementing multimedia processing systems for various applications.
Indicative Contents المحتويات الإرشادية	Indicative Contents of Digital Multimedia Processing typically include the following topics: 1. Introduction to Digital Multimedia Processing:[4 hrs] • Overview of multimedia data types (audio, video, images) • Multimedia formats and standards • Challenges and applications of digital multimedia processing 2. Digital Image Processing: [4 hrs] • Image acquisition and representation • Image enhancement techniques (contrast adjustment, color correction) • Image filtering • Image compression and coding (JPEG, PNG, etc.) • Image segmentation 3. Digital Audio Processing: [4 hrs] • Audio signal representation and sampling • Audio filtering and equalization • Speech processing and recognition 4. Multimedia Data Compression: [4 hrs]

	• Principles of data compression • Lossless and lossy compression algorithms • Transform coding (Fourier, wavelet, etc.) • Compression standards (JPEG, MPEG, etc.) • Multimedia streaming and transmission 5. Multimedia Communication and Networking: [4 hrs] • Fundamentals of multimedia networking • Multimedia protocols (RTP, RTSP, etc.) • Quality of Service (QoS) considerations • Multimedia synchronization • Multimedia over wireless networks 6. Multimedia Content Analysis and Retrieval: [4 hrs] • Content-based multimedia retrieval • Feature extraction and representation • Multimedia indexing and search techniques 7. Multimedia Applications: [4 hrs] • Multimedia in entertainment and gaming • Virtual and augmented reality • Multimedia in education and training • Multimedia in social media and advertising

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1 Giving theoretical lectures directly via electronic applications such as Google meet or Zoom 2 Attendance education in laboratory and giving many workshops to work on tests and find a solution for a specific problem. 2 Creating projects and distributing them to student groups to solve specific problems. 3 Reports and studies - 4 Using illustrations and uploading video lectures on the Google Classroom platform - 5 Direct discussion by asking questions and interaction with students.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	79	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	71	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**150**		

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

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction to Multimedia.
Week 2	Media and data streams. Sound and audio.
Week 3	Digital sampling and representation.
Week 4	Image & video types. Color Model
Week 5	Digital Multimedia & Pattern Recognition
Week 6	Speech recognition and synthesis.
Week 7	Digital images processing and recognition.
Week 8	Mid-Course Exam
Week 9	Image filtering. Image segmentation.
Week 10	Augmented imagery. Video.
Week 11	Animation and time - Synchronization.
Week 12	Media compression. Multimedia storage.
Week 13	Content analysis and multimedia databases
Week 14	Games and game design.
Week 15	Hypermedia and World Wide Web.
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Introduction to Multimedia
Week 2	Lab 2: Image & video types. Color Model
Week 3	Lab 3: Media and data streams. Sound and audio
Week 4	Lab 4: Image filtering. Image segmentation
Week 5	Lab 5: Animation and time - Synchronization
Week 6	Lab 6: Media compression. Multimedia storage
Week 7	Lab 7: Content analysis and multimedia databases

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	"Multimedia Image and Video Processing", 2012, Second Edition, By Ling Guan, Yifeng He, Sun-Yuan Kung ISBN 9781439830864	NO
Recommended Texts	Fundamentals of Multimedia: Ze-Nian Li & Mark S. Drew, Pearson Prentice Hall, 2004	No
Websites	https://www.coursera.org/browse/Digital Multimedia Processing	

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	Distributed Database Systems			**Module Delivery**	
Module Type	**Core**			☐ **Theory** ☒ **Lecture** ☒**Lab** ☒ **Tutorial** ☐**Practical** ☐**Seminar**	
Module Code	DIDS401				
ECTS Credits	**6**				
SWL (hr/sem)	**150**				
Module Level	UGIV		**Semester of Delivery**	7	
Administering Department	CE		**College**	E	
Module Leader			**e-mail**		
Module Leader's Acad. Title			**Module Leader's Qualification**		
Module Tutor			**e-mail**		
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date	01/06/2023		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Database Systems	**Semester**	6
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	9. The purpose of the module is to enrich the previous knowledge of database systems and exposing the need for distributed database technology to confront with the deficiencies of the centralized database systems. 10. The module will introduce the basic principles and implementation techniques of distributed database systems. 11. The module will equip students with principles and knowledge of parallel databases and big data processing.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	On the successful completion of the course, students should: 40. Understand distributed database systems architecture and design. 41. Familiar with the distributed data control. 42. Be able to apply methods and techniques for distributed query processing and optimization. 43. Understand the broad concepts of distributed transaction processing. 44. Understand the basics of database integration and multidatabase systems. 45. Familiar with the parallel database systems. 46. Understand the big data processing and distributed storage systems. 47. Familiar with the concepts of NoSQL, NewSQL, and Polystores
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. 15. Distributed Database System Architecture 16. Distributed and Parallel Database Design 17. Distributed Data Control 18. Distributed Query Processing 19. Distributed Transaction Processing 20. Database Integration—Multidatabase Systems 21. Parallel Database Systems 22. Big Data Processing
Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The main strategy of this module is to provide the students with knowledge needed to understand distributed database management systems (DDBMSs). Students acquire knowledge about distributed databases and components of a DDBMS including Distributed Database Design, Distributed Data Control, Transaction Management (Concurrency Control), Query Processing, Database Integration and Big

	Data Processing in DDBMSs

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	79	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	71	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**150**		

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

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction: • What Is a Distributed Database System? • Promises of Distributed DBMSs: ✓ Transparent Management of Distributed and Replicated Data ✓ Reliability Through Distributed Transactions ✓ Improved Performance ✓ Scalability
Week 2	Design Issues: • Distributed Database Design • Distributed Data Control • Distributed Query Processing • Distributed Concurrency Control • Reliability of Distributed DBMS • Replication • Parallel DBMSs • Database Integration • Alternative Distribution Approaches • Big Data Processing and NoSQL
Week 3	Distributed DBMS Architectures ✓ Architectural Models for Distributed DBMSs ✓ Client/Server Systems ✓ Peer-to-Peer Systems ✓ Multidatabase Systems ✓ Cloud Computing
Week 4	Distributed and Parallel Database Design: Data Fragmentation: ✓ Horizontal Fragmentation ✓ Vertical Fragmentation
Week 5	Allocation • Auxiliary Information • Allocation Model ✓ Total Cost ✓ Constraints
Week 6	Distributed Data Control:

	View Management ✓ Views in Centralized DBMSs ✓ Views in Distributed DBMSs
Week 7	Access Control • Discretionary Access Control • Mandatory Access Control • Distributed Access Control
Week 8	Distributed Query Processing: • Query Processing Problem • Query Optimization (Search Space, Cost Model, Search Strategy) • Layers Of Query Processing
Week 9	Distributed Cost Model ✓ Cost Functions ✓ Database Statistics Distributed Query Optimization ✓ Dynamic Approach
Week 10	Mid-term Exam
Week 11	Distributed Transaction Processing: ✓ Background and Terminology ✓ Distributed Concurrency Control (serializability)
Week 12	Database Integration—Multidatabase Systems: ✓ Database Integration (Data warehouse, Online Analytical Processing (OLAP)) ✓ Bottom-Up Design Methodology
Week 13	Parallel Database Systems: Objectives Parallel Architectures ✓ General Architecture ✓ Shared-Memory (Uniform Memory Access (UMA), Non-Uniform Memory Access (NUMA))
Week 14	Big Data Processing: Distributed Storage Systems ✓ Google File System
Week 15	NoSQL, NewSQL, and Polystores: Motivations for NoSQL Key-Value Stores ✓ DynamoDB

Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Revision of SQL basics
Week 2	Lab 2: Transactions and Locking: Isolation Levels, REPEATABLE READ, READ COMMITTED, READ UNCOMMITTED, SERIALIZABLE
Week 3	Lab 3: Locking: Metadata Locks, Row Locks, Deadlocks, MySQL Parameters Related to Isolation and Locks
Week 4	Lab 4: Doing More with MySQL: Inserting Data Using Queries, Loading Data from Comma-Delimited Files, Writing Data into Comma-Delimited Files
Week 5	Lab 5: Creating Tables with Queries
Week 6	Lab 6: Performing Updates and Deletes with Multiple Tables
Week 7	Lab 7: Replacing Data, The EXPLAIN Statement

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	3. M. Tamer O zsu and Patrick Valduriez, "Principles of Distributed Database Systems", 4th edition, 2020, Springer. 4. Learning MySQL by Vinicius M. Grippa & Sergey Kuzmichev, 2nd edition 2021, O'Reilly Media, Inc.	No
Recommended Texts	Database System Concepts by Abraham Silberschatz, Henry F. Korth, and S. Sudarshan, 7th edition 2020, McGraw-Hill Education.	No
Websites	https://www.mindluster.com/certificate/1519 https://www.w3schools.com/mysql/mysql_sql.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

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MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Digital Control Systems**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☐ **Lecture** ☒**Lab** ☒**Tutorial** ☐**Practical** ☐**Seminar**	
Module Code	DICS412				
ECTS Credits	**6**				
SWL (hr/sem)	**150**				
Module Level		UGIV	**Semester of Delivery**		8
Administering Department		Computer Engineering	**College**	College of Engineering	
Module Leader	Amar A. Mahawish		**e-mail**	amar.mahawish@aliraqia.edu.iq	
Module Leader's Acad. Title		Lecturer	**Module Leader's Qualification**		Master
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name		Name	**e-mail**	E-mail	
Scientific Committee Approval Date		01/06/2023	**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Control System	**Semester**	7
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	Digital control systems refer to systems where the control and manipulation of signals and data are done using digital techniques. These systems are widely used in various industries, including aerospace, automotive, robotics, industrial automation, and more. The subject of digital control systems encompasses the study of the theory, analysis, and design of such systems. It involves understanding concepts from control theory and applying them in the digital domain.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	48. Understanding of Control System Principles: Students will gain a solid understanding of the fundamental principles of control systems, including concepts such as feedback, stability, controllability, observability, and system performance metrics. 49. Analysis of Continuous-time and Discrete-time Systems: Students will learn how to analyze both continuous-time and discrete-time control systems. They will understand the differences between the two and be able to convert between continuous-time and discrete-time representations. 50. Design and Implementation of Digital Controllers: Students will learn various methods for designing digital controllers, including techniques such as transfer function representation, state-space representation, and frequency response methods. They will be able to design controllers that meet desired performance specifications. 51. Simulation and Modeling: Students will gain proficiency in using software tools and simulations to model and analyze digital control systems. They will learn how to simulate system behavior, perform stability analysis, and evaluate system performance. 52. System Identification: Students will learn techniques for system identification, which involve determining the mathematical models of control systems based on input-output data. They will understand methods such as least squares estimation and parameter identification. 53. Stability Analysis: Students will learn how to analyze the stability of digital control systems, including methods such as root locus, Nyquist stability criterion, and Bode plots. They will be able to determine the stability of a system and design controllers to achieve. 54. System Performance Evaluation: Students will learn how to evaluate the performance of digital control systems, including criteria such as rise time, settling time, overshoot, and steady-state error. They will be able to analyze and optimize system performance.
Indicative Contents المحتويات الإرشادية	1. Frequency-Domain Analysis • Frequency response of control systems • Bode plots • Stability analysis using frequency response methods 2. Stability and Performance Analysis • Stability analysis using Nyquist criteria • Performance measures (overshoot, peak time, etc.) • Jury test

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Learning and teaching strategies are approaches and techniques that educators use to facilitate effective learning experiences for students. These strategies aim to engage students, enhance their understanding, and promote their active participation in the learning process. Here are some commonly used learning and teaching strategies: 6. Lecture: The instructor presents information or concepts to the students through a structured talk or presentation. 7. Discussion: Students actively participate in conversations, sharing their thoughts, asking questions, and engaging in critical thinking. 8. Cooperative learning: Students work in small groups to solve problems, complete tasks, or discuss and analyze course material. This strategy promotes collaboration, communication, and teamwork skills. 9. Problem-based learning: Students learn through solving real-world problems or case studies, applying their knowledge and critical thinking skills to find solutions. 10. Inquiry-based learning: Students explore a topic or question, formulate their own inquiries, conduct research, and draw conclusions. This approach fosters curiosity, critical thinking, and independent learning.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	79	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	71	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**150**		

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

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

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	**Introduction to Digital Control**
Week 2	**Revision of Z-Transform**
Week 3	**Modeling of Digital Control Systems (ADC model & ADC model) and ZOH**
Week 4	**Linear systems and its Transfer Function DC motor**
Week 5	**Closed-loop transfer function in Z-Transform model**
Week 6	**Digital PID Control system**
Week 7	**Digital Implementation of analog system, Discrete State Space Model Representation**
Week 8	**Mid-Exam**
Week 9	**Stability Tests for Discrete-in-Time Systems**
Week 10	**Design of Sampled-Data Control Systems**
Week 11	**Jury Test**
Week 12	**Nyquist**
Week 13	**Performance measures (overshoot, peak time, response time etc.)**
Week 14	**Stability conditions – Asymptotic stability**

Week 15	**Stability conditions – BIBO stability and Internal stability**
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: ADC model & ADC model MATLAB
Week 2	Lab 2: The Closed-loop transfer function in Z-Transform model
Week 3	Lab 3: Digital PID Control system
Week 4	Lab 4: Discrete State Space Model Representation
Week 5	Lab 5: Nyquist with MATLAB.
Week 6	Lab 6: Performance measures (overshoot, peak time, response time

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Ogata: Discrete-Time Control Systems. Pearson, 2nd Edition, 2015.	No
	M. Sami Fadali: Digital Control Engineering-Analysis and Design, Elsevier, 2nd Edition, 2012.	No
Recommended Texts	Charles L. Phillips, Troy Nagle, and Aranya Chakrabortty: Digital Control System Analysis & Design. Peterson, 4th Edition, 2014.	No
Websites	N/A	

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

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	Computer Security			**Module Delivery**	
Module Type	**Core**			☒**Theory** ☐**Lecture** ☐**Lab** ☒**Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**COSE411**				
ECTS Credits	**5**				
SWL (hr/sem)	125				
Module Level		UGIV	**Semester of Delivery**		8
Administering Department		CE	**College**	E	
Module Leader	Dr. Tayseer S. Atia		**e-mail**	Tayseer.salman@aliraqia.edu.iq	
Module Leader's Acad. Title		Professor	**Module Leader's Qualification**		Ph.D.
Module Tutor	May hattim		**e-mail**	E-mail	
Peer Reviewer Name		Dr. Khamis	**e-mail**	E-mail	
Scientific Committee Approval Date			**Version Number**		1.0

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	Computer security is an essential subject that covers a wide range of topics related to protecting computer systems and networks from unauthorized access, theft, damage, or disruption. Some possible objectives of computer security subject include: 1. Understanding the threats: Computer security subject can help students understand the various types of threats that computer systems and networks face, such as malware, phishing attacks, and social engineering. 2. Developing security policies: Computer security subject can help students learn how to develop effective security policies and procedures for organizations to ensure that sensitive data is protected. 3. Implementing security controls: Computer security subject can help students learn how to implement various security controls, such as firewalls, intrusion detection systems, and encryption, to protect computer systems and networks. 4. Cybersecurity awareness: Computer security subject can help students become more aware of cybersecurity issues and best practices, such as how to create strong passwords, avoid phishing scams, and protect personal information online. 5. Incident response: Computer security subject can help students learn how to respond to security incidents, such as data breaches or cyber attacks, in a timely and effective manner to minimize damage and prevent future incidents.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Understanding of security concepts: Students should have a solid understanding of the fundamental concepts of computer security, including confidentiality, integrity, and availability. 2. Knowledge of security threats: Students should be able to identify and analyze various types of security threats, such as malware, phishing, and social engineering attacks. 3. Ability to develop security policies: Students should be able to develop effective security policies and procedures for organizations to ensure that sensitive data is

	protected. 4. Knowledge of security controls: Students should be able to implement various security controls, such as firewalls, intrusion detection systems, and encryption, to protect computer systems and networks. 5. Awareness of cybersecurity best practices: Students should be aware of cybersecurity best practices, such as how to create strong passwords, avoid phishing scams, and protect personal information online. 6. Ability to respond to security incidents: Students should be able to respond to security incidents in a timely and effective manner to minimize damage and prevent future incidents.
Indicative Contents المحتويات الإرشادية	1. Introduction to computer security: This topic covers the basic concepts of computer security, including confidentiality, integrity, and availability. 2. Threats to computer security: This topic covers various types of security threats, such as malware, phishing, and social engineering attacks. 3. Security policies and procedures: This topic covers the development of effective security policies and procedures for organizations to ensure that sensitive data is protected. 4. Security controls: This topic covers various security controls such as firewalls, intrusion detection systems, and encryption that can be used to protect computer systems and networks. 5. Cryptography: This topic covers the principles of cryptography, including symmetric and asymmetric encryption, hash functions, and digital signatures. 6. Network security: This topic covers the security of computer networks, including network architecture, protocols, and secure communication. 7. Web security: This topic covers the security of web applications, including web

	vulnerabilities, secure coding practices, and secure web communication.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Computer security subject requires a combination of theoretical knowledge and practical skills. Therefore, the learning and teaching strategies of computer security subject should include the following: 1. Lectures: Lectures are an effective way to deliver theoretical knowledge to students. Lectures can cover topics such as the basic concepts of computer security, security threats, cryptography, and network security. 2. Case studies: Case studies can be used to illustrate real-world examples of security incidents and how they were handled. This can help students understand the importance of incident response and the impact of security incidents. 3. Lab exercises: Lab exercises can provide students with hands-on experience in implementing security controls, such as firewalls, intrusion detection systems, and encryption. This can help students develop practical skills that are essential for securing computer systems and networks. 4. Group projects: Group projects can be used to encourage collaboration and teamwork among students. Group projects can involve developing security policies and procedures for organizations or conducting vulnerability assessments on computer systems 5. Online resources: Online resources such as videos, podcasts, and articles can be used to supplement lectures and provide additional learning materials for students.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	48	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	3
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	77	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**125**		

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

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Computer security, Computer Security Goal (confidentiality, integrity, and availability), Vulnerabilities, Threats (interruption, interception, modification and fabrication), Attacks, and Controls, H.W, SW, data Vulnerabilities and controls, method of defense.
Week 2	-Cryptography Terminology and Background (encryption, decryption, plain text, cipher text, key), encryption services, -Substitution Ciphers (Caesar cipher, Scrambled alphabet, Substitution with key as asentence
Week 3	-Transpositions (Columnar transposition)
Week 4	-Symmetric Encryption Systems, Stream and Block Ciphers, Confusion and Diffusion, The Data Encryption Standard (DES), Encryption on DES,
Week 5	- Decryption of DES, DES key generation
Week 6	-Stream cipher, NLFSR
Week 7	Mid-term Exam
Week 8	-Public key cryptosystem -The uses of public key -Number theory concept -The RSA algorithm Security and threat on RSA
Week 9	-One-Way Hash Functions Properties and application of SHADetails of SHA-1
Week 10	-Authentication -Identification versus Authentication - Authentication Based on Phrases and Facts (Password, attack on password (dictionary exhaustive), good password.) - Authentication Based on Biometrics - Authentication Based on tokens - Multifactor Authentication - Secure Authentication
Week 11	Program and programming security
Week 12	Network security
Week 13	web security
Week 14	Cyber security

Week 15	IoT security
Week 16	Preparatory week before the final Exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	2. "Security in Computing" by Charles P. Pfleeger and Shari Lawrence Pfleeger, 5th ed., Prentce Hall.	yes
Recommended Texts	1. "Computer Security: Principles and Practice" by William Stallings and Lawrie Brown: 2. "Applied Cryptography: Protocols, Algorithms, and Source Code in C" by Bruce Schneier.	yes
Websites	There are many great websites for computer security, but some popular ones include: - The Hacker News (https://thehackernews.com/) - Krebs on Security (https://krebsonsecurity.com/) - Dark Reading (https://www.darkreading.com/) - Threatpost (https://threatpost.com/) - SecurityWeek (https://www.securityweek.com/) These websites provide up-to-date news, analysis, and insights on the latest threats and vulnerabilities in the world of computer security.	

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Project Management**			**Module Delivery**	
Module Type	**Core**			☒**Theory** ☐**Lecture** ☐ **Lab** ☒**Tutorial** ☐**Practical** ☐**Seminar**	
Module Code	**PRMA413**				
ECTS Credits	**5**				
SWL (hr/sem)	**125**				
Module Level	UGIV		**Semester of Delivery**	8	
Administering Department	Computer Engineering		**College**	Engineering	
Module Leader			**e-mail**	@aliraqia .edu.iq	
Module Leader's Acad. Title			**Module Leader's Qualification**	Ph.D	
Module Tutor			**e-mail**		
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date	10/06/2023		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد 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	The objective of this course is to develop an understanding of the basic ideas of project management encountered in engineering. Focus will be on the methods for understanding project initiation and lifecycle in addition to fundamentals of the project planning techniques such as Bar chart, CPM, and project networks. Students will learn some about program evaluation and review technique (PERT) and time-cost relationship in PM (project crashing) that are useful for the understanding of different engineering projects. Another objective is to teach the Engineering student about Cash flow forecasting, Linear programming problem, managing Project Stakeholders, and project quality control and assurance. Finally, the student will learn the concept of using MS project software for designing real-life projects.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	On completion of the course, student will be able to: 1. Understand the fundamentals and importance of project management in achieving organizational goals and objectives. 2. Developing skills in project initiation and planning. 3. Gaining knowledge of project planning. 4. Understand and apply network planning techniques (A.O.N & A.O.A). 5. Apply network planning techniques such as Bar chart, CPM, and project networks. 6. Express the concepts of time-cost relationship in PM (project crashing). 7. Understand the concept of cash flow forecasting. 8. Understand the concept of Linear programming problem. 9. Express the concepts of Managing Project Stakeholders and Project Quality control. 10. Gaining practical experience in developing and managing projects using MS project software.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following: - Introduction to project management - Project selection and initiation - Project planning and scheduling - Project Planning: The Work Breakdown Structure (WBS) - Developing the Project Schedule: Critical Path Management (CPM) - Project Network Diagrams: A.O.N & A.O.A - Bar Charts - Program evaluation and review technique (PERT) - Time-Cost Relationship in PM (project crashing) - Cash flow forecasting - Linear programming problem using graphical method & simplex method - Resource allocation

	- Managing Project Stakeholders. - Project Quality control - MS project software

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	**Lectures**: Traditional lectures can be used to introduce and explain key concepts, theories, and algorithms in Project management. Lectures can also include demonstrations and examples to illustrate the application of AI techniques. **Practical Sessions**: Hands-on practical sessions allow students to apply the concepts learned in lectures. These sessions can involve programming exercises, implementing AI algorithms, and working with project management frameworks and tools. Practical sessions provide students with practical experience and help reinforce their understanding of Project management principles. **Case Studies**: Analyzing real-world case studies and examples can help students understand how Project management is applied in various domains. Case studies can involve analyzing and solving AI-related problems, discussing ethical considerations, and evaluating the societal impact of Project management. **Assessments**: Assessments can include quizzes, assignments, programming projects, and examinations to evaluate students' understanding of AI concepts and their ability to apply them. Assessments should be designed to assess both theoretical knowledge and practical skills in project management.

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

Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	77	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**125**		

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction to Project Management (PM)
Week 2	Project Methodologies and Processes

Week 3	Project Planning
Week 4	Project Planning: The Work Breakdown Structure (WBS)
Week 5	Developing the Project Schedule: Critical Path Management (CPM)
Week 6	Project Network Diagrams: A.O.N & A.O.A
Week 7	Bar Charts & Program evaluation and review technique (PERT)
Week 8	**Mid-term Exam**
Week 9	Time-Cost Relationship in PM (project crashing)
Week 10	Cash flow forecasting
Week 11	Linear programming problem
Week 12	Managing Project Stakeholders
Week 13	Project Quality control
Week 14	MS project program
Week 15	**Preparatory week before the final Exam**

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	**Available in the Library?**
Required Textbooks	1. Information Technology Project Management, Jack T. Marchewka, Wiley, 2015. 2. PMP in Depth: Project Management Professional Study PMP in Depth, 2nd Edition, ISBN: 159863996X	Yes
Recommended Texts	Project Management Professional Study Guide for the PMP Exam	-
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

Module Information معلومات المادة الدراسية					
Module Title	**Soft computing**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☐ **Lecture** ☒**Lab** ☒**Tutorial** ☐**Practical** ☐**Seminar**	
Module Code	**SOCO410**				
ECTS Credits	**7**				
SWL (hr/sem)	**175**				
Module Level		UGIV	**Semester of Delivery**		8
Administering Department		CE	**College**	E	
Module Leader	suphian		**e-mail**		
Module Leader's Acad. Title		Asst. lecturer	**Module Leader's Qualification**		M.Sc.
Module Tutor	Ahmed talal		**e-mail**		
Peer Reviewer Name		Dr. duraid	**e-mail**		
Scientific Committee Approval Date			**Version Number**		

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	**Artificial Intelligent**	**Semester**	SEVEN
Co-requisites module		**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	• Understanding Fuzzy Logic Principles: The module should aim to provide a comprehensive understanding of the principles and concepts of fuzzy logic. This includes grasping the fundamental concepts of membership functions, fuzzy sets, fuzzy rules, and fuzzy inference systems. • Fuzzy Logic Modeling: The module should enable students to develop skills in modeling real-world problems using fuzzy logic. This involves identifying appropriate input and output variables, defining membership functions, formulating fuzzy rules, and designing fuzzy inference systems. • Fuzzy Logic Operations: Students should become proficient in performing fuzzy logic operations, such as fuzzy set operations (union, intersection, complement), fuzzy arithmetic (addition, subtraction, multiplication), and fuzzy aggregation methods (max, min). • Fuzzy Inference Systems: The module should cover the different types of fuzzy inference systems, including Mamdani and Takagi-Sugeno models. Students should learn how to construct and interpret fuzzy rule bases, implement defuzzification methods, and evaluate the performance of fuzzy inference systems. • Fuzzy Control Systems: Students should gain knowledge about the application of fuzzy logic in control systems. This involves understanding how to design and implement fuzzy controllers, tuning fuzzy control parameters, and analyzing the stability and performance of fuzzy control systems. • Fuzzy Decision-Making: The module should explore the use of fuzzy logic in decision-making processes. Students should learn how to develop fuzzy decision models, perform fuzzy inference for decision-making, and interpret the results in practical scenarios. • Fuzzy Logic Applications: The module should provide insights into the diverse range of applications where fuzzy logic is used. This may include areas such as robotics, pattern recognition, expert systems, industrial process control, and risk analysis. Students should understand the advantages and limitations of using fuzzy logic in these applications. • Implementation and Tools: Students should be familiarized with software tools and programming languages commonly used for fuzzy logic implementation. This may involve hands-on experience with fuzzy logic toolboxes, programming fuzzy logic algorithms, and simulating fuzzy systems using appropriate software. • Evaluation and Optimization: The module should cover techniques for evaluating and optimizing fuzzy logic systems. This includes performance metrics, sensitivity analysis, tuning membership functions and fuzzy rules, and improving the overall efficiency and accuracy of fuzzy systems. • Future Trends and Advancements: Students should be exposed to current

	research trends and advancements in fuzzy logic. This may involve discussing topics like fuzzy neural networks, genetic algorithms in fuzzy systems, fuzzy clustering, and hybrid approaches combining fuzzy logic with other computational intelligence techniques. Overall, the module objectives should aim to provide a solid foundation in fuzzy logic theory, practical application skills, and an understanding of its significance in solving complex real-world problems.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Knowledge and Understanding: a. Demonstrate a comprehensive understanding of the principles and concepts of fuzzy logic. b. Explain the different components of fuzzy logic, including membership functions, fuzzy sets, fuzzy rules, and fuzzy inference systems. c. Understand the various types of fuzzy inference systems, such as Mamdani and Takagi-Sugeno models. Modeling and Problem Solving: a. Apply fuzzy logic principles to model and solve real-world problems. b. Identify appropriate input and output variables and define suitable membership functions. c. Formulate fuzzy rules and design fuzzy inference systems to solve specific problem domains. d. Implement defuzzification methods and evaluate the performance of fuzzy inference systems. Fuzzy Logic Operations: a. Perform fuzzy set operations, including union, intersection, and complement. b. Apply fuzzy arithmetic operations such as fuzzy addition, subtraction, and multiplication. c. Utilize fuzzy aggregation methods like max and min for combining fuzzy sets or values. Fuzzy Control Systems:

	a. Design and implement fuzzy controllers for various control applications. b. Tune fuzzy control parameters to achieve desired system behavior. c. Analyze the stability and performance of fuzzy control systems. Fuzzy Decision-Making: a. Develop fuzzy decision models for decision-making processes. b. Apply fuzzy inference techniques to make decisions based on fuzzy inputs and rules. c. Interpret and evaluate the results of fuzzy decision models in practical scenarios. Software and Implementation Skills: a. Utilize software tools and programming languages to implement fuzzy logic algorithms. b. Simulate and analyze fuzzy systems using appropriate software and toolboxes. c. Develop programming skills for fuzzy logic implementation. Evaluation and Optimization: a. Evaluate the performance of fuzzy logic systems using appropriate metrics. b. Perform sensitivity analysis to assess the impact of parameter variations on system outputs. c. Optimize fuzzy logic systems by tuning membership functions and fuzzy rules for improved performance. Application and Integration: a. Apply fuzzy logic in various application domains, such as robotics, pattern recognition, expert systems, industrial process control, and risk analysis. b. Identify opportunities to integrate fuzzy logic with other computational intelligence techniques for enhanced problem-solving capabilities. Critical Thinking and Analysis: a. Critically evaluate the advantages and limitations of using fuzzy logic in

	different contexts. b. Analyze and interpret the results of fuzzy logic models and systems, considering their practical implications. Awareness of Future Trends: a. Demonstrate an awareness of current research trends and advancements in fuzzy logic. b. Identify potential areas of future development and emerging applications of fuzzy logic. These learning outcomes are designed to ensure that students develop a strong theoretical foundation in fuzzy logic, gain practical skills in fuzzy logic modeling and implementation, and understand its application potential in various domains.
Indicative Contents المحتويات الإرشادية	Introduction to Fuzzy Logic: Basic concepts and principles of fuzzy logic Comparison with traditional binary logic Applications of fuzzy logic in various fields Fuzzy Sets and Membership Functions: Definition and properties of fuzzy sets Membership functions and their types (triangular, trapezoidal, Gaussian, etc.) Fuzzy membership grades and linguistic variables Fuzzy Logic Operations: Fuzzy set operations (union, intersection, complement) Fuzzy arithmetic operations (addition, subtraction, multiplication) Fuzzy aggregation methods (max, min) Fuzzy Inference Systems: Fuzzy rule-based reasoning

	Mamdani fuzzy inference model Takagi-Sugeno fuzzy inference model Defuzzification methods (centroid, weighted average, etc.) Fuzzy Control Systems: Introduction to fuzzy control systems Fuzzy controllers and their components (fuzzifier, rule base, inference engine, defuzzifier) Designing and tuning fuzzy controllers Stability and performance analysis of fuzzy control systems Fuzzy Decision-Making: Fuzzy decision models Fuzzy inference for decision-making Fuzzy decision rules and decision tables Evaluating and interpreting fuzzy decision models Fuzzy Logic Applications: Fuzzy logic in robotics and automation Fuzzy pattern recognition and image processing Fuzzy expert systems and knowledge representation Fuzzy logic in industrial process control Fuzzy Clustering and Data Analysis: Fuzzy clustering algorithms (Fuzzy C-means, Gustafson-Kessel, etc.) Fuzzy clustering validity measures Fuzzy data analysis and visualization Hybrid Approaches and Advanced Topics: Fuzzy logic combined with neural networks

	Genetic algorithms and evolutionary computation in fuzzy systems Fuzzy logic and decision support systems Fuzzy control in complex and uncertain environments Practical Implementation and Tools: Software tools for fuzzy logic modeling and simulation (Matlab) Hands-on exercises and projects using fuzzy logic software Programming fuzzy logic algorithms and systems Evaluation and Optimization of Fuzzy Systems: Performance evaluation metrics for fuzzy systems Sensitivity analysis and robustness testing Optimization techniques for tuning membership functions and fuzzy rules Future Trends and Emerging Applications: Current research trends and advancements in fuzzy logic Emerging applications of fuzzy logic in various domains Ethical considerations and challenges in fuzzy logic applications

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	**Lectures**: Traditional lectures can be used to introduce and explain key concepts, theories, and algorithms in soft computing. Lectures can also include demonstrations and examples to illustrate the application of Soft-computing techniques. **Practical Sessions**: Hands-on practical sessions allow students to apply the concepts learned in lectures. These sessions can involve programming exercises, implementing Soft-computing, and working with Soft-computing frameworks and tools. Practical sessions provide students with practical experience and help reinforce their understanding of Soft-computing principles. **Case Studies**: Analyzing real-world case studies and examples can help students understand how soft computing is applied in various domains. Case studies can

	involve analyzing and solving Soft-computing -related problems, discussing ethical considerations, and evaluating the societal impact of AI applications. **Assessments**: Assessments can include quizzes, assignments, programming projects, and examinations to evaluate students' understanding of Soft-computing concepts and their ability to apply them. Assessments should be designed to assess both theoretical knowledge and practical skills in soft computing.

Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	79	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	96	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	6
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**175**		

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1 Introduction to soft computing	o Overview of the course o Definition and brief history of Soft Computing o Approaches to AI: symbolic Soft Computing, and machine learning
Week 2 Introduction to Fuzzy Logic	o Overview of fuzzy logic principles and concepts o Membership functions and fuzzy sets o Fuzzy operations: union, intersection, and complement o Fuzzy logic applications
Week 3 Fuzzy Logic Modeling	o Identification of input and output variables o Defining membership functions o Formulating fuzzy rules o Designing fuzzy inference systems
Week 4 Fuzzy Inference System	o Mamdani fuzzy inference model o Takagi-Sugeno fuzzy inference model o Construction and interpretation of fuzzy rule bases o Defuzzification methods.
Week 5 Fuzzy Logic Operation	o Fuzzy arithmetic: addition, subtraction, and multiplication o Fuzzy aggregation methods: max, min o Fuzzy set operations in detail
Week 6 Fuzzy Control System	o Introduction to fuzzy control systems o Designing fuzzy controllers o Tuning fuzzy control parameters o Stability and performance analysis of fuzzy control systems
Week 7 Fuzzy Decision Making	o Fuzzy decision models o Fuzzy inference for decision-making o Interpretation and evaluation of fuzzy decision models
Week 8	o Introduction to software tools for fuzzy logic implementation o Programming fuzzy logic algorithms

software and implementation	o Simulation of fuzzy systems using software and toolboxes
Week 9 Evaluation and Optimization	o Performance evaluation of fuzzy logic systems o Sensitivity analysis o Optimization techniques for tuning membership functions and fuzzy rules
Week 10	Midterm Exam
Week 11 **Fuzzy Logic Application**	o Robotics and automation applications o Pattern recognition using fuzzy logic o Expert systems and fuzzy reasoning o Fuzzy logic in industrial process control
Week 12 Advance Topic and Future Trend	o Fuzzy neural networks o Genetic algorithms in fuzzy systems o Fuzzy clustering o Hybrid approaches and integration with other computational intelligence techniques
Week 13 Review	o Review of key concepts and techniques in fuzzy logic o Discussion of challenges and limitations in fuzzy logic applications
Week 14 Case Studies	o Case studies to apply fuzzy logic in practical scenarios
Week 15	o **Final Exam Review and Wrap-up** o **Exam preparation and practice questions** o **Summary of the course and future directions in Soft Computing** o **Teaching materials: Review materials, sample exam questions**

Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Introduction to fuzzy logic principles and concepts Overview of the lab equipment and software Familiarization with the lab environment and tools
Week 2	Implementing membership functions using software tools Creating fuzzy sets and visualizing membership functions Performing fuzzy set operations (union, intersection, complement) in the lab
Week 3	Implementing Mamdani fuzzy inference system in the lab Defining fuzzy rules and constructing rule bases Testing and evaluating the performance of the fuzzy inference system
Week 4	Implementing fuzzy arithmetic operations (addition, subtraction, multiplication) Applying fuzzy aggregation methods (max, min) in the lab Performing fuzzy logic operations on fuzzy sets and values
Week 5	Designing and implementing fuzzy controllers in the lab Tuning fuzzy control parameters for desired system behavior Analyzing the stability and performance of fuzzy control systems
Week 6	Developing fuzzy decision models for lab scenarios Implementing fuzzy inference for decision-making in the lab

	Interpreting and evaluating the results of fuzzy decision models
Week 7	Programming fuzzy logic algorithms in the lab Utilizing software tools for fuzzy logic implementation Simulating and analyzing fuzzy systems using lab software and toolboxes
Week 8	Evaluating the performance of fuzzy logic systems using lab experiments Performing sensitivity analysis to assess parameter variations Optimizing fuzzy logic systems through tuning membership functions and fuzzy rules
Week 9	Implementing fuzzy logic in lab applications such as robotics, pattern recognition, or control systems Testing and evaluating the performance of fuzzy logic in specific lab scenarios
Week 10	Mid Term exam
Week 11	Project Development Lab Introduction to project development Forming project teams and selecting topics
Week 12	Exploring advanced topics such as fuzzy neural networks or genetic algorithms in the lab Discussing current research trends and emerging applications of fuzzy logic
Week 13	Project Presentation Preparation Lab Preparing project presentations and demonstrations
Week 14	Project Presentations and Showcase Lab Presentation of final projects to the class Demonstration of project functionality
Week 15	Review of key concepts and techniques covered in the lab Discussion of challenges and limitations in fuzzy logic applications

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Textbooks	Dan W. Patterson ,"Artificial Neural Networks: Theory and Applications ",Prentice all 1996.	Yes
Recommended Texts	V Valluru Rao and Hayagriva Rao,"C++Neural and Fuzzy Logic", New Delhi, BPB Publication 2nd edition, 1996. Understanding Neural Networks and Fuzzy Logic: Basic Concepts and Applications, New York 1996.	-
Websites		

Grading Scheme

مخطط الدرجات

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Parallel Processing**			**Module Delivery**	
Module Type	**Core**			☒**Theory** ☐**Lecture** ☐**Lab** ☒**Tutorial** ☐**Practical** ☐**Seminar**	
Module Code	PAPR414				
ECTS Credits	**5**				
SWL (hr/sem)	**125**				
Module Level		UGIV	**Semester of Delivery**		8
Administering Department		Computer engineering	**College**	College of engineering	
Module Leader	Name		**e-mail**	E-mail	
Module Leader's Acad. Title			**Module Leader's Qualification**		
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name		Name	**e-mail**	E-mail	
Scientific Committee Approval Date		01/06/2023	**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Computer Architecture II	**Semester**	6
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. To develop skills in designing and implementing parallel algorithms. 2. To enable students to apply parallel processing techniques in real-world scenarios and domain-specific applications. 3. To consider ethical and societal implications associated with parallel processing, including privacy, security, and fairness. 4. To explore emerging trends and technologies in parallel processing, such as GPU computing and distributed computing.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. To provide a comprehensive understanding of the principles and concepts of parallel processing. 2. To explore different types of parallel architectures and their characteristics. 3. To develop knowledge and skills in designing and implementing parallel algorithms. 4. To analyze and evaluate the performance of parallel algorithms and architectures. 5. To understand the challenges and issues related to parallel processing, such as synchronization and load balancing, and learn strategies to address them. 6. Evaluate the impact of different architectural features on parallel processing performance, including cache coherence, memory hierarchy, and interconnect topologies.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following: Providing an overview of parallel processing with significance, and the motivation behind its use. Students will learn about the types of parallel architectures, such as SIMD (Single Instruction, Multiple Data) and MIMD (Multiple Instruction, Multiple Data), and the taxonomy of parallel algorithms. Focusing on the design and analysis of parallel algorithms. Students will learn various techniques for designing parallel algorithms, including task parallelism, data parallelism, and pipeline parallelism. They will also explore performance analysis metrics such as speedup, efficiency, and scalability, enabling them to evaluate the effectiveness of parallel algorithms. Students will learn about performance profiling and analysis tools to identify bottlenecks and optimize parallel programs. They will also explore techniques for load balancing, data partitioning, and minimizing communication and synchronization overheads.

	Students will learn how to parallelize matrix computations (such as matrix multiplication and LU decomposition), sorting and searching algorithms, and graph algorithms (such as graph traversal and shortest paths).

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	48	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	3
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	77	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**125**		

Module Evaluation

تقييم المادة الدراسية

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

	Report	1	10% (10)	All	All
Summative assessment	**Midterm Exam**	2hr	10% (10)	8	LO #1 - #4
	Final Exam	3hr	50% (50)	15	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction, Parallel architectures
Week 2	Parallel algorithm design.
Week 3	Shared memory programming
Week 4	Message passing programming
Week 5	Combining MPI and OpenMP, Debugging MPI programs
Week 6	Floyd's algorithm
Week 7	Performance analysis
Week 8	**Mid-term Exam**
Week 9	Matrix-vector multiplication
Week 10	Matrix multiplication, Finite difference methods
Week 11	Sorting
Week 12	Combinatorial search,
Week 13	External memory sorting
Week 14	Heterogeneous architectures
Week 15	Load balancing
Week 16	**Preparatory week before the final Exam**

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	John Hennessy and David Patterson, Computer Architecture: A Quantitative Approach, Morgan Kauffman Publisher.	Yes
Recommended Texts	Parallel Programming in C with MPI and OpenMP by M.J. Quinn, McGraw-Hill Science/Engineering/Math, 1 st edition, 2003, ISBN: 0072822562.	No

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