



الجامعة العراقية
كلية الهندسة
برنامج قسم هندسة الحاسوب
وفق مسار بولونيا

للعام الدراسي
2026-2025



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 (2025-2026)						 جمهورية العراق - وزارة التعليم العالي والبحث العلمي الجامعة العراقية بكالوريوس في هندسة الحاسوب (الدورة الأولى) أربع سنوات (ثمانية فصول دراسية) - ٢٤٠ وحدة ائتمانية - كل وحدة ائتمانية = ٢٥ ساعة														
Level	Semester	No.	Module Code	Module Name in English	اسم المادة الدراسية	Language	SSWL (hr/w)						Exam hr/sem	SSWL L hr/sem	SSWL L hr/sem	SWL hr/sem	ECTS	Module Type	Prerequisite Module(s) Code	
							CL (hr/w)	Lect (hr/w)	Lab (hr/w)	Pr (hr/w)	Tut (hr/w)	Seminar (hr/w)								
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	COMP101	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 الانكليزية 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 الانسان والديمقراطية	Arabic	2							3	33	17	50	2.00	S	—
Total							16	0	6	0	3	0	24	399	351	750	30.00			
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			
UGI	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 شبيهة	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 للاتصالات 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	الالكترونيات 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			
UGII	Four	1	ENAN208	Engineering Analysis	تحليلات هندسية	English	4							3	63	12	75	3.00	B	—
		2	ELEC210	Electronics II	الالكترونيات 2	English	2			2		1		4	79	46	125	5.00	C	ELEC204
		3	COFU212	Communication Fundamentals II	اساسيات للاتصالات 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	ENLA202	English language II	اللغة الانكليزية 2	English	2							3	33	17	50	2.00	S	—
		7	ARLA201	Arabic language II	اللغة العربية 2	Arabic	2							3	33	17	50	2.00	S	—
		8	DASA215	Data structures and algorithms	هيكل بيانات والخوارزميات	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			
UGIII	Five	1	PROB300	Probability	احتمالات	English	2							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 واسات	English	2					2		3	63	62	125	5.00	C	—
		5	COAR303	Computer Architecture I	هندسة معالجات الحاسوب 1	English	2					1		3	48	77	125	5.00	C	—
		6	MICR304	Microprocessor I	المعالج الميكرو 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	
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	هندسة معالجات الحاسوب 2	English	2					1		3	48	77	125	5.00	C	COAR303
		5	MICR314	Microprocessor II	المعالج الميكرو 2	English	2			2		1		4	79	46	125	5.00	C	MICR304
		6	CONE315	Computer network	شبكة الحاسوب	English	2			2				4	64	86	150	6.00	C	—
		Total							12	0	6	0	5	0	21	366	384	750	30.00	
UGIV	Seven	1	ARIN400	Artificial Intelligent	الذكاء الاصطناعي	English	2							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	النظم المدمجة	English	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	30.00	
UGIV	Eight	1	SOCO410	Soft computing	الحوسبة اللينة	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	ادارة مشاريع	English	2							3	48	77	125	5.00	C	—
		5	PAPRA14	Parallel Processing	المعالجة المتوازية	English	2					1		3	48	77	125	5.00	C	—
		6	GRPR405	Graduation Project	مشروع التخرج	English	1							2	17	33	50	2.00	C	—
		Total							11	0	4	0	5	0	19	319	431	750	30.00	
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 fulfill the requirements of the Bachelor's degree																				
Structured SWL (hr/w) type	CL	Class Lecture				Module type		B Basic learning activities						SWL: Student Workload						
	Lab	Laboratory						C Core learning activity						SSWL: Structured SWL						
	Pr	Practical Training						S Support or related learning activity						USSWL: Unstructured SWL						
	Tut	Tutorial																		
	Lect	Online lecture																		
Note: Columns O, Q and R are prograded, protected and should not be edited																			V7.0	



الملحق رقم (2)

دليل البرنامج الأكاديمي 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	بيان المهمة والرؤية
2. Program Specification	مواصفات البرنامج
3. Program (Objectives) Goals	أهداف البرنامج
4. Program Student learning outcomes	مخرجات تعلم الطالب
5. Academic Staff	الهيئة التدريسية
6. Credits, Grading and GPA	الاعتمادات والدرجات والمعدل التراكمي
7. Modules	المواد الدراسية
8. Contact	اتصال

1. **Mission & Vision Statement**

Vision Statement

We are committed to delivering high-quality education that fosters a deep understanding of computer engineering principles, theory, and practice.

We maintain strong connections with industry leaders and stay abreast of the latest technological trends. By incorporating industry-relevant content into our programs, we ensure that our graduates possess the skills and expertise demanded by the rapidly evolving computing industry.

We embrace diversity in all its forms and strive to create an inclusive environment that fosters collaboration, mutual respect, and equal opportunities for all students, faculty, and staff. We believe that a diverse community enhances creativity, promotes innovation, and enriches the learning experience.

We encourage an entrepreneurial mindset and leadership qualities among our students. We support their endeavors to transform their ideas into viable products and services, nurturing a culture of innovation, creativity, and initiative.

Mission Statement

We deliver a rigorous and up-to-date curriculum that equips students with a strong foundation in computer engineering. Through a combination of theoretical knowledge and practical hands-on experience, we ensure that our graduates possess the skills and expertise needed to excel in the field.

We foster a culture of research and innovation, encouraging faculty and students to engage in cutting-edge research projects. By exploring emerging technologies, developing new methodologies, and contributing to scholarly publications.

We establish strong partnerships with industry leaders, creating opportunities for internships, cooperative education, and collaborative research projects. These connections enable us to bridge the gap between academia and industry, ensuring that our graduates are well-prepared to meet the demands of the rapidly evolving technology sector.

We are dedicated to the professional growth of our students, faculty, and staff. We offer mentorship, workshops, seminars, and other professional development opportunities to enhance technical skills.

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. Provide students with a strong foundation in computer engineering principles, theories, and practices. Develop their technical skills in areas such as digital systems design, computer architecture, programming, algorithms, networking, and software engineering.
2. Cultivate students' ability to analyze complex problems in computer engineering and apply critical thinking skills to develop innovative and effective solutions. Enhance their problem-solving capabilities through hands-on projects, laboratory work, and practical assignments.
3. Enable students to design, develop, and implement computer hardware and software systems. Familiarize them with design methodologies, tools, and techniques used in computer engineering. Emphasize the importance of designing for performance, reliability, security, and energy efficiency.
4. Foster effective teamwork and communication skills among students. Promote collaboration in project-based activities, group assignments, and presentations. Develop students' ability to work collaboratively in multidisciplinary teams, reflecting real-world industry scenarios.
5. Continuous Learning and Adaptability: Prepare students for lifelong learning and the ability to adapt to emerging technologies. Develop their research skills, information literacy, and the ability to stay updated with advancements in computer engineering. Foster an enthusiasm for learning and an attitude of continuous improvement.
6. Equip students with the skills and knowledge that align with industry needs and trends. Foster connections with industry professionals and promote industry collaboration through internships, co-op programs, guest lectures, and industry projects. Ensure graduates are well-prepared for successful careers in computer engineering.
7. Promote research culture among faculty and students. Encourage participation in research projects, publications, conferences, and scholarly activities in computer engineering. Foster a spirit of inquiry, critical analysis, and the pursuit of knowledge.
8. Foster an inclusive environment that values diversity, respects different perspectives, and encourages equal opportunities for all students. Create a supportive and inclusive community that celebrates diversity and promotes equal participation in computer engineering.
9. These program goals serve as a guiding framework for the department's efforts in designing the curriculum, teaching methodologies, assessments, and overall educational experience to ensure that graduates are well-prepared and equipped to make meaningful contributions in the field of computer engineering.

4. Student Learning Outcomes

1. Demonstrate a comprehensive understanding of computer engineering principles, including digital logic design, computer architecture, programming languages, algorithms, data structures, computer networks, and operating systems.
2. Apply engineering principles and methodologies to design, develop, and implement computer hardware and software systems. This includes analyzing requirements, creating specifications, prototyping, testing, and evaluating the performance and reliability of computer systems.
3. Analyze complex problems in computer engineering, formulate appropriate strategies, and apply critical thinking skills to develop creative and effective solutions. Utilize mathematical and engineering principles to solve technical challenges.
4. Demonstrate proficiency in programming languages commonly used in computer engineering, and effectively utilize programming techniques to develop software applications, algorithms, and data structures.
5. Integrate hardware and software components to create functional computer systems. Understand the interaction between software and hardware, and effectively interface software with computer peripherals and devices.
6. Apply theoretical knowledge to practical situations through laboratory experiments, projects, and assignments. Demonstrate proficiency in using tools, software, and equipment relevant to computer engineering.
7. Collaborate effectively in teams to solve complex engineering problems, demonstrating strong interpersonal skills, communication, and leadership abilities. Convey technical concepts and ideas clearly and professionally in oral and written forms.
8. Understand and adhere to ethical standards and professional responsibilities in computer engineering practice. Recognize and address ethical dilemmas, respecting privacy, security, intellectual property rights, and social implications of technology.
9. Engage in research activities, demonstrating the ability to conduct literature reviews, design and execute experiments, analyze data, and draw meaningful conclusions. Contribute to the advancement of computer engineering knowledge through research projects.
10. Acquire industry-relevant skills and knowledge, including familiarity with industry practices, tools, and technologies. Demonstrate readiness for professional careers in computer engineering, including internships, cooperative education, and other industry engagement opportunities.

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:

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

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 Systems	79	71	6.00	C	Database 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
2. Undergraduate Modules 2024-2025
3. Contact

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.

نظرة عامة

يتناول هذا الدليل المواد الدراسية التي يقدمها برنامج هندسة الحاسوب للحصول على درجة بكالوريوس العلوم. يقدم البرنامج (48) 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)
2	2	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's complement and 2's 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 إبّان حكمه عدداً كبيراً من الجرائم المختلفة، واختلافها يلزم ببيان مفاهيم وتعريف للطلاب ليكون على معرفة ودراية بما يمر به مما لها علاقة بمادة المنهاج، كمفهوم الجريمة وأقسامها، والجرائم الدولية التي حُكم عليها قيادات وأزلام نظام البعث وفق قانون المحكمة الجنائية العراقية العليا لقد تضمن هذا المنهج ما جاء مفاتيح معرفية بيد الطالب الجامعي يقوى بها على كلّ مُرتج حُبكت رواية أكوته أيادي البعث وإعلامه المزيف، وباعت ضميرها أنفس تُرى أن تبقى إلى الآن ذليلة أسيرة، وذليلاً 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)
2	1	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 R_s and R_L. 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 يمكن 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 الثالثة / الفصل الاول

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	
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
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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.
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Student Workload (SWL)

الحمل الدراسي للطلاب محسوب لـ ١٥ أسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطلاب خلال الفصل	79	Structured SWL (h/w) الحمل الدراسي المنتظم للطلاب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطلاب خلال الفصل	71	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطلاب أسبوعيا	5
Total SWL (h/sem) الحمل الدراسي الكلي للطلاب خلال الفصل	150		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	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
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	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		
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	1. To provide students with a solid understanding of web development principles, technologies, and best practices. 2. To equip students with the necessary skills to design and build dynamic and interactive websites. 3. To introduce students to the tools and frameworks commonly used in web development. 4. To foster problem-solving and critical thinking skills in the context of web development projects. 5. To prepare students for entry-level web development positions or further studies in the field. 6. 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
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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. - 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. - 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. - 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. - 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. - 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. - 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.
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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 functions and 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 databases Database 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	
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	1. 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. 2. 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 . 3. 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 4. Stochastic Processes: For time-dependent or sequence-dependent phenomena, understanding stochastic processes such as Markov chains, Poisson processes, and queuing theory can be crucial. 5. 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	1. 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). 2. 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. 3. 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. 4. 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. 5. 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. 6. 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.
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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
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	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	
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	1. Software Development Life Cycle (SDLC): Understand the various phases of the software development process, including requirements gathering, system design, implementation, testing, deployment, and maintenance. 2. Software Requirements Engineering: Learn techniques for eliciting, analyzing, documenting, and managing software requirements. Explore methods to ensure that requirements are complete, consistent, and feasible. 3. 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. 4. 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. 5. 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. 6. 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. 7. 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. 8. 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. 9. 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. 10. 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)
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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 modeling, 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	
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.
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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.				

وصف مقررات مواد المرحلة الثالثة / الفصل الثاني

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Digital Signal processing		Module Delivery
Module Type	Core		☒ Theory ☐ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☐ Seminar
Module Code	DISP311		
ECTS Credits	4		
SWL (hr/sem)	100		
Module Level	UGIII	Semester of Delivery	
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: - Understand the fundamentals of signal sampling. - Express the concepts of Discrete signals and systems and their different types which can be used in a wide variety of disciplines in engineering. - Identify and report system properties such as causality, stability, linearity, and time invariance etc. - Apply the convolution sum formulas to determine the output of discrete time systems. - Understand and resolve the Discrete time signals in frequency domain using Fourier series and Fourier transforms, and Fast Fourier Transform. - Understand the concept of z-transform and its and develop the ability to analyze the system in z- domain. - 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.
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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
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 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/N umber	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:
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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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Computer Network		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	
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. 1. Understand the fundamental concepts and principles of computer networks, including network architecture, protocols, and standards . 2. Demonstrate knowledge of the various network components, such as routers, switches, hubs, and network cables, and their functions within a network infrastructure. 3. Design and configure local area networks (LANs) and wide area networks (WANs) using appropriate network topologies, protocols, and addressing schemes. 4. Evaluate different network protocols, such as TCP/IP, Ethernet, and wireless protocols, and understand their advantages, disadvantages, and

	appropriate use cases. 5. Understand the principles of network security, including authentication, encryption, firewalls, and intrusion detection systems, and apply them to secure network infrastructure. 6. Demonstrate knowledge of network management techniques, including network monitoring, performance optimization, and capacity planning. 7. 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, “ <i>Computer Networks</i> ”, Pearson, Fourth Edition, 2010.	No
Recommended Texts	James F. Kurose and Keith W. Ross, “ <i>Computer Networking: A Top-Down Approach Featuring the Internet</i> ”, 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	
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: 6. Describe the fundamental elements of relational database management systems. 7. Explain the basic concepts of relational data model, entity-relationship model, relational database design. 8. Design entity-relationship models to represent simple database application scenarios. 9. Learn the basics of SQL. 10. Convert the entity-relationship model to relational tables, populate relational database and formulate SQL queries on data. 11. Improve the database design by normalization. 12. Explain the basic database storage structures and hashing techniques 13. Apply indexing methods including B tree. 14. 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)	
المناهج 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", 7 th edition 2016, Pearson Higher Education. 2. Vinicius M. Grippa & Sergey Kuzmichev, "Learning MySQL", 2 nd edition 2021, O'Reilly Media, Inc.	No
Recommended Texts	Abraham Silberschatz, Henry F. Korth, and S. Sudarshan "Database System Concepts", 7 th 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				
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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	
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. 1. <u>Introduction to Numerical analysis</u> <u>Basic principles in numerical analysis</u> <u>Types and most common errors</u> 2. <u>Roots finding solutions</u> Bisection method Newton – Raphson method Secant method Fixed point method 3. <u>Curve fitting</u> • Least square regression line • Interpolation Newton (Forwards , Backwards , divided differences)

	Lagrange polynomial Hermit interpolation Spline interpolation 4. <u>Numerical Differentiation</u> 5. <u>Numerical Integration</u> (Trapezoidal , Simpson 1/3 , Simpson 3/8) rules 6. Numerical Solutions of ordinary differential equation (Euler and Runge – Kutta) methods. 7. Numerical Solutions of linear systems (Gauss elimination , Gauss Seidel , Jacobi) .
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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 ^s : 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) المناهج 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.				