



Ministry of Higher Education and Scientific Research
Scientific Supervision and Evaluation Authority
Directorate of Quality Assurance and Academic Accreditation
Accreditation Department

Academic Program and Course Description Guide Computer Engineering Dept.

2025-2026

Academic Program Description Form

University Name: Al-Iraqia University

College/Institute: College of Engineering

Scientific Department: Department of Computer Engineering

Academic/Professional Program: Bachelor of Computer Engineering

Final Degree Awarded: Bachelor of Science in Computer Engineering

Academic System: Bologna Process (First, Second, and Third Levels);

Semester System (Fourth Level)

Description Preparation Date: 1 October 2025

File Completion Date: 27 May 2026

Al-Iraqia University
College of Engineering
Dep. Of Computer Engineering

Signature:

Scientific Associate Name:
Dr. Omar Hassan Hameed
Deputy Dean for Scientific Affairs
College of Engineering

Date: 27-5-2026

Signature:

Head of Department Name:

Date: 27-5-2026

File Reviewed by: Director, Quality Assurance and University Performance

Division: Ass. Prof. Dr. Rana Muthanas Ali

Date: 27/5/2026

Signature:



Dean's Approval

Prof. Dr. Malik Abdul Raheem

Introduction

An academic program is a coordinated and structured package of courses, procedures, and learning experiences organized into a curriculum. Its primary purpose is to build and refine graduates' competencies so that they are prepared to meet labor-market requirements. The program is reviewed and evaluated annually through internal and external quality-assurance processes, including the External Examiner Program.

The academic program description provides a concise summary of the program's principal features and courses, and identifies the competencies students are expected to acquire in accordance with the program objectives. This description is a cornerstone of program accreditation and is prepared collaboratively by the academic staff under the supervision of the scientific committees in the relevant departments.

This second edition of the guide presents an updated academic program description that reflects recent developments in the Iraqi higher-education system. It covers the traditional annual and semester systems, as well as the academic program description adopted for programs operating under the Bologna Process pursuant to the Directorate of Studies letter No. T.M.3/2906 dated 3 May 2023.

In this context, the importance of preparing accurate academic program and course descriptions cannot be overstated, as they are essential to the effective delivery and continuous improvement of the educational process.

Concepts and Terminology

Academic Program Description: A concise statement of the program's vision, mission, and objectives, including an accurate description of the intended learning outcomes and the strategies used to achieve them.

Course Description: A concise summary of the course's principal characteristics and the learning outcomes students are expected to achieve. It demonstrates how students can make effective use of the available learning opportunities and is derived from the academic program description.

Program Vision: An ambitious and realistic view of the program's future, intended to be progressive, inspiring, motivating, and achievable.

Program Mission: A concise statement that identifies the objectives and activities required to achieve them and defines the program's development pathways and strategic direction.

Program Objectives: Measurable and observable statements describing what the academic program intends to achieve within a specified period.

Curriculum Structure: All courses included in the academic program under the approved learning system (semester, annual, or Bologna Process), whether classified as ministry, university, college, or department requirements, together with their credit units.

Learning Outcomes: An integrated set of knowledge, skills, and values acquired by students upon successful completion of the academic program. The learning outcomes of each course must be defined in a manner that supports achievement of the program objectives.

Teaching and Learning Strategies: Planned approaches used by faculty members to support student learning and achieve the intended learning outcomes. They encompass both classroom and extracurricular learning activities.

Program Vision

Our vision is to cultivate an environment in which excellence thrives and minds are empowered. We envision a community of learners and innovators driven by curiosity and a passion for learning. By integrating qualified academics, practical experience, and collaborative research, we aim to develop the next generation of engineers who will advance technology and shape the world through creativity and expertise.

Program Mission

Our mission is to educate and empower students in computer engineering, conduct pioneering research, and strengthen partnerships with industry. We promote diversity, serve the community, and continuously develop our programs to respond to evolving labor-market needs and scientific and technological progress.

Program Objectives

1. Provide effective and comprehensive education that prepares students for successful careers in computer engineering.
2. Conduct high-impact research that advances knowledge and addresses critical societal needs.
3. Promote diversity, equality, and inclusion within the engineering community.
4. Collaborate with industry partners and stakeholders to create meaningful opportunities for students and faculty.
5. Contribute to the development of sustainable technologies and practices that benefit society and the environment.
6. Prepare graduates to work as computer-engineering practitioners and consultants in reputable organizations.
7. Encourage postgraduate study and scientific research at advanced research universities.
8. Promote lifelong learning and continuing professional development among graduates.
9. Encourage participation in professional associations and community service.

Graduate Outcomes

The engineering program outcomes adopted by the Iraqi Council for Engineering Education require graduates to demonstrate the ability to:

- GO1. Identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.
- GO2. Apply engineering design to produce solutions that meet specified needs while considering public health, safety, environmental, economic, social, cultural, and global factors.
- GO3. Develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw sound conclusions.
- GO4. Communicate effectively with individuals, groups, the public, and different administrative levels in a manner appropriate to the context.
- GO5. Recognize ethical and professional responsibilities in engineering situations and make informed judgments that consider environmental, economic, and societal consequences.
- GO6. Recognize the ongoing need to acquire new knowledge and select and apply appropriate learning strategies.
- GO7. Function effectively as a member or leader of a team that establishes goals, plans tasks, meets deadlines, and creates a collaborative and inclusive environment.

Mapping of Graduate Outcomes to Program Educational Objectives

GO1	Ability to identify, formulate, and solve computer-engineering problems by applying principles of engineering, science, and mathematics.	1, 2, 5
GO2	Ability to apply the engineering design process to produce solutions that meet specified needs while considering health, safety, global, cultural, social, environmental, economic, and discipline-specific factors.	1, 2, 5
GO3	Ability to develop and conduct appropriate experiments, analyze and interpret data, and use engineering judgment to draw conclusions.	1, 2, 5
GO4	Ability to communicate effectively with a range of audiences.	3, 4
GO5	Ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments that consider the global, economic, environmental, and societal impact of engineering solutions.	4, 5
GO6	Ability to recognize the continuing need to acquire new knowledge, select appropriate learning strategies, and apply that knowledge.	2, 3, 5
GO7	Ability to function effectively as a member or leader of a team that sets goals, plans tasks, meets deadlines, and creates a collaborative and inclusive environment.	4, 5

Program Objectives				
GO7	Ability to work collaboratively as part of an integrated team with shared objectives and defined schedules, ensuring quality and timely completion of work.		4, 5, 6, 7, 8	
Program Accreditation				
The Department is completing the requirements for program accreditation by the Iraqi Council for Accreditation of Engineering Education (ICAEE). A readiness review has been conducted, and the curriculum, graduate outcomes, and continuous-improvement plans have been updated in accordance with accreditation requirements.				
Other External Influences				
Labor-market requirements; practical and field visits to relevant government institutions and companies; the Industrial Advisory Council of the College of Engineering; requirements of the Ministry of Higher Education and Scientific Research; and the requirements of the Iraqi Council for Accreditation of Engineering Education.				
Program Structure				
Program Component	Number of Courses	Credit Units	Percentage	Notes*
Institutional Requirements	7	15	7.8%	Core
College Requirements	11	38	20%	Core
Department Requirements	39	78	72.2%	Core
Summer Training	1	—	—	Core
Other				

* Notes may indicate whether a course is core or elective.

Program Description				
Year / Level	Course Code	Course Title	Credit Hours	
			Theoretical	Practical
First / First Semester	MATH102	Mathematics I	4	
	ENDR104	Engineering Drawing	2	
	COPM101	Computer Programming Methodology	2	2
	FUDS102	Fundamentals of Digital System	2	2
	ENGL120	English Language	2	
	FUEC103	Fundamentals of Electrical Circuits I	2	2
	HRAD103	Human Rights and Democracy	2	
First / Second Semester	PHYS101	Electronic Physics	4	2
	MATH1108	Mathematics II	4	
	WORK110	Workshop		2
	FUCO110	Fundamentals of Computer Organization	2	2
	FUEC111	Fundamentals of Electrical Circuits II	2	2
	CHIM105	Chemistry	2	
	ARLA101	Arabic Language I	2	
Second / First Semester	CBRI104	Crimes of the Baath Regime in Iraq		
	OBOP201	Object Oriented Programming	2	2
	ENMA201	Engineering Mathematics		
	COFU202	Communication Fundamentals I	2	2
	DISD203	Digital Systems Design I	2	2
Second / Second Semester	BIOL202	Biology	2	
	ELEC204	Electronics I	2	2
	ENAN208	Engineering Analysis	2	
	ELEC210	Electronics II	2	2
	COFU212	Communication Fundamentals II	2	2
	DISD213	Digital Systems Design II	2	2
	OPSY214	Operating Systems	2	

Program Description				
Year / Level	Course Code	Course Title	Credit Hours	
			Theoretical	Practical
	ENLA216	English Language II	2	
	ARLA217	Arabic Language II	2	
	DASA215	Data Structures and Algorithms	2	2
Third / Second Semester	PROB300	Probability	2	
	SOFT300	Software Engineering	2	
	WEDE301	Web Development	2	2
	SISY302	Signals and Systems	2	
	COAR303	Computer Architecture I	2	
	MICR304	Microprocessor I	2	2
Third / Second Semester	NUAN306	Numerical Analysis	2	
	DASY310	Database Systems	2	2
	DISP311	Digital Signal Processing	2	
	COAR312	Computer Architecture II	2	
	MICR314	Microprocessor II	2	2
	CONE315	Computer Network	2	2
Fourth / First Semester	CE431	Soft Computing I	2	
Fourth / First Semester	CE441	Real-Time Systems	2	
Fourth / First Semester	CE432	Parallel Processing	2	
Fourth / First Semester	CE433	Embedded Systems	2	2
Fourth / First Semester	CE442	Internet Programming	2	2
Fourth / First Semester	CE443	Laboratories I		6
Fourth / First Semester	U441	Graduation Project	2	
Fourth / Second Semester	CE434	Soft Computing II	2	
Fourth / Second Semester	CE435	Digital Multimedia Processing	2	2
Fourth / Second Semester	CE436	Project Management	2	
Fourth / Second Semester	CE446	Computer Security	2	
Fourth / Second Semester	CE447	I/O Interfacing	2	
Fourth / Second Semester	UR449	English	2	
Fourth / Second Semester	CE448	Laboratories II		4
Fourth / Second Semester	U441	Graduation Project	2	
Expected Program Learning Outcomes				
Knowledge				
GO1		Identify, formulate, and solve engineering problems by applying principles of science, mathematics, and engineering.		
GO2		Develop engineering designs that meet specified needs while considering health, safety, environmental, economic, and social factors.		
GO3		Conduct appropriate experiments and analyses to a high standard; analyze and interpret the resulting data; and use sound engineering judgment to draw accurate conclusions.		
Skills				
GO4		Communicate effectively through appropriate methods with individuals, groups, the public, and different administrative levels.		
GO6		Engage in lifelong learning to continuously develop professional knowledge.		
GO7		Work effectively as part of an integrated team with common goals and defined schedules, ensuring the quality and timely completion of work.		
Values				
GO5		Recognize ethical and professional responsibilities in engineering contexts while considering environmental, economic, and societal consequences.		

Teaching and Learning Strategies

1. Flipped Classroom: Students review video or digital learning materials before class; classroom time is used for discussion and practical application.
2. E-learning: Online platforms and applications are used to provide content and facilitate interaction with instructors.
3. Blended Learning: Face-to-face instruction is combined with online learning to increase flexibility and engagement.
4. Problem-Based Learning: Students investigate authentic problems and develop evidence-based solutions.
5. Project-Based Learning: Students complete integrated projects that connect theoretical knowledge with practical application.
6. Multimedia Learning: Videos, animations, digital simulations, and other media are used to support understanding.
7. Adaptive Learning: Intelligent systems adjust learning content to students' levels and pace.
8. Online Collaborative Learning: Students work collaboratively through digital tools such as forums and virtual discussion rooms.
9. Digital Inquiry-Based Learning: Students search for, collect, and analyze online data to construct knowledge and reach informed conclusions.

Assessment Methods

1. Formative Assessment: Continuous monitoring through short questions, activities, and discussions.
2. Summative Assessment: End-of-unit or end-of-semester projects and examinations.
3. Portfolio Assessment: Collection of student work over time to measure development.
4. Performance Assessment: Practical tasks such as experiments, oral presentations, and problem solving.
5. Self-Assessment: Students evaluate their own performance against defined criteria.
6. Peer Assessment: Students evaluate one another's work using agreed criteria.
7. E-Assessment: Digital platforms and interactive tests are used for assessment.
8. Rubric-Based Assessment: Clear performance criteria are used to determine achievement levels.
9. Adaptive Assessment: Questions adjust to the individual student's level.
10. Project-Based Assessment: Evaluation is based on completion of an integrated project that combines theory and practice.

Faculty							
Faculty Members							
Academic Rank		Name		General Specialization		Specific Specialization	
		Name	General	Specific		Permanent / Lecturer	
Professor	Muwafaq Shyaa Alwan	Mechanical Engineering	Refractory			Permanent	
Assistant Professor	Mudhafar Hussain Ali	Communication Engineering	Optical Communication Engineering				
Assistant Professor	Satea Hikmat Alnajjar	Electrical and Electronic Engineering	Communication Engineering				
Assistant Professor	Ali Salem Ali	Computer Science	Secure Networking				
Assistant Professor	Omar Hussein Salman	Computer Engineering	Computer Systems Engineering				
Lecturer	Omar Hassan Hameed	Mechanical Engineering	Mechanical Engineering				
Lecturer	Ammar Mzeal Shanta	Physical Education	Physical Education and Sports Sciences				
Lecturer	Ali Mahmood Jasim	Electrical Engineering	Electrical Engineering				
Lecturer	Ghassan Akram Abed	Computer Engineering	Networks Engineering				

Faculty							
Faculty Members							
Academic Rank		Name		General Specialization		Specific Specialization	
		Name	General	Specific		Permanent / Lecturer	
Lecturer	Omar Raad Kadhim	Electrical Engineering	Electronic and Communication Engineering			Permanent	
Lecturer	Ahmed Sabah Noori	Electrical and Electronic Engineering	Communication Engineering				
Lecturer	Noor Foud Kadhim	Genetic Engineering	Biotechnology				
Lecturer	Zainab Abbas Fadil	Computer Engineering	Computer Engineering				
Lecturer	Amjed Razzaq Hussein Al-Abbas	Electrical and Computer Engineering	Optical Networks and Communications				
Lecturer	Mahmood Jalal Ahmad	Electrical and Electronic Engineering	Communication Engineering				
Lecturer	Russul Dhiaa AbdulJabar	Computer Science	Computer Science				
Assistant Professor	Zahraa Khudhair Taha	Electrical Engineering	Electronics and Communications				
Assistant Professor	Arwa Amir Moosa	Laser Engineering	Optoelectronics				
Faculty							
Faculty Members							
Academic Rank		Name		General Specialization		Specific Specialization	
		Name	General	Specific		Permanent / Lecturer	

Lecturer	Othman Atta Ismael	Electrical and Electronic Engineering	Communication Engineering			Permanent	
Lecturer	Rami Raad Saadi	Mathematics	Mathematical Sciences				
Assistant Lecturer	Shaima'a Bader Yass	Mathematics	Applied Mathematics				
Assistant Lecturer	Samar Kareem Ibrahim	Electrical Engineering	Optoelectronics Engineering				
Assistant Lecturer	Sura Nasser Maryoush	Computer Science	Computer Science and Networks				
Assistant Lecturer	Aya Ayad Hussein	Computer Engineering	Networks Engineering				
Assistant Lecturer	Ali Adnan Hussein	Electrical and Electronic Engineering	Communication Engineering				
Assistant Lecturer	Mazin Nabih Ali	Materials Engineering	Materials Engineering				
Assistant Lecturer	Israa Majeed Ali	Information Engineering	Information and Communication Engineering				

Professional Development

Orientation for New Faculty Members

1. Provide comprehensive orientation on the nature of the work and the institutional and departmental goals and values.
2. Offer training courses covering innovative teaching methods and recognized academic practices.
3. Orient faculty members to institutional and departmental policies and procedures, including research ethics and quality standards.
4. Provide opportunities to communicate with colleagues and participate in research and professional-development activities.
5. Monitor the performance of new faculty members and provide additional support and guidance as needed.

Professional Development for Faculty Members

1. Provide specialized training in effective teaching strategies and modern educational technology.
2. Conduct workshops for exchanging experience and applying good teaching practices in the classroom.
3. Periodically evaluate faculty performance and learning outcomes to improve the educational process.
4. Encourage participation in continuing professional-development programs, seminars, workshops, and academic conferences.
5. Support scientific research and publication to enhance academic competence.
6. Provide opportunities for communication and cooperation in areas of shared interest.
7. Offer qualification programs to develop academic-management and leadership skills.

Annual Faculty Professional-Development Plan

An annual plan is prepared to equip faculty members with contemporary skills, knowledge, and techniques related to teaching, scientific research, administrative and leadership responsibilities, and community service. The plan aims to strengthen integrated professional performance and includes: (1) development of teaching and learning strategies; (2) assessment of learning outcomes; (3) faculty professional development; and (4) development of e-learning processes.

Admission Criteria

Admission to the College is through centralized admission for morning study. Morning study: minimum average 87%, maximum age 25 years, and 50 seats. Admission to evening study is by direct application. Evening study: minimum average 77%, no specified age limit, and 50 seats. Admission regulations remain subject to the current instructions issued by the Ministry of Higher Education and Scientific Research.

Principal Sources of Information about the Program

1. Websites of local and international universities.
2. Workshops organized by the Ministry of Higher Education and their quality standards.
3. Guide of the Iraqi Council for Accreditation of Engineering Education.
4. IEEE Computer Engineering Body of Knowledge.
5. Website of the Department of Computer Engineering, College of Engineering, Al-Iraqia University.
6. Departmental documents and records of the scientific, quality-assurance, and academic-accreditation committees.

Program Development Plan

1. Analyze needs through labor-market surveys and feedback from students, graduates, and faculty members.
2. Update the curriculum in line with technological developments and labor-market needs, particularly artificial intelligence, cybersecurity, and embedded systems.
3. Enhance interactive learning through laboratories, projects, workshops, and simulation.
4. Focus on practical skills in programming, systems design, project management, communication, and teamwork.
5. Improve the learning environment and technical infrastructure and provide internet access and learning platforms.
6. Monitor and evaluate program performance and analyze student data and learning outcomes to support continuous improvement.
7. Strengthen cooperation with industry through summer training, field visits, partnerships, and employment opportunities.
8. Conduct periodic reviews of the program in accordance with quality and academic-accreditation requirements.

Program Skills Matrix										
	Course Code	Course Title	Core or Elective	Knowledge			Skills			Value s
				GO1	GO2	GO3	GO4	GO6	GO7	GO5
Year / Semester	MATH102	Mathematics I	Core	✓				✓		
	ENDR104	Engineering Drawing	Core	✓	✓			✓		
	COPM101	Computer Programming Methodology	Core	✓	✓	✓	✓		✓	
	FUDS102	Fundamentals of Digital System	Core	✓	✓	✓	✓	✓		
	ENGL120	English Language	Core						✓	✓
	FUEC103	Fundamentals of Electrical Circuits I	Core	✓		✓				
	HRAD103	Human Rights and Democracy	Core							✓
First / Second Semester	PHYS101	Electronic Physics	Core	✓				✓		
	MATH1108	Mathematics II	Core	✓	✓			✓		
	WORK110	Workshop	Core	✓	✓	✓	✓		✓	
	FUCO110	Fundamentals of Computer Organization	Core	✓	✓	✓	✓	✓		
	FUEC111	Fundamentals of Electrical Circuits II	Core						✓	✓
	CHIM105	Chemistry	Core	✓		✓				
Second / First Semester	ARLA101	Arabic Language I	Core							✓
	CBRI104	Crimes of the Baath Regime in Iraq	Core	✓				✓		
	OBOP201	Object Oriented Programming	Core	✓	✓			✓		
	ENMA201	Engineering Mathematics	Core	✓	✓	✓	✓		✓	
	COFU202	Communication Fundamentals I	Core	✓	✓	✓	✓	✓		
	DISD203	Digital Systems Design I	Core						✓	✓
Second / Second Semester	BIOL202	Biology	Core	✓		✓				
	ELEC204	Electronics I	Core							✓
	ENAN208	Engineering Analysis	Core	✓				✓		
	ELEC210	Electronics II	Core	✓	✓			✓		
	COFU212	Communication Fundamentals II	Core	✓	✓	✓	✓		✓	
	DISD213	Digital Systems Design II	Core	✓	✓	✓	✓	✓		
Third / First Semester	OPSY214	Operating Systems	Core						✓	✓
	ENLA216	English Language II	Core	✓		✓				
	ARLA217	Arabic Language II	Core							✓
	DASA215	Data Structures and Algorithms	Core	✓				✓		
	PROB300	Probability	Core	✓	✓			✓		
	SOFT300	Software Engineering	Core	✓	✓	✓	✓		✓	
	WEDE301	Web Development	Core	✓	✓	✓	✓	✓		
	SISY302	Signals and Systems	Core						✓	✓
	COAR303	Computer Architecture I	Core	✓		✓				
	MICR304	Microprocessor I	Core							✓
Third / Second Semester	NUAN306	Numerical Analysis	Core	✓				✓		
	DASY310	Database Systems	Core	✓	✓			✓		
	DISP311	Digital Signal Processing	Core	✓	✓	✓	✓		✓	
	COAR312	Computer Architecture II	Core	✓	✓	✓	✓	✓		

Program Skills Matrix										
Year / Semester	Course Code	Course Title	Core or Elective	Knowledge			Skills			Value s
				GO1	GO2	GO3	GO4	GO6	GO7	GO5
	MICR314	Microprocessor II	Core						✓	✓
	CONE315	Computer Network	Core	✓		✓				
	CE431	Soft Computing I	Core							✓
Fourth / First Semester	CE441	Real-Time Systems	Core	✓				✓		
	CE432	Parallel Processing	Core	✓	✓			✓		
	CE433	Embedded Systems	Core	✓	✓	✓	✓		✓	
	CE442	Internet Programming	Core	✓	✓	✓	✓	✓		
	CE443	Laboratories I	Core						✓	✓
	U441	Graduation Project	Core	✓		✓				
	CE434	Soft Computing II	Core							✓
	CE435	Digital Multimedia Processing	Core	✓				✓		
	CE436	Project Management	Core	✓	✓			✓		
	CE446	Computer Security	Core	✓	✓	✓	✓		✓	
	CE447	I/O Interfacing	Core	✓	✓	✓	✓	✓		
	UR449	English	Core						✓	✓
	CE448	Laboratories II	Core	✓		✓				
	U441	Graduation Project	Core							✓

Course Descriptions for the Department of Computer Engineering

2025-2026

LEVEL ONE

First Year / First Semester

Engineering Drawing

Course Name: Engineering Drawing Course	
Course Code: ENDR 104	
Semester / Year: Semester 1 \ 2025-2026	
Description Preparation Date: 01/10/2025	
Available Attendance Forms: Semester 1 \ 2025-2026	
Number of Credit Hours (Total) / Number of Units (Total)	
2 hours per week / 30 hours of study in the classroom/ 2 Ects	
Course administrator's name (mention all, if more than one name)	
Name: - Abrar Ghaleb Mahmood Email: - abrar.g.mahmood@aliraqia.edu.iq	
Course Objectives	
Course Objectives	. The aim of this module is to provide students with a comprehensive understanding of engineering drawing principles and techniques. It aims to develop their skills in creating and interpreting technical drawings, which are essential in the field of engineering. The module also aims to enhance students' spatial visualization abilities and their understanding of the relationship between 2D representations and 3D objects. Describing the AutoCAD program and Its icons, knowing what's new in AutoCAD version. The students will have skills to use that are program and drawing any things (2D). . Reading plans of projects . . How to make show for them projects . 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
Teaching and Learning Strategies	
Strategy	A-Cognitive goals The student will learn the basic and applied concepts of Engineering drawing with the following fundamentals: A.1.The fundamental stages necessary for achieving success in engineering drawing. A.2.Principals of engineering drawing . A.3.The features that an engineering drawing (AutoCAD software) A.4.Why The features that an engineering drawing (autocad software) is important. A.5.Basic geometric shapes and their construction methods.. A.6.How to Multitier projection and views of an object.. A.7.What project management is and why you should care. A.8.Types of sectional views (full, half, offset). A.9.Types of dimensions (linear, angular, radial). A.10.Drawing auxiliary views to show true shape and size of inclined surfaces A.11.Drawing isometric and oblique pictorial views. A.12.Drawing exploded views and assembly details. A.13. A.14.Creating simple drawings using CAD software. A.15.solving problems using isometric projection A.16.Review and Project Work B. The skills goals special to the course Technical Drafting Skills: Engineering drawing courses aim to equip students with the ability to create accurate and detailed technical drawings using drafting tools and software. This includes mastering techniques for creating precise lines, arcs, circles, and geometric shapes. Understanding Standards and Conventions: Students learn the principles of engineering drawing standards and conventions such as line types, dimensioning styles, symbols, and annotations. They develop an understanding of industry-standard practices for creating drawings that are universally understood and compliant with relevant standards.

Spatial Visualization: A crucial aspect of engineering drawing is the ability to visualize three-dimensional objects from two-dimensional representations. Students practice spatial visualization techniques to accurately represent complex geometries, assemblies, and mechanisms on paper. Orthographic Projection: Engineering drawing courses focus on teaching orthographic projection, the method used to represent objects in multiple views (e.g., front, top, side) to convey all relevant details of shape and size accurately. Technical Communication: Effective communication of design intent is vital in engineering. Students learn how to convey technical information clearly and concisely through drawings, annotations, and notes. This includes understanding the hierarchy of information and organizing drawings in a logical and readable manner. CAD Proficiency: With the increasing prevalence of computer-aided design (CAD) software in engineering, students often receive training in CAD tools relevant to their field. They learn how to create, edit, and annotate digital drawings, enhancing their efficiency and adaptability in modern engineering practice. Problem-Solving and Interpretation: Engineering drawing courses often incorporate practical exercises and projects that challenge students to interpret design requirements, visualize solutions, and translate them into accurate drawings. This cultivates problem-solving skills essential for real-world engineering challenges. Attention to Detail and Accuracy: Precision is paramount in engineering drawing. Students are encouraged to develop meticulous attention to detail and accuracy in their drawings, ensuring that all dimensions, annotations, and symbols are correct and consistent. Collaboration and Teamwork: Engineering projects typically involve collaboration among multidisciplinary teams. Students learn how to effectively communicate and collaborate with colleagues by sharing and interpreting engineering drawings, fostering teamwork and synergy in project environments. Adherence to Industry Practices and Regulations: Lastly, students are introduced to relevant industry practices, regulations, and ethical considerations governing engineering drawing, ensuring that their work meets professional standards and complies with legal requirements. Overall, the specialized skill goals of the engineering drawing course aim to prepare students to become proficient technical drafters capable of accurately communicating design information and contributing effectively to engineering projects across various disciplines.
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Course Structure

Course Structure: Second Semester 04-02-2024

The week	Hours	Required learning outcomes	Unit/Module or Topic Title	Teaching Method	Assessment Method
Week 1	2 Theoretical	A1, A2, A3 B1, C1, C3	Principle of engineering drawing	In class	In class activities
Week 2	2 Theoretical	A1, A2, A3, A4 B1, C1, C2	Sketching techniques and line types & Scaling, dimensioning, and labeling	In class	In class activities and home duties
Week 3	2 Theoretical	A1, A2, A3, B1, C1, C3	Principles of orthographic projection	In class	In class activities
Week 4	2 Theoretical	A3, A4, A5 B1, C2, C3	Multiview drawings in orthographic projection	In class	In class activities
Week 5	2 Theoretical	A5, A6 B1, C1, C4	Sectional views and conventions mistakes	In class	In class activities and home duties
Week 6	2 Theoretical	A6, A7 B1, B2, C2, C3	Introduction to isometric projections	In class	In class activities and home duties
Week 7	2 Theoretical	A8, A9 B1, B3, C1, C3	Isometric drawing techniques and isometric scales	In class	Home duties and reports
Week 8	2 Theoretical	A9, A10 B1, B3, C1, C3	Isometric views of objects and assemblies Extracting 2D Drawings form Isometric drawing	In class	Quiz 1

Week 9	2 Theoretical		Mid exam	In class	Questions during the lecture
Week 10	2 Theoretical	A12, B2, B4, B3, C1,C2	1- Introduction - Theory lectures on history of AutoCAD program, what's new versions ,how to install program. 2- Explanation the main window for program, how to arrange it before start work.	In class	Home duties and questions during the lecture
Week 11	2 Theoretical		how to use file icon from the window(open,new,save ,save as,export,merge ,drawing properties .draw orders(line and construction line with types of lines (hidden and center lines)) and modify (erase,move,copy) Orthogonally ,snaps, grid, scale and explode .	In class	Mid Term
Week 12	2 Theoretical	A13, B1, C2,C3	Draw Arcs,polyline,circles and rectangle Draw Ellipses ,trim and extend orders , rotate and mirror.	In class	In class activities
Week 13	2 Theoretical	A1, A2, A3, A6, B1, B2, B3, C2, C3	term Exam + tutorial. And Application of previous orders. Layer order (how to change color,name,type and thickness of line by layer)	In class	In class activities
Week 14	2 Theoretical	A14, A15, B1,B2, C3	Explanation of construction and architectural plans and types of lines.	In class	Assignment Presentation
Week 15	2 Theoretical		Preparatory week before the final Exam	In class	In class activities
Course Evaluation					
Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports etc					
Learning and Teaching Resources					
Required textbooks (curricular books, if any)					
Main references (sources)			Beginning Software Engineering Author: Colin H Simmons Publisher: John Wiley Publishing year: 2015		
Recommended books and references (scientific journals, reports...)					
Electronic References, Websites					

Fundamentals of Digital Systems

Course Name: Fundamentals of Digital Systems					
Course Code: FUDS102					
Semester / Year: Semester 1 \ 2025-2026					
Description Preparation Date: 01/10/2025					
Available Attendance Forms: Offline, In class					
Number of Credit Hours (Total) / Number of Units (Total)					
5 hours per week / 75 hours of study in the classroom / 7 Ects					
Course administrator's name (mention all, if more than one name)					
Name: -May Hattim Abood Email: - May.hattim@aliraqia.edu.iq					
Course Objectives					
Course Objectives	The primary approach for implementing this module will involve promoting active student engagement in exercises, as well as enhancing their ability to think critically. This goal will be accomplished through a combination of classroom sessions, interactive tutorials, and the incorporation of intriguing sampling-based experiments.				
Teaching and Learning Strategies					
Strategy	A. Cognitive goals The student will learn the basic and applied concepts of Computer Engineering with the following fundamentals: A.1. Understanding of basic Number Systems: Students should gain a solid understanding of various number systems and Codes such as decimal, binary, octal, hexadecimal, Binary Coded Decimal (BCD).and Gray system. A.2. Analysis of LOGIC Gates: Students should be able to analyze and solve LOGIC Gates using tables for each circuit such as and, or, and other gates.. A.3. -Boolean algebra and Logic Simplification: Students should learn about various rules and theorem of Boolean algebra and DeMorgan’s Theorems. They should be able to calculate the equivalent expression of logic circuits by using Karnaugh map and SOP.. A.4. - Analysis: Students should be familiar with basic combinational circuit, they should be able to apply the pulse waveform inputs to the Combinational Logic gates and calculate the observed outputs. B. The skills goals special to the course of digital system design B.1 Learn Digital Systems and Binary Numbers B.2 Learn Boolean Algebra and Logic Gates. B.3 Learn how to Gate-Level Minimization. B.4 Learn about Combinational Logic.				
Course Structure					
Course Structure: Second Semester 01-10-2023					
The week	Hours	Required learning outcomes	Unit/Module or Topic Title	Teaching Method	Assessment Method
Week 1	3 Theoretical 2 Lab 1 Tutorial	A1, B1, C1	Digital Systems and Binary Numbers	In class	In class activities
Week 2	3 Theoretical 2 Lab 1 Tutorial	A1, B1, C1	Digital Systems and Binary Numbers	In class	In class activities and home duties
Week 3	3 Theoretical 2 Lab 1 Tutorial	A1, B1, C1	Digital Systems and Binary Numbers	In class	In class activities
Week 4	3 Theoretical 2 Lab 1 Tutorial	A2, B2, C2	Boolean Algebra and Logic Gates	In class	In class activities
Week 5	3 Theoretical 2 Lab 1 Tutorial	A2, B2, C2	Boolean Algebra and Logic Gates.	In class	In class activities and home duties

Week 6	3 Theoretical 2 Lab 1 Tutorial	A2, B2, C2	Boolean Algebra and Logic Gates	In class	In class activities and home duties
Week 7	3 Theoretical 2 Lab 1 Tutorial		Mid-term Exam	In class	Mid Term
Week 8	3 Theoretical 2 Lab 1 Tutorial	A3, B3, C3	Gate-Level Minimization	In class	In class activities & Quiz
Week 9	3 Theoretical 2 Lab 1 Tutorial	A3, B3, C3	Gate-Level Minimization	In class	In class activities & Questions during the lecture
Week 10	3 Theoretical 2 Lab 1 Tutorial	A3, B3, C3	Gate-Level Minimization	In class	In class activities & Questions during the lecture
Week 11	3 Theoretical 2 Lab 1 Tutorial	A3, B3, C3	Gate-Level Minimization	In class	In class activities
Week 12	3 Theoretical 2 Lab 1 Tutorial	A4, B4, C4	Combinational Logic	In class	In class activities
Week 13	3 Theoretical 2 Lab 1 Tutorial	A4, B4, C4	Combinational Logic	In class	In class activities
Week 14	3 Theoretical 2 Lab 1 Tutorial	A4, B4, C4	Combinational Logic	In class	In class activities
Week 15	3 Theoretical 2 Lab 1 Tutorial	A4, B4, C4	Combinational Logic	In class	In class activities
Week 16	3 hrs		Final Exam		Final Exam
Course Evaluation					
Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports etc					
Learning and Teaching Resources					
Required textbooks (curricular books, if any)			•M. Morris Mano, Michael D., Digital Design, 5th edition, Ciletti Prentice Hall. •Thomas L. Floyd, Digital Fundamentals, 11th Edition, Pearson Prentice Hall.		
Main references (sources)					
Recommended books and references (scientific journals, reports...)			Research in research engines specialized in scientific research such as: •Google scholar •Science direct •IEEE.		
Electronic References, Websites			Here's a summary of important URLs related to this book: https://www.coursera.org/browse/physical-science-and-engineering/electrical-engineering		

Human rights and democracy

Course Name: human rights and democracy					
Course Code: HRAD103					
Semester / Year: Semester 1 \ 2025-2026					
Description Preparation Date: 01/10/2025					
Available Attendance Forms: Offline, In class					
Number of Credit Hours (Total) / Number of Units (Total)					
2 hours per week / 30 hours of study in the classroom / 2 Ects					
Course administrator's name (mention all, if more than one name)					
Name: - Shahad Adel Subhi					
Email: - shahad.a.subhi@aliraqia.edu.iq					
Course Objectives					
Course Objectives	The purpose of teaching human rights and democracy in the computer engineering section is to give the student an understanding of the nature of human rights and democracy and to introduce them to their history, present and future, as well as to make it possible to know how these rights and freedoms have developed and their effects, and how they have affected citizens and society under a government with a certain political focus.				
Teaching and Learning Strategies					
Strategy	A. Cognitive goals •Definition of the student with the principles of human rights •Define it briefly with what is human rights and freedoms and what is democracy and its types • Giving the student the possibility of partial knowledge of human rights and freedoms in light of the existing reality and types of countries. B. The skills goals special to the course of Signals and Systems - Introducing the student to human rights and freedoms and how to deal with international and regional treaties and their internal legislation. - Developing knowledge related to human rights and how they are reflected and their true civilizational role in the lives of peoples. - Knowing how different governments deal with human rights and democracy in practice in countries around the world.				
Course Structure					
Course Structure: Second Semester 01-10-2023					
The week	Hours	Required learning outcomes	Unit/Module or Topic Title	Teaching Method	Assessment Method
Week 1	3 Theoretical	A1, B1, C1	Introduction to Human Rights and Definition and scope of human rights	In class	In class activities
Week 2	3 Theoretical	A1, B1, C1	Theories of Human Rights	In class	In class activities and home duties
Week 3	3 Theoretical	A1, B1, C1	International Human Rights Instruments	In class	In class activities
Week 4	3 Theoretical	A2, B2, C2	Democracy: Concepts and Definitions	In class	In class activities
Week 5	3 Theoretical	A2, B2, C2	Regional Human Rights Systems	In class	In class activities and home duties
Week 6	3 Theoretical	A2, B2, C2	Human Rights Violations and Responses	In class	In class activities and home duties
Week 7	3 Theoretical		Mid-term Exam	In class	Mid Term
Week 8	3 Theoretical	A3, B3, C3	Mechanisms for accountability and justice (tribunals, truth commissions)	In class	In class activities & Quiz

Week 9	3 Theoretical	A3, B3, C3	Democracy and Governance	In class	In class activities & Questions during the lecture
Week 10	3 Theoretical	A3, B3, C3	Economic, Social, and Cultural Rights	In class	In class activities & Questions during the lecture
Week 11	3 Theoretical	A3, B3, C3	Human Rights in Conflict Zones	In class	In class activities
Week 12	3 Theoretical	A4, B4, C4	Gender and Human Rights	In class	In class activities
Week 13	3 Theoretical	A4, B4, C4	The Role of Education in Promoting Human Rights	In class	In class activities
Week 14	3 Theoretical	A4, B4, C4	Current Challenges in Human Rights and Democracy	In class	In class activities
Week 15	3 Theoretical	A4, B4, C4	The role of youth in promoting human rights and democracy	In class	In class activities
Week 16	3 hrs		Final Exam		Final Exam
Course Evaluation					
Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports etc					
Learning and Teaching Resources					
Required textbooks (curricular books, if any)			-Human rights between text and application , Dr. Ali Shukri -Human rights , Dr. Maher Allawi		
Main references (sources)					
Recommended books and references (scientific journals, reports...)					
Electronic References, Websites					

Mathematics I

Course Name: Mathematics I					
Course Code: MATH102					
Semester / Year: Semester 1 \ 2025-2026					
Description Preparation Date: 01/10/2025					
Available Attendance Forms: Offline, In class					
Number of Credit Hours (Total) / Number of Units (Total)					
3 hours per week (2 theoretical + 1 tutorial) / 45 hours of study in the classroom / 4 Ects					
Course administrator's name (mention all, if more than one name)					
Name: -Aymen Dheyaa Khaleel Email: - aymen.d.khaleel@aliraqia.edu.iq					
Course Objectives					
Course Objectives	The aim of this course is to know the definition and use of the principles of mathematics and study all cases that are treated through the article. The focus will be building a mathematical toolkit via introduce various mathematical tools and techniques necessary for engineering analysis and make students able to analyze engineering problems and formulate mathematical models to solve them.				
Teaching and Learning Strategies					
Strategy	A. Cognitive goals The student will learn the basic and applied concepts of mathematics with the following fundamentals: A1. Understand and perform operations on matrices, including addition, subtraction, multiplication and determination. A2. Understand mathematical concepts in engineering as apply matrix techniques to problems in engineering. A3. Applying the system of linear equations to problem in networking. A4. In engineering, by domain and range one can used to design and optimize systems. A5. Analyze and graph functions, including determining their domain and range. A6. Understand the concepts of limit and continuity of functions. A7. Studying the derivative of functions including chain rule and implicit differentiation. A8. Applying the integration rules and solve problems including definite and indefinite integral. A9. Studying the Trigonometric functions, and apply their properties to solve problems. A10. Applying logarithms and exponential functions in solving problems, and perform derivation and integrations involving these functions.				
Course Structure					
Course Structure: first Semester 01-11-2023					
The week	Hours	Required learning outcomes	Unit/Module or Topic Title	Teaching Method	Assessment Method
Week 1	2 Theoretical	A1, A2	Introduction to matrices and their operations	In class	Discussion
	1 tutorial		Examples		
Week 2	2 Theoretical	A1, A2	Determination of matrices	In class	Oral questions
	1 tutorial		Examples		
Week 3	2 Theoretical	A1, A2, A3	Inverse of matrix	In class	Short exam
	1 tutorial		Examples		
Week 4	2 Theoretical	A1, A2, A3, B4	Solving linear system using inverse of matrix	In class	Oral questions in the lecture
	1 tutorial		Examples		
Week 5	2 Theoretical	A1, A2, A3, B4	Cramer's rule for solving systems of linear equations	In class	Short exam
	1 tutorial		Examples		
Week 6	2 Theoretical	A1, A2, A3	Eigen values and Eigen vectors	In class	Questions in the lecture
	1 tutorial		Examples		
Week 7	2 Theoretical	A4, A5, B1	Real numbers, Intervals, Functions: graph, domain and	In class	Short exam

			range		
	1 tutorial		Examples		
Week 8	2 Theoretical	A4, A6	Limits and continuity	In class	Questions in the lecture
	1 tutorial		Examples		
Week 9	2 Theoretical	A7, B1, B2, B4	Differentiation	In class	Discussion
	1 tutorial	A1- A6	Midterm exam		
Week 10	2 Theoretical	A7, B1, B2, B4	Rules of differentiation	In class	quiz
	1 tutorial		Examples		
Week 11	2 Theoretical	A7, B1, B2, B4, C4	Chain rule, Implicit differentiation	In class	Homework
	1 tutorial		Examples		
Week 12	2 Theoretical	A8, B1, B2, B4, C4	Rules of integration, Definite and indefinite integration	In class	Questions inside the lecture and homework
	1 tutorial		Examples		quiz
Week 13	2 Theoretical	A7, A8, A9, B1, B3, B4, C4	Trigonometric functions: differentiation and integration	In class	oral questions
	1 tutorial		Examples		
Week 14	2 Theoretical	A7, A8, A10, B1, B3, B4, C4	Logarithms functions: differentiation and integration	In class	oral questions
	1 tutorial		Examples		
Week 15	2 Theoretical	A7, A8, A10, B1, B3, B4, C4	Exponential functions: differentiation and integration	In class	In class activities
	1 tutorial		Examples		
Week 16	3 hrs	A1 – A10	Final Exam		Final Exam
Course Evaluation					
Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports etc					
Learning and Teaching Resources					
Required textbooks (curricular books, if any)		- Calculus by: Thomas.			
Main references (sources)		•Calculus: Early Transcendentals By: Howard Anton, Irl Bivens, Stephen Davis •Engineering Mathematics By: Ken Stroud.			
Recommended books and references (scientific journals, reports...)					
Electronic References, Websites					

Computer programming methodology

Course Name: Computer programming methodology					
Course Code: COPM101					
Semester / Year: Semester 1 \ 2025-2026					
Description Preparation Date: 01/10/2025					
Available Attendance Forms: Offline, In class					
Number of Credit Hours (Total) / Number of Units (Total)					
5 hours per week / 150 hours of study in the classroom/ 6 Ects					
Course administrator's name (mention all, if more than one name)					
Name: - Marwah Mohammed Abed Email: - Marwah.m.abed@aliraqia.edu.iq					
Course Objectives					
Course Objectives	•The main objectives of this course are to introduce the student the basic programming techniques by learning the C++ programming language. Then, start with the skills of writing the program and designing and implementing algorithms to solve the problem.				
Teaching and Learning Strategies					
Strategy	A. Cognitive goals A.Cognitive goals The student will learn the basic and applied concepts of computer programming methodology with the following fundamentals: A.1.State the basic parts of any computer system and explain them. A.2.Demonstrate the differences between various parts of the computer system. A.3.Identify variables and constants and apply them in statements in the program. A.4.Work with input output functions to inquire data from keyboard and display them on the monitor. A.5.Deal with various mathematical and logical operations inside the program. A.6.Construct flowcharts for solving different problems and presenting solutions. A.7.Include many libraries in the programs that require extra functionalities. A.8.be able to use conditional statements like (if, case,...) in the program and how to use them in various conditions. A.9.Implement repetitive structures like (for) and how to utilize it inside the program. A.10.Use the (while, do while) structures as an alternative for (for). A.11.Write the syntax for identifying array and how to identify them in a program. A.12.Understand the principle of indexing and how to manipulate indices throughout the program. A.13.Write custom functions in the program and how to identify and use a new function by the user. A.14.Provide learners with an understanding of how to read, write, and process array elements and functions in C++ and create new functions with return values and calls.				
Course Structure					
Course Structure: Second Semester 01-10-2023					
The week	Hours	Required learning outcomes	Unit/Module or Topic Title	Teaching Method	Assessment Method
Week 1	2 Theoretical	A1, A2,A3 B1, C1, C3	Understanding computer usage: hardware, software, programming languages; applying computers for problem-solving, requirements analysis; designing, implementing, testing algorithms, verifying, documenting programs.	In class	In class activities
Week 2	2 Theoretical	A4 B1, B2 C1, C2	Input and output/ data types.	In class	In class activities and home duties
Week 3	2 Theoretical	A5,A6 B3,B4 C1, C3	Arithmetic and logical operators, precedence of operators.	In class	In class activities
Week 4	2 Theoretical	A7, A8, B5,B6 C2, C3	C++ program control and structured programming Selections, If statement, nested if statement, if-else if ladder else.	In class	In class activities

Week 5	2 Theoretical	A8 B6 C1, C4	Switch-case statements, nested switch-case statement.	In class	In class activities and home duties
Week 6	2 Theoretical	A9 , B7 C2, C3	Counter controlled and sentinel-controlled repetition.	In class	In class activities and home duties
Week 7	1.5 - 2 Theoretical	A-A8 B1, B7, B4, B6 C1, C3	Mid-course Exam	In class	Mid Term
Week 8	2 Theoretical	A10 B8 C1, C3	The do-while and while loops.	In class	In class activities & Quiz
Week 9	2 Theoretical	A9,A10 B8 C2, C3	Skipping loop iterations break and continue and exit() function..	In class	In class activities & Questions during the lecture
Week 10	2 Theoretical	A9,A10 B8, C1, C2	Labels and goto statement, nested loops.	In class	In class activities & Questions during the lecture
Week 11	2 Theoretical	A11 B9	Using the array data structure to represent lists and tables of values, One-dimensional array creation, initialization and processing.	In class	In class activities
Week 12	2 Theoretical	A11,14 B12 C2,C3	Two-dimensional array creation, initialization and processing.	In class	In class activities
Week 13	2 Theoretical	A13 B11 C2, C3	Functions in C/C++ / new function creation return values and call.	In class	In class activities
Week 14	2 Theoretical	A13 B11 C3	Formal parameters call by value and call by reference/ Math and other standard library functions	In class	In class activities
Week 15	2 Theoretical	A14	Create a call by pointer reference/ formal reference.	In class	In class activities
Week 16	3 hrs	A1 – A7	Final Exam		Final Exam
Course Evaluation					
Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports etc					
Learning and Teaching Resources					
Required textbooks (curricular books, if any)			•Deitel, P and Deitel H, C++ How to Program, 8th Edition, Prentice Hall 2012. •Bradley, A, Programming for Engineers, Springer, 2011.		
Main references (sources)			•Bronson, G, C for Engineers and Scientists, West Publishing Company, 1993.-Human rights , Dr. Maher Allawi		
Recommended books and references (scientific journals, reports...)			Research in research engines specialized in scientific research such as: •Google scholar •Science direct •IEEE.		
Electronic References, Websites					

ENGLISH LANGUAGE

Course Name: ENGLISH LANGUAGE	
Course Code: ENG120	
Semester / Year: Semester 1 \ 2025-2026	
Description Preparation Date: 01/10/2025	
Available Attendance Forms: Offline, In class	
Number of Credit Hours (Total) / Number of Units (Total)	
2 hours per week / 30 hours of study in the classroom/ 2 Ects	
Course administrator's name (mention all, if more than one name)	
Name: - Hasseeb Dawood Injas Email: - Hasseeb.d.injas@aliraqia.edu.iq	
Course Objectives	
Course Objectives	The main purpose of the course is to provide knowledge about the English language, improve communication skills in English, improve critical writing skills, increase literary skills, explain the principal types of grammar, make it capable to evaluate and analyse sentences. Students taking this course spend their time reading scientific essays , , and other pieces of science . Student will be able to communicate in a Basic English medium with his friends. Along with this, in this English course, various types of activities including team work and seminar are also added to its curriculum studies. In addition to that, students will respond to English activity with thoughtful formal and informal speaking .Students will explore the power of grammar through the study of the spoken word. Students will read silently at varying speeds depending on the purpose of reading; adopt different strategies for different types of text; recognize the organization of a text. This course, the student who does this course helps a lot in reading English, getting information about English, increasing his speaking speed in English, and writing English. 1-To enable the learner to communicate effectively and appropriately in real-life situations. 2-To use English effectively for study purposes across the curriculum. 3-To develop and integrate the use of the two language skills, i.e., listening, speaking. 4-To develop interest in and appreciation of literature. 5-To revise and reinforce structures already learnt. 6-To basically translate from English to Arabic and vice versa
Teaching and Learning Strategies	
Strategy	A. Cognitive goals The student will learn the basic and applied concepts of mathematics with the following fundamentals: - A1. Understand and perform operations on matrices, including addition, subtraction, multiplication and determination. - A2. Understand mathematical concepts in engineering as apply matrix techniques to problems in engineering. - A3. Applying the system of linear equations to problem in networking. - A4. In engineering, by domain and range one can used to design and optimize systems. - A5. Analyze and graph functions, including determining their domain and range. - A6. Understand the concepts of limit and continuity of functions. - A7. Studying the derivative of functions including chain rule and implicit differentiation. - A8. Applying the integration rules and solve problems including definite and indefinite integral. - A9. Studying the Trigonometric functions, and apply their properties to solve problems. - A10. Applying logarithms and exponential functions in solving problems, and perform derivation and integrations involving these functions.
Course Structure	
Course Structure: first Semester 01-11-2023	
Course Evaluation	
Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports etc	
Learning and Teaching Resources	
Required textbooks (curricular books, if any)	New Headway of Oxford / Pre- Intermediate / Student's Book Fourth edition
Main references (sources)	
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

Fundamentals of Electrical Circuits I

Course Name: Fundamentals of Electrical Circuits I					
Course Code: FUEC103					
Semester / Year: Semester 1 \ 2025-2026					
Description Preparation Date: 01/10/2025					
Available Attendance Forms: In class (theory), Tutorial, LAB					
Number of Credit Hours (Total) / Number of Units (Total)					
3 hours per week in class 2 hours per week in LAB 79 hours of study in the classroom / 7 Ects					
Course administrator's name (mention all, if more than one name)					
Name: - Email: -					
Course Objectives					
Course Objectives	1. Understand the fundamental concepts of electric circuits, including voltage, current, resistance, and power, and their relationships as defined by Ohm's law. 2. Analyze and solve basic DC circuits using techniques such as series and parallel circuit analysis, voltage division, and current division. 3. Apply Kirchhoff's laws (Kirchhoff's current law and Kirchhoff's voltage law) to analyze and solve complex DC circuits. 4. Calculate the equivalent resistance of resistors in series and parallel configurations and apply this knowledge to simplify complex resistor networks. 5. Analyze circuits using various circuit analysis techniques, such as nodal analysis and mesh analysis, to determine voltage, current, and power relationships. 6. Apply important circuit theorems, such as the superposition theorem, Thevenin's theorem, and Norton's theorem, to simplify complex DC circuits and calculate unknown quantities.				
Teaching and Learning Strategies					
Strategy	A1. Understand the fundamental principles of direct current (DC) electrical circuits. A2. Apply analytical methodologies to analyze DC circuits. A3. Demonstrate proficiency in applying Ohm's law, Kirchhoff's laws, and circuit analysis techniques. A4. Interpret and solve problems related to complex DC circuits using various theorems and analysis methods				
Course Structure					
Course Structure: Second Semester 01-10-2023					
The week	Hours	Required learning outcomes	Unit/Module or Topic Title	Teaching Method	Assessment Method
Week 1	2 Theoretical 1 Tutorial 2 LAB	A1, D4	Introduction - Electrical circuit, electrical current, voltage difference, notations	In classIn LAB	In class activities
Week 2	2 Theoretical 1 Tutorial 2 LAB	A1, D4	Basics of Network Elements- Types of voltages, types of currents, power and energy	In classIn LAB	In class activities and home duties
Week 3	2 Theoretical 1 Tutorial 2 LAB	A1, A2, C1, D4	Resistors and resistivity, Conductance, and Conductivity	In classIn LAB	In class activities
Week 4	2 Theoretical 1 Tutorial 2 LAB	A1, A2, A3, B1, C1, D1, D4	Ohm's law, and Temperature effect	In classIn LAB	In class activitiesLAB Reports
Week 5	2 Theoretical 1 Tutorial 2 LAB	A1, A2, A3, B1, B2, C1, C2, D1, D2 D4	Series and parallel circuits,	In classIn LAB	In class activities and home dutiesQuiz LAB Reports
Week 6	2 Theoretical 1 Tutorial 2 LAB	A1, A2, A3, B1, B2, C1, C2, D1, D2 D4	Delta -star , and star - delta transformation, Kirchhoff's laws.	In classIn LAB	In class activities and home duties LAB Reports
Week 7	2 Theoretical 1 Tutorial 2 LAB	A1, A2, A3, B1, B2, C1, C2, C3, D1, D2, D4	Mesh current analysis	In classIn LAB	In class activities and home dutiesQuiz LAB Reports
Week 8	2 Theoretical 1 Tutorial 2 LAB	A1, A2, A3, B4, D2	Mid-course Exam	In classIn LAB	Mid Term

Week 9	2 Theoretical 1 Tutorial 2 LAB	A2, A3, B1, B2, B3, C1, C2, C3, D1, D2, D4	Branch current method	In classIn LAB	In class activities & Questions during the lecture
Week 10	2 Theoretical 1 Tutorial 2 LAB	A2, A3, B1, B2, B3, C1, C2, C3, D1, D2, D4	Sources transformation	In classIn LAB	In class activities & Questions during the lecture
Week 11	2 Theoretical 1 Tutorial 2 LAB	A2, A3, B1, B2, B3, C1, C2, C3, D1, D2, D3,	Node voltage analysis	In classIn LAB	In class activities Quiz LAB Reports
Week 12	2 Theoretical 1 Tutorial 2 LAB	A2, A3, A4 B2, B3, B4 C2, C3, C4, D1, D2, D3,	Super-position circuit analysis theorem	In classIn LAB	In class activities LAB Reports
Week 13	2 Theoretical 1 Tutorial 2 LAB	A2, A3, A4 B2, B3, B4 C2, C3, C4, D1, D2, D3,	Thevinon's theorem	In classIn LAB	In class activities LAB Reports
Week 14	2 Theoretical 1 Tutorial 2 LAB	A2, A3, A4 B2, B3, B4 C2, C3, C4, D1, D2, D3	Norton theorem	In classIn LAB	In class activities Quiz LAB Reports
Week 15	2 Theoretical 1 Tutorial 2 LAB	A2, A3, A4 B2, B3, B4 C2, C3, C4, D1, D2, D3	Maximum power transfer	In classIn LAB	In class activities LAB Reports
Week 16		A1, A2, A3, A4	Preparatory week before the final Exam		Final Exam
Course Evaluation					
Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports etc					
Learning and Teaching Resources					
Required textbooks (curricular books, if any)			• Introductory circuit Analysis; by Robert L. Boylestad, 2011		
Main references (sources)			•Sadiku, Matthew NO, and Charles K. Alexander. Fundamentals of electric circuits. New York: McGraw-Hill, 2009.		
Recommended books and references (scientific journals, reports...)			Research in research engines specialized in scientific research such as: •Google scholar •Science direct •IEEE.		
Electronic References, Websites			https://www.coursera.org/browse/physical-science-and-engineering/electrical-engineering		

First Year / Second Semester Arabic Language

Course Name: Arabic Language					
Course Code: ARLA 101					
Semester / Year: Semester 2 \ 2025-2026					
Description Preparation Date: 01/10/2025					
Available Attendance Forms: In class (theory)					
Number of Credit Hours (Total) / Number of Units (Total)					
2 hours per week / 50 hours of study in the classroom 2 Ects					
Course administrator's name (mention all, if more than one name)					
Name: - Shahad Adel Subhi Email: - shahad.a.subhi@aliraqia.edu.iq					
Course Objectives					
Course Objectives	The aim of this course is to 1- The Arabic language is a means of communication. It carries a message between speakers. In order for this message to be clear and understandable, its vocabulary must be arranged according to the grammatical structure of that language. Hence, the necessity of teaching grammar in all languages clearly emerged 2- The student learns about writing and expression skills and identifies areas of error in order to correct the correct pronunciation 3- Mastering the skill of correct writing by knowing the rules of spelling, especially the locations of common errors 4- Preserving the Arabic language as it is the language of the Holy Quran 5- Introducing the basic principles of the Arabic language through developing writing, expression, and conversation skills				
Teaching and Learning Strategies					
Strategy	1. The student acquires knowledge of the basic concepts of the Arabic language and their application through examples 2-Knowing how to write phonetic speech accurately in terms of correct or defective sounds 3-The student studies the topic of number and knows how to write it correctly 4- The student can find appropriate and correct solutions to complex real problems and develop the intellectual sense by giving examples of the Arabic language and applying them. 5- Assigning students to write research and reports to test the extent of their understanding of the basic rules of the Arabic language and their application in their daily lives				
Course Structure					
Course Structure: Second Semester 01-10-2023					
The week	Hours	Required learning outcomes	Unit/Module or Topic Title	Teaching Method	Assessment Method
Week 1	2 Theoretical	A1, A2, B1, C1, C3	Introduction to punctuation marks and identifying their types	In class	In class activities
Week 2	2 Theoretical	A1, A2 B1, B2 C1, C2	Writing the types of hamza (cut-and-connect hamza, intermediate hamza, and extreme hamza)	In class	In class activities and home duties
Week 3	2 Theoretical	A1, A2, A3, B1, B2 C1, C3	Supplements to writing controls (intention, stress, duration) and identifying types of linguistic errors	In class	In class activities
Week 4	2 Theoretical	A2, A3, B1, B3 C2, C3	The subject of the issue and how it is written	In class	In class activities
Week 5	2 Theoretical	A2, A3, B1, B3 C1, C4	Arabic calligraphy and its types	In class	In class activities and home duties
Week 6	2 Theoretical	A4, B1, B2, B5, B10C2, C3	Derivatives (participle, active participle, time and place names, instrument name)	In class	In class activities and home duties
Week 7	2 Theoretical	A1, A2, A3, A4 B1, B3, B4, B6	Action and its types	In class	Mid Term

		C1, C3			
Week 8	2 Theoretical	A4, A5 B1, B3, B4, B6, B10 C1, C3	The subject and the object	In class	In class activities & Quiz
Week 9	2 Theoretical	A4, A5 B1, B2, B3, B7 C2, C3	Types of effects Mid-term Exam	In class	In class activities & Questions during the lecture
Week 10	2 Theoretical	A5, A6 B2, B4, B3, B7 C1, C2	The subject and the predicate	In class	In class activities & Questions during the lecture
Week 11	2 Theoretical	A6 B4, B5, B6, B8	The dual and the plural and its types	In class	In class activities
Week 12	2 Theoretical	A6, A7 B1,B9 C2,C3	The difference between ta and ha	In class	In class activities
Week 13	2 Theoretical	A6, A7 B1, B2, B8, C2, C3	Masculinity and feminization and their types	In class	In class activities
Week 14	2 Theoretical	A6, A7, B2,B5, B8, B9 C3	Al-Mu'allaqat's	In class	In class activities
Week 15	2 Theoretical	A6, A7	Review for students before the final exam	In class	In class activities
Week 16	3 hrs	A1 – A7	Final Exam		Final Exam
Course Evaluation					
Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports etc					
Learning and Teaching Resources					
Required textbooks (curricular books, if any)			Al-Wajiz fi al-Lughah al-Arabiyyah, Muhi Hilal Sarhan; Sharh Qatr al-Nada wa-Ball al-Sada, Ibn Hisham al-Ansari; Al-Ajurrumiyah, Abu Abdullah Muhammad al-Sanhaji; Al-Imla' wa-al-Tarqim fi al-Kitabah al-Arabiyyah, Abd al-Alim Ibrahim; Al-Lughah al-Arabiyyah li-Ghayr al-Mukhtassin, Mustafa Jatl and Salah Kazara.		
Main references (sources)			• Jami' al-Durus al-Arabiyyah, Mustafa al-Ghalayini; Ma'ani al-Nahw, Fadil al-Samarrai; A Study of Arabic Spelling Rules, Dr. Abdul-Jawad al-Tayyib; Al-Shamil Encyclopedia of Writing and Spelling, Musa Hassan al-Hudaib.		
Recommended books and references (scientific journals, reports...)			Research in research engines specialized in scientific research such as: •Google scholar •Science direct •IEEE.		
Electronic References, Websites			1. https://shamela.ws/ 2. https://waqfeya.net/		

Fundamentals of Electrical Circuit II

Course Name: Electrical Circuit II					
Course Code: FUEC 111					
Semester / Year: Semester 2 \ 2025-2026					
Description Preparation Date: 01/10/2025					
Available Attendance Forms: In class (theory), tutorial and Lab					
Number of Credit Hours (Total) / Number of Units (Total)					
5 hours per week / 75 hours of study in the classroom 7 Ects					
Course administrator's name (mention all, if more than one name)					
Name: - Sahar Kareem Hassan Email: - Sahar.k.hassan@aliraqia.edu.iq					
Course Objectives					
Course Objectives	1. Understand the basics of alternating current (AC) electrical circuits. 2. Analyze single-phase and three-phase systems. 3. Grasp the fundamental concepts of alternating quantities. 4. Explain the resonance phenomenon in AC circuits. 5. Understand and analyze capacitive and inductive circuits. 6. Comprehend AC electrical circuits and the theoretical principles of elements within them. 7. Apply methods of analysis and theories specific to AC circuits. 8. Analyze electrical circuits with series, parallel, and mixed connections for AC current.				
Teaching and Learning Strategies					
Strategy	a1. Enable the student to understand and analyze capacitive and inductive circuits. a2. Enable the student to comprehend AC electrical circuits and the basic theoretical principles of the elements within these circuits. a3. Enable the student to understand and apply methods of analysis and theories specific to AC circuits. a4. Enable the student to analyze electrical circuits with series, parallel, and mixed connections for AC current.				
Course Structure					
Course Structure: Second Semester 01-10-2023					
The week	Hours	Required learning outcomes	Unit/Module or Topic Title	Teaching Method	Assessment Method
Week 1	5Theoretical +Lab+ Tutorial	A1,A3,A4	Sinusoidal Alternating Current, Definitions, General Format for the Sinusoidal Voltage and Current	In class	In class activities
Week 2	5Theoretical +Lab+ Tutorial	A1,A3,A4	Phase Relations, Average Value, Effective Values	In class	In class activities and home duties
Week 3	5Theoretical +Lab+ Tutorial	A1,A3,A4	AC Series Circuit Capacitive and Inductive Reactance	In class	In class activities
Week 4	5Theoretical +Lab+ Tutorial	A1,A3,A4	Resistor & Inductor in Series	In class	In class activities
Week 5	5Theoretical +Lab+ Tutorial	A1,A3,A4	Resistor & Capacitor in Series	In class	In class activities and home duties
Week 6	5Theoretical +Lab+ Tutorial	A1,A3,A4	Resistor, Inductor & Capacitor in parallel	In class	In class activities and home duties
Week 7	5Theoretical +Lab+ Tutorial	A1,A3,A4	Series-parallel Resistor, Inductor & Capacitor circuits	In class	In class activities & Quiz
Week 8	5Theoretical +Lab+ Tutorial	A1,A3,A4	Mid-term Exam	In class	Mid Term
Week 9	5Theoretical +Lab+ Tutorial	A1,A3,A4	superposition AC, Thevenin Theorem , Nortons Theorem	In class	In class activities & Quiz
Week 10	5Theoretical +Lab+ Tutorial	A1,A3,A4	Power Circuit, Average Power and Power Factor	In class	In class activities & Questions during the lecture

Week 11	5Theoretical +Lab+ Tutorial	A1,A3,A4	Series Resonance Circuits	In class	In class activities & Questions during the lecture
Week 12	5Theoretical +Lab+ Tutorial	A1,A3,A4	Frequency measurements	In class	In class activities
Week 13	5Theoretical +Lab+ Tutorial	A1,A3,A4	Series Resonance Circuits	In class	In class activities
Week 14	5Theoretical +Lab+ Tutorial	A1,A3,A4	Parallel Resonance Circuits	In class	In class activities
Week 15	5Theoretical +Lab+ Tutorial	A1,A3,A4	superposition AC, Thevenin Theorem , Nortons Theorem	In class	In class activities
Week 15	5Theoretical +Lab+ Tutorial	A1,A3,A4	Power Circuit, Average Power and Power Factor	In class	In class activities

Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports etc

Learning and Teaching Resources

Required textbooks (curricular books, if any)	•Electrical Engineering, principles and applications, third edition, Allan R. Hambley. •Sadiku Introductory circuit analysis by Robert L.Bolestad.
Main references (sources)	
Recommended books and references (scientific journals, reports...)	Research in research engines specialized in scientific research such as: •Google scholar •Science direct •IEEE.
Electronic References, Websites	https://www.coursera.org/browse/physical-science-and-engineering/electrical-engineering

Electronic Physics

Course Name: Electronic Physics					
Course Code: PHYS101					
Semester / Year: Semester 2 \ 2025-2026					
Description Preparation Date: 01/10/2025					
Available Attendance Forms: In class (theory), tutorial and Lab					
Number of Credit Hours (Total) / Number of Units (Total)					
5 hours per week / 75 hours of study in the classroom 7 Ects					
Course administrator's name (mention all, if more than one name)					
Name: - Mustafa Subhi Email: - mustafasubhi1967@gmail.com					
Course Objectives					
Course Objectives	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.				
Teaching and Learning Strategies					
Strategy	A.1. -Understand the semiconductors, etc. A.2. -Understand diode operation and its conditions. A.3. -Understand parallel & series configurations. A.4. -Understand zener diode and its applications.				
Course Structure					
Course Structure: Second Semester 01-10-2023					
The week	Hours	Required learning outcomes	Unit/Module or Topic Title	Teaching Method	Assessment Method
Week 1	5Theoretical +Lab+ Tutorial	A1,A3,A4	Atomic structure & electronic state (orbit, energy and valence) of electron.	In class	In class activities
Week 2	5Theoretical +Lab+ Tutorial	A1,A3,A4	semiconductors, conductors and isolators, effects of temperature on depletion layer and P-N junction.	In class	In class activities and home duties
Week 3	5Theoretical +Lab+ Tutorial	A1,A3,A4	Characteristics of Diode: forward and reverse bias and its relations.	In class	In class activities
Week 4	5Theoretical +Lab+ Tutorial	A1,A3,A4	the diode operation and its conditions.	In class	In class activities
Week 5	5Theoretical +Lab+ Tutorial	A1,A3,A4	zener region in terms of voltage and power dissipations, DC & AC resistance.	In class	In class activities and home duties
Week 6	5Theoretical +Lab+ Tutorial	A1,A3,A4	Resistor, Inductor & Capacitor in parallel	In class	In class activities and home duties
Week 7	5Theoretical +Lab+ Tutorial	A1,A3,A4	Specifications of diode: diode capacitance, reverse recovery time	In class	In class activities & Quiz
Week 8	5Theoretical +Lab+ Tutorial	A1,A3,A4	Mid-term Exam	In class	Mid Term
Week 9	5Theoretical +Lab+ Tutorial	A1,A3,A4	diode measuring and testing	In class	In class activities & Quiz
Week 10	5Theoretical +Lab+ Tutorial	A1,A3,A4	Power Circuit, Average Power and Power Factor	In class	In class activities & Questions during the lecture
Week 11	5Theoretical +Lab+ Tutorial	A1,A3,A4	Diode applications: load line analysis,	In class	In class activities & Questions during the lecture

Week 12	5Theoretical +Lab+ Tutorial	A1,A3,A4	series diode configuration	In class	In class activities
Week 13	5Theoretical +Lab+ Tutorial	A1,A3,A4	parallel & series configurations	In class	In class activities
Week 14	5Theoretical +Lab+ Tutorial	A1,A3,A4	half – wave rectifier and peak reverse voltage	In class	In class activities
Week 15	5Theoretical +Lab+ Tutorial	A1,A3,A4	full wave rectifier and related circuits (biased, diode clippers and clampers)	In class	In class activities
Week 15	5Theoretical +Lab+ Tutorial	A1,A3,A4	zener diode and its applications	In class	In class activities
Course Evaluation					
Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports etc					
Learning and Teaching Resources					
Required textbooks (curricular books, if any)			-Electronic Devices & Circuit Theory", By R. Boylestad, 11th ed.. -Electronic Devices", By Floyd. 9th ed		
Main references (sources)					
Recommended books and references (scientific journals, reports...)			Research in research engines specialized in scientific research such as: •Google scholar •Science direct •IEEE.		
Electronic References, Websites			https://www.coursera.org/browse/physical-science-and-engineering/electrical-engineering		

Fundamentals of Computer Organization

Course Name: Fundamentals of Computer Organization					
Course Code: FUCO110					
Semester / Year: Semester 2 \ 2025-2026					
Description Preparation Date: 01/10/2025					
Available Attendance Forms: In class (theory), and Lab					
Number of Credit Hours (Total) / Number of Units (Total)					
2 hours per week / 30 hours of study in the classroom 6 Ects					
Course administrator's name (mention all, if more than one name)					
Name: - Yaqoob Yousif Mahdi					
Email: - Yaqoob.y.mahdi@aliraqia.edu.iq					
Course Objectives					
Course Objectives	- Understand the structure, function and characteristics of computer systems. - Understand the design of the various functional units and components of computers. - Understand basic machine organization, including processors, Storage, memory, and input/output architecture. - Understand the basics of the operating system and their types, concept and techniques. - Understand the computer network fundamentals just like topology and components and basic testing commands. - Explain the function of each element of a memory hierarchy. - Identify and compare different methods for computer I/O.				
Teaching and Learning Strategies					
Strategy	1. Understand the structure, function and characteristics of computer systems. 2. Understand the concept, Purpose, and characteristic of CPUs. 3. Learn the concepts of motherboards and its types. 4. Identify the names, Purposes, and characteristics of ROM and RAM 5. Identify the names, purpose, and characteristics of storage device (floppy, hard disk, optical, Blu-ray, flash drive, SSD, USB flash, Secure Digital Cards) 6. Learn the concepts of input and output devices. 7. Understand the fundamentals of operating system 8. Learn the fundamentals laptops and portable device				
Course Structure					
Course Structure: Second Semester 01-10-2023					
The week	Hours	Required learning outcomes	Unit/Module or Topic Title	Teaching Method	Assessment Method
Week 1	5Theoretical +Lab	A1,A3,A4	Fundamental Concepts of computer	In class	In class activities
Week 2	5Theoretical +Lab	A1,A3,A4	Introduction to CPU	In class	In class activities and home duties
Week 3	5Theoretical +Lab	A1,A3,A4	BIOS and CMOS	In class	In class activities
Week 4	5Theoretical +Lab	A1,A3,A4	Introduction Motherboards and its types	In class	In class activities
Week 5	5Theoretical +Lab	A1,A3,A4	Memory Organization: Memory Hierarchy, Main memory, secondary memory	In class	In class activities and home duties
Week 6	5Theoretical +Lab+ Tutorial	A1,A3,A4			
Week 7	5Theoretical +Lab	A1,A3,A4	Introduction to Storage Drives	In class	In class activities and home duties
Week 8	5Theoretical +Lab	A1,A3,A4	Mid-term Exam	In class	Mid Term
Week 9	5Theoretical +Lab+ Tutorial	A1,A3,A4	Introduction to Input and Output Device	In class	In class activities & Quiz
Week 10	5Theoretical +Lab	A1,A3,A4	Types of connection cables	In class	In class activities & Questions during the lecture
Week 11	5Theoretical +Lab+ Tutorial	A1,A3,A4	Fundamental of operating system	In class	In class activities & Questions during the

					lecture
Week 12	5Theoretical +Lab	A1,A3,A4	Types of OS	In class	In class activities
Week 13	5Theoretical +Lab+ Tutorial	A1,A3,A4	Fundamentals of laptops and portable device	In class	In class activities
Week 14	5Theoretical +Lab	A1,A3,A4	Identify common uses of PDAs and Smartphone	In class	In class activities
Week 15	5Theoretical +Lab	A1,A3,A4	Troubleshooting and diagnostics of computer problems - Software troubleshooting	In class	In class activities
Week 15	5Theoretical +Lab	A1,A3,A4	Troubleshooting and diagnostics of computer problems - hardware troubleshooting	In class	In class activities
Course Evaluation					
Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports etc					
Learning and Teaching Resources					
Required textbooks (curricular books, if any)			1. M. Moris Mano, "Computer Systems Architecture", 4th Edition, Pearson/PHI, ISBN:10:0131755633 2. Carl Hamacher, Zvonko Vranesic, Safwat Zaky, "Computer Organization", 5th Edition, McGraw Hill.		
Main references (sources)			1. A.Anandkumar, "Fundamentals of digital circuits", 4th edition, PHI. 2. William Stallings, "Computer Organization and Architecture", 6th Edition, Pearson/PHI, ISBN:10:0-13-609704-9		
Recommended books and references (scientific journals, reports...)			Research in research engines specialized in scientific research such as: •Google scholar •Science direct •IEEE.		
Electronic References, Websites			Here's a summary of important URLs related to this book: https://www.coursera.org/learn/ computer organization fundamentals		

Mathematics II

Course Name: Mathematics II					
Course Code: MATH1108					
Semester / Year: Semester 2 \ 2025-2026					
Description Preparation Date: 01/10/2025					
Available Attendance Forms: In class (theory), and tutorial					
Number of Credit Hours (Total) / Number of Units (Total)					
3 hours per week (2 theoretical + 1 tutorial) / 45 hours of study in the classroom 4 Ects					
Course administrator's name (mention all, if more than one name)					
Name: - Saba Raad Mtansh Email: - Saba.raad@aliraqia.edu.iq					
Course Objectives					
Course Objectives	The aim of this course is to know the definition and use of the principles of mathematics and study all cases that are treated through the article. The focus will be building a mathematical toolkit via introduce various mathematical tools and techniques necessary for engineering analysis and make students able to analyze engineering problems and formulate mathematical models to solve them.				
Teaching and Learning Strategies					
Strategy	A1. Understand and perform operations on matrices, including addition, subtraction, multiplication and determination. A2. Understand mathematical concepts in engineering as apply matrix techniques to problems in engineering. A3. Applying the system of linear equations to problem in networking. A4. In engineering, by domain and range one can used to design and optimize systems. A5. Analyze and graph functions, including determining their domain and range. A6. Understand the concepts of limit and continuity of functions. A7. Studying the derivative of functions including chain rule and implicit differentiation. A8. Applying the integration rules and solve problems including definite and indefinite integral. A9. Studying the Trigonometric functions, and apply their properties to solve problems. A10. Applying logarithms and exponential functions in solving problems, and perform derivation and integrations involving these functions.				
Course Structure					
Course Structure: Second Semester 01-10-2023					
The week	Hours	Required learning outcomes	Unit/Module or Topic Title	Teaching Method	Assessment Method
Week 1	2 Theoretical	A1, A2	Introduction to matrices and their operations	In class	Discussion
Week 2	1 tutorial	A1,A3,A4	Examples	In class	In class activities and home duties
Week 2	2 Theoretical	A1, A2	Determination of matrices	In class	Oral questions
Week 4	1 tutorial	A1,A3,A4	Examples	In class	quiz
Week 3	2 Theoretical	A1, A2, A3	Inverse of matrix	In class	Short exam
Week 6	1 tutorial	A1,A3,A4	Examples		Discussion
Week 4	2 Theoretical	A1, A2, A3, B4	Solving linear system using inverse of matrix	In class	Oral questions in the lecture
Week 8	1 tutorial	A1,A3,A4	Examples	In class	Mid Term
Week 5	2 Theoretical	A1, A2, A3, B4	Cramer's rule for solving systems of linear equations	In class	Short exam
Week 10	1 tutorial	A1,A3,A4	Examples	In class	In class activities & Questions during the lecture
Week 6	2 Theoretical	A1, A2, A3	Eigen values and Eigen vectors	In class	Questions in the lecture
Week 12	1 tutorial	A1,A3,A4	Examples	In class	In class activities
Week 7	2 Theoretical	A4, A5, B1	Real numbers, Intervals, Functions: graph, domain and	In class	Short exam

			range		
Week 14	1 tutorial	A1,A3,A4	Examples	In class	In class activities
Week 8	2 Theoretical	A4, A6	Limits and continuity	In class	Questions in the lecture
Week 15	1 tutorial	A1,A3,A4	Examples	In class	In class activities
Course Evaluation					
Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports etc					
Learning and Teaching Resources					
Required textbooks (curricular books, if any)			Calculus by: Thomas.		
Main references (sources)			•Calculus: Early Transcendentals - By: Howard Anton, Irl Bivens, Stephen Davis •Engineering Mathematics - By: Ken Stroud.		
Recommended books and references (scientific journals, reports...)			Research in research engines specialized in scientific research such as: •Google scholar •Science direct •IEEE.		
Electronic References, Websites					

Workshop

Course Name: Workshop					
Course Code: work110					
Semester / Year: Semester 2 \ 2025-2026					
Description Preparation Date: 01/10/2025					
Available Attendance Forms: In class (theory), and Lab					
Number of Credit Hours (Total) / Number of Units (Total)					
3 hours per week / 30 hours of study in the classroom 4 Ects					
Course administrator's name (mention all, if more than one name)					
Name: - Aymen Dheyaa Khaleel					
Email: - aymen.d.khaleel@aliraqia.edu.iq					
Course Objectives					
Course Objectives	The Technical Workshop aims to provide students with skills: -Identify all the pieces used in the computer and network industries -Check and test electronic parts used in computers and electronic devices -Learn the Soldering and DE soldering processes and how to deal with destroyed parts.				
Teaching and Learning Strategies					
Strategy	Learning Outcomes, Teaching, Learning and Assessment Method. A-Knowledge and Understanding 1. Search 2.Design 3.Analysis 4.Devices 5.Tests B-Subject-specific skills 1.Welding skills 2. Requirement analysis 3.Case studies 4. listening and understanding C-Teaching and Learning Methods Lecture 1.Group work 2.Lab team 3.Research project 4.Assessment methods 5.Note 6.Quiz 7.Problems 8.Test (short & long) 9.Thinking Skills 10.Analysis 11.Improving Skills 12.Active mind D-Teaching and Learning Methods 1.Problem for understanding 2.Analysis and classification 3.Assessment methods 4.Samples of student work 5.Mini projects 6.Local test preparation				
Course Structure					
Course Structure: Second Semester 01-10-2023					
The week	Hours	Required learning outcomes	Unit/Module or Topic Title	Teaching Method	Assessment Method
Week 1,2	1 theoretical + 2 practical	A1, A2, A3 B1, C1, C3	Understanding the goal and rules Electrical Safety Principles	In workshop	In class activities
Week 3	1 theoretical + 2 practical	A1, A2, A3, A4 B1, C1, C2	Understand the principles of resistor and ohms law with problem solution and design circuits	In workshop	In class activities and home duties
Week 4,5	1 theoretical +	A1, A2, A3,	Understand the principles of	In workshop	In class activities

	2 practical	B1, C1, C3	capacitor and method and circuit with test		
Week 6,7	1 theoretical + 2 practical	A3, A4, A5 B1, C2,C3	Understand the principles of transformer and it tests	In workshop	In class activities
Week 8,9	1 theoretical + 2 practical	A5, A6 B1, C1, C4	Learn how to deal with fuses and understanding diode function and test	In workshop	In class activities and home duties
Week 10	Mid exam		Practical mid exam	In workshop	Mid term
Week 11,12	1 theoretical + 2 practical	A6, A7 B1, B2, C2,C3	Understanding the Zener and LED circuit and test	In workshop	In class activities and home duties
Week 13,14,15	1 theoretical + 2 practical	A8, A9 B1, B3, C1,C3	Project Management Mini power supply project team	In workshop	In class
Course Evaluation					
Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports etc					
Learning and Teaching Resources					
Required textbooks (curricular books, if any)			•Technical workshop (Materials & Devices) authored by Assist. Lecturer Mazin N. Ali supervised by Prof. Mohammed H. Hafiz Dean of college of engineering. •Electrical & Electronics Engineering, Amrita School of Engineering, 2014 •Electronics Workshop Lab Manual, Polytechnic, Bilaspur, 2010		
Main references (sources)					
Recommended books and references (scientific journals, reports...)			Research in research engines specialized in scientific research such as: •Google scholar •Science direct •IEEE.		
Electronic References, Websites					

LEVEL TWO

Second Year / First Semester

Digital System Design

Course Name:	
Digital System Design	
Course Code:	
CR-CE224	
Semester / Year: Semester 1 \ 2025-2026	
Description Preparation Date: 01/10/2025	
12-2-2024	
Available Attendance Forms:	
Attendance in class	
Number of Credit Hours (Total) / Number of Units (Total)	
30 Hours (2 Hours/Week) / 2 units	
Course administrator's name (mention all, if more than one name)	
Name: Asst. Prof. Dr. Rasha Thabit Email: rasha.thabit@aliraqia.edu.iq	
Course Objectives	
Course Objectives	Understand Memory Fundamentals: Gain foundational knowledge of computer memory principles. Explore the architecture and functionalities of Random-Access Memory (RAM) and Read-only Memory (ROM). Explore Programmable ROMs and Logic Devices: Investigate Programmable Read-only Memory (PROM) and Erasable Programmable Read-only Memory (EPROM). Understand Simple Programmable Logic Devices (SPLDs) and Complex Programmable Logic Devices (CPLDs). Master Macrocells and their Role: Comprehend the concept and significance of macrocells in programmable logic devices. Explore how macrocells contribute to the functionality of CPLDs and FPGAs. Dive into FPGA Architecture and Applications: Introduce Field-Programmable Gate Arrays (FPGAs) and their architecture. Understand the advantages and applications of FPGAs in real-world scenarios. Hands-on Experience with Altera and Xilinx FPGAs: Compare and contrast FPGAs from Altera and Xilinx. Gain practical skills in programming and configuring FPGAs from both manufacturers. Comprehend Asynchronous Circuit Fundamentals: Gain a foundational understanding of asynchronous sequential circuits and their behavior. Explore the advantages and challenges associated with asynchronous operation in electronic circuits. Master Analysis and Design Techniques: Analyze the structure of asynchronous circuits, including derivation and reduction of primitive flow tables. Investigate cycles, races, and state assignment to optimize the stability and reliability of asynchronous circuits. Develop Practical Asynchronous Circuit Design Skills: Acquire hands-on design skills for asynchronous sequential circuits. Apply knowledge in asynchronous behavior, flow table reduction, and state assignment to design efficient and reliable asynchronous circuits. Master VHDL Fundamentals: Gain a comprehensive understanding of VHDL, including its main features and applications in digital design. Learn to create and organize design units such as entities, architectures, and configurations. Develop Proficiency in Modeling Techniques: Explore various modeling techniques in VHDL, including structural, data flow, and behavioral modeling. Understand how to use mixed-style modeling for comprehensive design representation. Acquire Practical VHDL Skills: Gain hands-on experience in VHDL for simulation, testing, and verification of digital designs. Understand VHDL synthesis principles, facilitating the conversion of VHDL code into hardware.
Teaching and Learning Strategies	
Strategy	• Theoretical lectures and direct discussion are delivered by asking questions and opening the door to dialogue and interaction with students. • Periodic quick tests are conducted to measure the student's level of understanding of a small part of the material. • Monthly, semi-semester and final tests are conducted to measure the level of learning. • Using the thinking skill strategy within a group.

		• Using critical thinking strategy in learning. • Use a brainstorming strategy.			
Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1st	2	Understand the basics of data storage devices	Memory Basics. The Random-Access Memory (RAM).	Theoretical lecture	Discussions and dialogues
2nd	2	Understanding the components of random access memory, the way data is stored in it, and the difference from permanent storage memory	The Read-only memory (ROM). Programmable ROMs.	Theoretical lecture, discussions and dialogues	Quiz
3rd	2	Understanding programmable storage devices, ways to program them, and building circuits using them	Programmable Logic SPLDs and CPLDs, Altera CPLDs, Xilinx CPLDs. Macrocells.	Theoretical lecture, discussions and dialogues	Quiz
4th	2	Understand the internal structure of data storage cells	Programmable Logic: FPGAs Altera FPGAs, Xilinx FPGAs	Theoretical lecture, discussions and dialogues	Monthly exam
5th	2	Understand the basics of asynchronous sequential circuits	Asynchronous Sequential Circuits Asynchronous Behavior.	Theoretical lecture, discussions and dialogues	Quiz
6th	2	Understand methods of analyzing and measuring the outputs of asynchronous series circuits	Structure of Asynchronous Circuits, Analysis of Asynchronous Circuits. Derivative of Primitive Flow Table, Reduction of Primitive Flow Table.	Theoretical lecture, discussions and dialogues	Quiz
7th	2	Learn how to design asynchronous sequential circuits	Cycle and Races State Assignment Asynchronous Circuit Design.	Theoretical lecture, discussions and dialogues	Quiz
8th	Midterm Exam				
9th	2	Learn about a programming language used to define and design components of digital circuits	Main Features of VHDL Design Units.	Theoretical lecture and practical application	Discussions and dialogues
10th	2	Identify the basic units for designing digital components	Structural Modeling.	Theoretical lecture and practical application	Quiz and practical test
11th	2	Learn how to design components for VHDL	Data Flow Modeling. Behavioral Modeling.	Theoretical lecture and practical application	Quiz and practical test
12th	2	Learn to create programs for digital components and how to prepare them	Mixed Style Modeling. Concurrent vs Sequential	Theoretical lecture and practical application	Monthly exam
13th	2	Learn about data types and how to deal with them in VHDL	Data Objects, Data Types. Components and Packages	Theoretical lecture and practical application	Quiz and practical test
14th	2	Learn the basics of independent functions and how to call them	Functions and Procedures VHDL Simulation,	Theoretical lecture and practical application	Report
15th	2	Learn how to run programs, examine circuits, and analyze results	VHDL Synthesis.	Theoretical lecture and practical application	Monthly exam
Course Evaluation					
Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports etc 40 marks includes (assignments + daily tests + monthly tests + commitment to attendance + reports) 60 marks final exam					

Learning and Teaching Resources	
Required textbooks (curricular books, if any)	
Main references (sources)	Thomas L. Floyd (2015) “Digital Fundamentals”, 11th Edition, Pearson. https://bpcbirgunj.edu.np/wp-content/uploads/2019/10/DIGITAL_ELECTRONICS-by-Flyod.pdf
Recommended books and references (scientific journals, reports...)	Thomas L. Floyd and Jain, “Digital Fundamentals”, 8th edition, Pearson Education, 2006 M. Morris Mano, Michael D. (2013) “Digital Design With an Introduction to the Verilog HDL” 5th edition, Prentice Hall
Electronic References, Websites	https://github.com/stevenctang/CSE310/

Electronic III

Course Name: Electronic III					
Course Code: CE 212					
Semester / Year: Semester 1 \ 2025-2026					
Description Preparation Date: 01/10/2025					
Available Attendance Forms: Offline, In class					
Number of Credit Hours (Total) / Number of Units (Total)					
2 hours per week / 30 hours of study in the classroom / 2 unit					
Course administrator's name (mention all, if more than one name)					
Name: - Sarah Waleed Abdulmajeed					
Email: - sara.waleed@aliraqia.edu.iq					
Course Objectives					
Course Objectives	The primary approach for implementing this module will involve promoting active student engagement in exercises, as well as enhancing their ability to think critically. This goal will be accomplished through a combination of classroom sessions, interactive tutorials, and the incorporation of intriguing sampling-based experiments.				
Teaching and Learning Strategies					
Strategy	This course describes the basic tasks of the electronic circuit design cycle, which are as follows: 1.To provide students with a comprehensive understanding of electronic circuit components, principles, and methodologies. 2.To equip students with the skills and knowledge necessary for designing both analog and digital electronic circuits. 3.To enable students to comprehend the operation and characteristics of semiconductor devices, including transistors, and apply this understanding in circuit design. 4.To instruct students in the design and implementation of logic gates and combinational and sequential logic circuits using digital electronic components. 5.To introduce students to the use of integrated circuits (ICs) and integrated circuit design principles in electronic circuitry, including both analog and digital ICs 6.To enable students to use simulation and analysis tools to model, simulate, and analyze electronic circuits for performance evaluation and optimization. 7.To develop students' proficiency in printed circuit board (PCB) layout and fabrication techniques, ensuring proper design for manufacturability and reliability. 8.To prepare students for careers in engineering by providing them with the necessary skills, knowledge, and practical experience in electronic circuit design to meet the demands of the industry. 9.By addressing these aims, the Electronic Circuit Design course aims to equip students with the foundational and advanced skills needed to excel in the field of electronic circuit design and engineering.				
Course Structure					
Course Structure: Second Semester 01-10-2023					
The week	Hours	Required learning outcomes	Unit/Module or Topic Title	Teaching Method	Assessment Method
Week 1	2 Theoretical 2 Lab	A1, B1, C1	BJT Transistor Modeling AMPLIFICATION IN THE AC DOMAIN	In class	In class activities
Week 2	2 Theoretical 2 Lab	A1, B1, C1	BJT TRANSISTOR MODELING THE IMPORTANT PARAMETERS: Zi, Zo, Av, Ai	In class	In class activities and home duties
Week 3	2 Theoretical 2 Lab	A1, B1, C1	THE re TRANSISTOR MODEL Common Base Configuration	In class	In class activities
Week 4	2 Theoretical 2 Lab	A2, B2, C2	Common Emitter Configuration Common Collector Configuration	In class	In class activities
Week 5	2 Theoretical 2 Lab	A2, B2, C2	THE HYBRID EQUIVALENT MODEL	In class	In class activities and home duties
Week 6	2 Theoretical 2 Lab	A2, B2, C2	GRAPHICAL DETERMINATION OF THE h-PARAMETERS	In class	In class activities and home duties

Week 7	2 Theoretical 2 Lab		VARIATIONS OF TRANSISTOR PARAMETERS	In class	In class activities and home duties
Week 8	2 Theoretical 2 Lab	A3, B3, C3	COMMON-EMITTER FIXED-BIAS CONFIGURATION	In class	Quiz 1
Week 9	2 Theoretical 2 Lab	A3, B3, C3	VOLTAGE-DIVIDER BIAS	In class	Questions during the lecture
Week 10	2 Theoretical 2 Lab	A3, B3, C3	CE EMITTER-BIAS CONFIGURATION EMITTER-FOLLOWER CONFIGURATION	In class	Home duties and questions during the lecture
Week 11	2 Theoretical 2 Lab	A3, B3, C3	Monthly exam	In class	Mid Term
Week 12	2 Theoretical 2 Lab	A4, B4, C4	COMMON-BASE CONFIGURATION COLLECTOR FEEDBACK CONFIGURATION	In class	Quiz 2
Week 13	2 Theoretical 2 Lab	A4, B4, C4	Collector DC feedback Configuration Effect of RL and RS CASCADED SYSTEMS	In class	In class activities
Week 14	2 Theoretical 2 Lab	A4, B4, C4	RC-Coupled BJT Amplifiers Darlington configuration	In class	Assignment Presentation
Week 15	2 Theoretical 2 Lab	A4, B4, C4	Cascode Connection	In class	In class activities
Week 16	3 hrs		Final Exam		Final Exam
Course Evaluation					
Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports etc					
Learning and Teaching Resources					
Required textbooks (curricular books, if any)			INTRODUCTORY CIRCUIT ANALYSIS. •Author: Robert L. Boylestad, Eleven Edition •Publishing year: 2007		
Main references (sources)			Electronic Devices and Circuit Theory 11th Edition" by Robert L. Boylestad and Louis Nashelsky Copyright Year: 2013, dissidents.		
Recommended books and references (scientific journals, reports...)			Research in research engines specialized in scientific research such as: •Google scholar •Science direct •IEEE.		
Electronic References, Websites			https://www.waterstones.com/book/electronic-devices-and-circuit-theory/robert-boylestad/louis-nashelsky/9781292025636		

The crimes of the Baath regime

Course Name: The crimes of the Baath regime					
Course Code: CRM222					
Semester / Year: Semester 1 \ 2025-2026					
Description Preparation Date: 01/10/2025					
Available Attendance Forms: Offline, In class					
Number of Credit Hours (Total) / Number of Units (Total)					
2 hours per week / 30 hours of study in the classroom / 2 unit					
Course administrator's name (mention all, if more than one name)					
Name: - Shahad A. Kazar Email: - shahad.a.kazar@aliraqia.edu.iq					
Course Objectives					
Course Objectives	The purpose of teaching the course on the crimes of the Baath regime in Iraq in the computer department is to give the student an overview of the crimes of the Baath regime in Iraq and introduce them to their history and how these Baathist crimes developed and affected many individuals under a centralized dictatorial regime.				
Teaching and Learning Strategies					
Strategy	•Introducing the student to the concept of crimes and their categories •Introducing the student to the sections and types of international crimes •Clarifying psychological and social crimes and the most prominent violations of the Baathist regime in Iraq				
Course Structure					
Course Structure: First Semester 01-10-2023					
The week	Hours	Required learning outcomes	Unit/Module or Topic Title	Teaching Method	Assessment Method
Week 1	2 Theoretical	A1, B1, C1	Crimes of the Baath regime according to the Iraqi Supreme Criminal Court in 2005	In class	In class activities
Week 2	2 Theoretical	A1, B1, C1	Drying the marshes	In class	In class activities and home duties
Week 3	2 Theoretical	A1, B1, C1	Events of genocide graves committed by the Baathist regime in Iraq and their chronological classification	In class	In class activities
Week 4	2 Theoretical	A2, B2, C2	Drying the marshes	In class	In class activities
Week 5	2 Theoretical	A2, B2, C2	Events of genocide graves committed by the Baathist regime in Iraq and their chronological classification	In class	In class activities and home duties
Week 6	2 Theoretical	A2, B2, C2	Drying the marshes	In class	In class activities and home duties
Week 7	2 Theoretical		Mid-term Exam	In class	Mid Term
Week 8	2 Theoretical	A3, B3, C3	Drying the marshes	In class	In class activities & Quiz
Week 9	2 Theoretical	A3, B3, C3	Events of genocide graves committed by the Baathist regime in Iraq and their chronological classification	In class	In class activities & Questions during the lecture
Week 10	2 Theoretical	A3, B3, C3	Drying the marshes	In class	In class activities & Questions during the lecture
Week 11	2 Theoretical	A3, B3, C3	Events of genocide graves committed by the Baathist	In class	In class activities

			regime in Iraq and their chronological classification		
Week 12	2 Theoretical	A4, B4, C4	Psychological and social crimes and their effects	In class	In class activities
Week 13	2 Theoretical	A4, B4, C4	Psychological and social crimes and their effects	In class	In class activities
Week 14	2 Theoretical	A4, B4, C4	Psychological and social crimes and their effects	In class	In class activities
Week 15	2 Theoretical	A4, B4, C4	Combinational Logic	In class	In class activities
Week 16	3 hrs		Final Exam		Final Exam
Course Evaluation					
Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports etc					
Learning and Teaching Resources					
Required textbooks (curricular books, if any)			Crimes of the Baath regime in Iraq (Ministry of Higher Education and Scientific Research)		
Main references (sources)					
Recommended books and references (scientific journals, reports...)			Research in research engines specialized in scientific research such as: •Google scholar •Science direct •IEEE.		
Electronic References, Websites			Crimes of the Baath regime in Iraq (Ministry of Higher Education and Scientific Research)		

Communication Fundamentals I

Course Name: Communication Fundamentals I					
Course Code: CE216					
Semester / Year: Semester 1 \ 2025-2026					
Description Preparation Date: 01/10/2025					
Available Attendance Forms: Offline, In class					
Number of Credit Hours (Total) / Number of Units (Total)					
2 hours per week / 30 hours of study in the classroom / 2 unit					
Course administrator's name (mention all, if more than one name)					
Name: - Email: -					
Course Objectives					
Course Objectives	1.Understanding Communication Systems: The subject aims to provide a fundamental understanding of analog communication systems. Students learn about the key components, concepts, and principals involved in the transmission and reception of signals in communication systems. 2.Signal Representation and Analysis: The subject focuses on the study of different signal representations, including continuous-time signals. Students learn to analyze signals using techniques such as Fourier transform. 3.Analog Communication Systems: The subject covers the principles and techniques used in analog communication systems. Students learn about modulation techniques, such as amplitude modulation (AM), frequency modulation (FM), and phase modulation (PM). They also study demodulation techniques and the impact of noise on analog signals.				
Teaching and Learning Strategies					
Strategy	The student will learn the basic and applied concepts of Communication Fundamentals I with the following fundamentals: A1.Understanding of Communication Systems: Gain a comprehensive understanding of the basic concepts and principles underlying analog communication systems. A2.Knowledge of Signal Representation: Acquire knowledge of various methods for representing analog signals, including time-domain and frequency-domain representations. A3.Familiarity with Analog Modulation Techniques: Gain an understanding of different analog modulation techniques such as amplitude modulation (AM), frequency modulation (FM), and phase modulation (PM). Understand the advantages, disadvantages, and applications of each technique. B1 - To provide the student with experience in dealing with any signal during the communication process. B2 - Providing the student with knowledge of maintenance of communication system				
Course Structure					
Course Structure: First Semester 01-10-2023					
The week	Hours	Required learning outcomes	Unit/Module or Topic Title	Teaching Method	Assessment Method
Week 1	2 Theoretical 2 LAB	A1, B1, C1	Introduction to Fundamentals of communication	In class	In class activities
Week 2	2 Theoretical 2 LAB	A1, B1, C1	Review of Fourier Transforms and Linear Systems {Definitions/general block diagrams of analog and digital communication systems.	In class	In class activities and home duties
Week 3	2 Theoretical 2 LAB	A1, B1, C1	Signal Classifications, Fourier Transform, Dirac Delta Function (Unit Impulse), Fourier Transform of a Periodic Signal,	In class	In class activities
Week 4	2 Theoretical 2 LAB	A2, B2, C2	Transmission of Signals Through Linear Systems	In class	In class activities
Week 5	2 Theoretical 2 LAB	A2, B2, C2	Analog Communications fundamentals and Linear Modulation and Demodulation	In class	In class activities and home duties

Week 6	2 Theoretical 2 LAB	A2, B2, C2	Modulation technique	In class	In class activities and home duties
Week 7	2 Theoretical 2 LAB		Double Sideband	In class	Mid Term
Week 8	2 Theoretical 2 LAB	A3, B3, C3	Amplitude modulation, Envelope Detection, Hilbert Transform,	In class	In class activities & Quiz
Week 9	2 Theoretical 2 LAB	A3, B3, C3	Analytic Signal, Single-Sideband, Vestigial Sideband, Frequency Mixing}	In class	In class activities & Questions during the lecture
Week 10	2 Theoretical 2 LAB	A3, B3, C3	Angle Modulation- PM and FM	In class	In class activities & Questions during the lecture
Week 11	2 Theoretical 2 LAB	A3, B3, C3	Universal Modulation	In class	In class activities
Week 12	2 Theoretical 2 LAB	A4, B4, C4	Frequency Modulation, Narrowband	In class	In class activities
Week 13	2 Theoretical 2 LAB	A4, B4, C4	Signals,	In class	In class activities
Week 14	2 Theoretical 2 LAB	A4, B4, C4	Bessel Functions, Carson's	In class	In class activities
Week 15	2 Theoretical 2 LAB	A4, B4, C4	Rule- Bandwidth, Demodulation,	In class	In class activities
Week 16	3 hrs		Final Exam		Final Exam
Course Evaluation					
Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports etc					
Learning and Teaching Resources					
Required textbooks (curricular books, if any)			j.G. Proakis, digital communication, fifth edition, 2001		
Main references (sources)			R.G. Gallager, principle of digital communication, 2008		
Recommended books and references (scientific journals, reports...)			Research in research engines specialized in scientific research such as: •Google scholar •Science direct •IEEE.		
Electronic References, Websites			https://www.cbipr.com/services/digital-communications		

English II

Course Name: English II					
Course Code: UR219					
Semester / Year: Semester 1 \ 2025-2026					
Description Preparation Date: 01/10/2025					
Available Attendance Forms: Offline, In class					
Number of Credit Hours (Total) / Number of Units (Total)					
2 hours per week / 30 hours of study in the classroom / 2 unit					
Course administrator's name (mention all, if more than one name)					
Name: - Hasseeb Dawood Injas					
Email: - Hasseeb.d.injas@aliraqia.edu.iq					
Course Objectives					
Course Objectives	The goal of this course is to improve the student’s performance in his linguistic capabilities and to improve and develop listening and speaking in the language to benefit from it in the labor market, as the language provides more job opportunities for the student who has high linguistic capabilities.				
Teaching and Learning Strategies					
Strategy	A.1. knows the greeting words and how introduction himself. A.2. can speak and Openings and closings the conversation and learn the conditional sentences. A.3. be aware of jobs, personal information and listening about that and negatives and questions. A.4. learn possessive’s and use have/has and alphabet. A.5. learn the family tree and names of family and relatives and learn the passive voice active and passive A.6. Interest in sports, eating and drinking, study present simple and know the languages and nationalities. A.7. study the time and always/sometimes/never and words that go together.				
Course Structure					
Course Structure: First Semester 01-10-2023					
The week	Hours	Required learning outcomes	Unit/Module or Topic Title	Teaching Method	Assessment Method
Week 1	2 Theoretical	A1, B1, C1	Greeting	In class	In class activities
Week 2	2 Theoretical	A1, B1, C1	Your world	In class	In class activities and home duties
Week 3	2 Theoretical	A1, B1, C1	All about you	In class	In class activities
Week 4	2 Theoretical	A2, B2, C2	speaking	In class	In class activities
Week 5	2 Theoretical	A2, B2, C2	Family and friends	In class	In class activities and home duties
Week 6	2 Theoretical	A2, B2, C2	Possessive’s	In class	In class activities and home duties
Week 7	2 Theoretical		Mid-term Exam	In class	Mid Term
Week 8	2 Theoretical	A3, B3, C3	The way I live	In class	In class activities & Quiz
Week 9	2 Theoretical	A3, B3, C3	speaking	In class	In class activities & Questions during the lecture
Week 10	2 Theoretical	A3, B3, C3	Opening and closing conversation	In class	In class activities & Questions during the lecture
Week 11	2 Theoretical	A3, B3, C3	Languages and nationalities	In class	In class activities
Week 12	2 Theoretical	A4, B4, C4	Every day	In class	In class activities
Week 13	2 Theoretical	A4, B4, C4	O’clock and prics num	In class	In class activities
Week 14	2 Theoretical	A4, B4, C4	Always/sometimes/never	In class	In class activities
Week 15	2 Theoretical	A4, B4, C4	speaking	In class	In class activities

Week 16	3 hrs		Final Exam		Final Exam
Course Evaluation					
Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports etc					
Learning and Teaching Resources					
Required textbooks (curricular books, if any)			•John and Liz Soars		
Main references (sources)			R.G. Gallager, principle of digital communication, 2008		
Recommended books and references (scientific journals, reports...)			Research in research engines specialized in scientific research such as:		
			•Google scholar		
			•Science direct		
			•IEEE.		
Electronic References, Websites					

Mathematics III

Course Name: Mathematics III					
Course Code: CR-211					
Semester / Year: Semester 1 \ 2025-2026					
Description Preparation Date: 01/10/2025					
Available Attendance Forms: Offline, In class					
Number of Credit Hours (Total) / Number of Units (Total)					
2 hours per week / 30 hours of study in the classroom / 2 unit					
Course administrator's name (mention all, if more than one name)					
Name: - Saba Raad Mtansh					
Email: - Saba.raad@aliraqia.edu.iq					
Course Objectives					
Course Objectives	The aim of this course is to develop an understanding of the basic ideas of the engineering mathematics encountered in engineering. The focus will be on the methods for understanding Fourier series, partial derivative, and multiple integration. Students will also learn vectors and vector functions that are useful for the understanding of communication systems.				
Teaching and Learning Strategies					
Strategy	A.Cognitive goals The student will learn the basic and applied concepts of engineering mathematics with the following fundamentals: A.1. Understand the fundamentals of Fourier series and its types and its application in real-world problems. A.2. Express the concepts of partial derivative, chain rule, and directional derivatives in addition to different types of points (Maximum, minimum, and saddle points) which can be used in a wide variety of disciplines in engineering. A.3. Strengthens understanding of vector concepts in addition to line and plane vectors in space and their applications in various fields. A.4. Apply vector concepts to determine the vector valued functions to represent forces, velocities, and other quantities in engineering and physics. A.5. Understand and resolve double in both Cartesian and polar forms to calculate areas, volumes, and work done over surfaces and regions in space. These concepts are crucial for understanding physical phenomena and engineering applications. A.6. Understand the concept of sequences and its types that enhances the student’s logical reasoning and problem-solving in evaluating infinite processes. A.7. Understand the concept of Infinite Series and develop the ability to learn convergence tests to determine if a series has a finite value, a critical skill for various engineering applications. A.8. Understand the concept of Maclaurin and Taylor series that allows the students to approximate complex functions and gain deeper insights into their behavior. B. The skills goals special to the course of Mathematics III B.1 Students will translate real-world engineering problems from learning Fourier series and its application in real-world problems. B.2 Students will apply partial derivatives to analyze the rate of change in multivariable functions and understand how each variable contributes to the overall change. B.3 Students will apply partial and directional derivatives to find local maxima and minima of functions of two variables, equipping them to optimize engineering designs and solve problems with multiple parameters. B.4 Students will apply vector concepts (dot product, cross product) to represent and analyze line and plane vectors in space. B.5 Students will apply vector concepts to represent and analyze vector functions such as forces, velocities, and other relevant engineering and physics quantities. B.6 Students will use double integral to calculate areas, volumes, and work done over surfaces and regions in space, crucial for various engineering applications. B.7 Students will analyze sequences. B.8 Students will analyze infinite series using convergence tests (comparison, ratio, root) to determine if a series has a finite value, a critical skill for evaluating infinite processes in engineering. B.8. Students will learn techniques to represent functions as infinite sums using Maclaurin and Taylor series, enabling them to approximate complex functions and gain deeper insights into their behavior.				
Course Structure					
Course Structure: First Semester 01-10-2023					
The week	Hours	Required learning outcomes	Unit/Module or Topic Title	Teaching Method	Assessment Method

Week 1	2 Theoretical	A1, B1, C1	Fundamental Concepts of Fourier serie- Introduction	In class	In class activities
Week 2	2 Theoretical	A1, B1, C1	Half range Fourier series	In class	In class activities and home duties
Week 3	2 Theoretical	A1, B1, C1	Partial derivatives	In class	In class activities
Week 4	2 Theoretical	A2, B2, C2	Chain rule	In class	In class activities
Week 5	2 Theoretical	A2, B2, C2	Directional Derivative and Maxima, minima, and saddle points	In class	In class activities and home duties
Week 6	2 Theoretical	A2, B2, C2	Vectors: Introduction	In class	In class activities and home duties
Week 7	2 Theoretical		Mid-term Exam	In class	Mid Term
Week 8	2 Theoretical	A3, B3, C3	Vectors: properties, dot and cross product	In class	In class activities & Quiz
Week 9	2 Theoretical	A3, B3, C3	Equations of lines and planes in space	In class	In class activities & Questions during the lecture
Week 10	2 Theoretical	A3, B3, C3	Vector function	In class	In class activities & Questions during the lecture
Week 11	2 Theoretical	A3, B3, C3	Multiple Integrals: Double Integrals	In class	In class activities
Week 12	2 Theoretical	A4, B4, C4	Double Integrals using polar coordinate	In class	In class activities
Week 13	2 Theoretical	A4, B4, C4	Sequences	In class	In class activities
Week 14	2 Theoretical	A4, B4, C4	Infinite series- tests	In class	In class activities
Week 15	2 Theoretical	A4, B4, C4	Taylor and Maclaurin series	In class	In class activities
Week 16	3 hrs		Final Exam		Final Exam
Course Evaluation					
Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports etc					
Learning and Teaching Resources					
Required textbooks (curricular books, if any)			•Thomas Calculus, George B. Thomas, 11th Edition, 2005, Pearson Education Inc. •Thomas CALCULUS George B. Thomas Maurice D. Weir Global Edition 2010		
Main references (sources)					
Recommended books and references (scientific journals, reports...)			Here's a summary of important URLs related to this book: https://www.coursera.org/learn/engineering-mathematics-fundamentals		
Electronic References, Websites					

Microprocessor

Course Name: Microprocessor					
Course Code: CE213					
Semester / Year: Semester 1 \ 2025-2026					
Description Preparation Date: 01/10/2025					
Available Attendance Forms: Offline, In class					
Number of Credit Hours (Total) / Number of Units (Total)					
2 hours per week / 30 hours of study in the classroom / 2 unit					
Course administrator's name (mention all, if more than one name)					
Name: - Yasmine Mustafa Khazaal Email: - Yasmin.m.khazaal@aliraqia.edu.iq					
Course Objectives					
Course Objectives	a)To gain the practical concept of 8086 microprocessors, its architecture, operation and interfacing with other peripheral devices. b)To develop the skill of assembly language programming using instruction set. c)To be familiar with possible microprocessor based design and operation for the practical applications.				
Teaching and Learning Strategies					
Strategy	The student will learn the basic and applied concepts of Computer Engineering with the following fundamentals: A.1.Understand the fundamentals of microprocessor. A.2.Knowledge about the structure of 8086 microprocessor used in a wide variety of disciplines in engineering. A.3.execute instructions quickly and efficiently. This involves optimizing instruction pipelines, designing efficient caching mechanisms, and employing sophisticated branch prediction techniques to minimize processing delays.. A.4.Introduction to the Assembly Language with 8086 microprocessor. A.5.Started with simple Instruction sets and apply on the 8086 assembly language. A.6.Understand the concept of writing Integrated code on the 8086 assembly language. A.7.Effective memory management is crucial for optimizing performance and resource utilization by apply on the 8086 assembly language. A8. Design and ensure reliable operation under diverse operating conditions and environmental factors by flags, and memory when used 8086 assembly language.				
Course Structure					
Course Structure: First Semester 01-10-2023					
The week	Hours	Required learning outcomes	Unit/Module or Topic Title	Teaching Method	Assessment Method
Week 1	2 Theoretical	A1, B1, C1	Introduction to the microprocessor and computer.	In class	In class activities
Week 2	2 Theoretical	A1, B1, C1	Main structural component of a computer system	In class	In class activities and home duties
Week 3	2 Theoretical	A1, B1, C1	Intel 8086	In class	In class activities
Week 4	2 Theoretical	A2, B2, C2	microprocessor - Internal Architecture	In class	In class activities
Week 5	2 Theoretical	A2, B2, C2	The 8086 Hardware Specifications. Pin-outs and the pin functions.	In class	In class activities and home duties
Week 6	2 Theoretical	A2, B2, C2	Unsigned and signed numbers	In class	In class activities and home duties
Week 7	2 Theoretical			In class	Mid Term
Week 8	2 Theoretical	A3, B3, C3	Mid-term Exam	In class	In class activities & Quiz
Week 9	2 Theoretical	A3, B3, C3	Instruction Set and Programming - Data Movement Instructions.	In class	In class activities & Questions during the lecture
Week 10	2 Theoretical	A3, B3, C3	Instruction Set and Programming – Arithmetic	In class	In class activities & Questions during the

			and Logical Instructions.		lecture
Week 11	2 Theoretical	A3, B3, C3	Instruction Set and Programming – shift and rotate instructions	In class	In class activities
Week 12	2 Theoretical	A4, B4, C4	Assembly language examples	In class	In class activities
Week 13	2 Theoretical	A4, B4, C4	The 8086/8088	In class	In class activities
Week 14	2 Theoretical	A4, B4, C4	microprocessor Architecture and pin configuration Minimum mode: Bus timing. e- Ready and the wait state	In class	In class activities
Week 15	2 Theoretical	A4, B4, C4	The 8086/8088	In class	In class activities
Week 16	3 hrs		Final Exam		Final Exam
Course Evaluation					
Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports etc					
Learning and Teaching Resources					
Required textbooks (curricular books, if any)			•Douglas V Hall, Microprocessor and Interfacing: Programming and Hardware, 2nd Edition, Tata McGraw-Hill Publishing Company Limited, 7 West Patel Nagar, New Delhi.		
Main references (sources)					
Recommended books and references (scientific journals, reports...)			https://kader05cuat.wordpress.com/lecture-materials- 2/microprocessor-andinterfacing-sessional/		
Electronic References, Websites					

Object Oriented Programming

Course Name: Object Oriented Programming					
Course Code: CE215					
Semester / Year: Semester 1 \ 2025-2026					
Description Preparation Date: 01/10/2025					
Available Attendance Forms: Offline, In class					
Number of Credit Hours (Total) / Number of Units (Total)					
2 hours per week / 30 hours of study in the classroom / 2 unit					
Course administrator's name (mention all, if more than one name)					
Name: - Ahmed Adeeb Jalal					
Email: - Ahmed.Adeeb@aliraqia.edu.iq					
Course Objectives					
Course Objectives	The aim of this course is to Object-Oriented Programming concepts and techniques. Also, teaching the student the fundamentals of programming in C++. Subsequently, efficiently perform the principles of software engineering in Object-Oriented languages. In addition to, Ability to design and implement Object-Oriented software to solve complex problems.				
Teaching and Learning Strategies					
Strategy	A. Cognitive goals a1. Know the basic characteristics of C++ programming. a2. Analyze the problem and solve it with object oriented programming. a3. Understand the role that functions play in an object-oriented program. a4. Enable the student to know the principle of Classes. a5. Enable the student to know the benefits of the objects. a6. Enabling the student to know the principle of inheritance and a simple degree of polymorphism. B. The skills goals special to the course b1. Enable the student to acquire overwrite skills b2. Enabling the student to acquire overload skills b3. Enable the student to acquire the skills of writing a private function b4. Enabling the student to acquire Public Function writing skills. b5. Analyze a problem and determine what problem elements to represent as functions or objects. b6. Apply object-oriented Programming fundamental techniques to develop small scale applications. b7. Trace, analyze, validate and deduce the output of given program code of different complexities.				
Course Structure					
Course Structure: First Semester 01-10-2023					
The week	Hours	Required learning outcomes	Unit/Module or Topic Title	Teaching Method	Assessment Method
Week 1	2 Theoretical	A1, B1, C1	Introduction C++ basics, Loops, and decisions.	In class	In class activities
Week 2	2 Theoretical	A1, B1, C1	Arrays, Multidimensional Arrays, C-Strings, and The Standard C++ String.	In class	In class activities and home duties
Week 3	2 Theoretical	A1, B1, C1	Structures, and The Address-of Operator &, and Pointer Variables.	In class	In class activities
Week 4	2 Theoretical	A2, B2, C2	Functions, Overloaded Functions, and Inline Functions.	In class	In class activities
Week 5	2 Theoretical	A2, B2, C2	C++/Object-Oriented concepts: objects, classes, reusability, inheritance, information hiding, encapsulation, and polymorphism.	In class	In class activities and home duties
Week 6	2 Theoretical	A2, B2, C2	Objects, Classes, Member Functions, Private Member Functions,	In class	In class activities and home duties
Week 7	2 Theoretical		Mid-term Exam	In class	Mid Term
Week 8	2 Theoretical	A3, B3, C3	Friend Function, Friend Class, and Array of Object.	In class	In class activities & Quiz

Week 9	2 Theoretical	A3, B3, C3	Operator Overloading, and this Pointer.	In class	In class activities & Questions during the lecture
Week 10	2 Theoretical	A3, B3, C3	Inheritance, Public and Private Inheritance, Class Hierarchies, and Multiple Inheritances.	In class	In class activities & Questions during the lecture
Week 11	2 Theoretical	A3, B3, C3	Encapsulation: Private, Public, and Protected Members Variables and Functions.	In class	In class activities
Week 12	2 Theoretical	A4, B4, C4	C++ legacy code topics, C++ Templates, and standard template library.	In class	In class activities
Week 13	2 Theoretical	A4, B4, C4	Fundamental Algorithms in C++ for searching and sorting such as find, sort, search, count, and merge.	In class	In class activities
Week 14	2 Theoretical	A4, B4, C4	Member Functions with Vector: push_back(), size(), swap(), empty(), back(), and pop_back().	In class	In class activities
Week 15	2 Theoretical	A4, B4, C4	Practices, Exercises, Exams, and Review.	In class	In class activities
Week 16	3 hrs		Final Exam		Final Exam
Course Evaluation					
Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports etc					
Learning and Teaching Resources					
Required textbooks (curricular books, if any)			•Robert Lafore, Object-Oriented Programming in C++ , Sams Publishing, 4th Edition. •Bjarne Stroustrup, The C++ Programming Language, Addison-Wesley Professional, 4th Edition, ISBN-10: 0321563840 ISBN-13: 978-0321563842 (advanced).		
Main references (sources)					
Recommended books and references (scientific journals, reports...)					
Electronic References, Websites			Here's a summary of important URLs related to this book: https://www.w3schools.com/cpp/default.asp https://www.geeksforgeeks.org/object-oriented-programming-in-cpp/		

Second Year / Second Semester Mathematics IV

Course Name: Mathematics IV	
Course Code: CR-221	
Semester / Year: Semester 2 \ 2025-2026	
Description Preparation Date: 01/10/2025	
Available Attendance Forms: Offline, In class	
Number of Credit Hours (Total) / Number of Units (Total)	
2 hours per week / 30 hours of study in the classroom / 2 unit	
Course administrator's name (mention all, if more than one name)	
Name: - Jasmine Aziz Hussein	
Email: - Yasmeen.a.hussein@aliraqia.edu.iq	
Course Objectives	
Course Objectives	The aim of this course is to develop an understanding of the basic ideas of the engineering mathematics encountered in engineering. The focus will be on the methods for understanding Fourier series, partial derivative, and multiple integration. Students will also learn vectors and vector functions that are useful for the understanding of communication systems.
Teaching and Learning Strategies	
Strategy	A. Cognitive goals The student will learn the basic and applied concepts of engineering mathematics with the following fundamentals: A.1. Students will be able to analyze a given problem and identify whether it can be modeled by an ordinary differential equation (ODE) and determine its type (first, second, or higher order). A.2. Students will be able to apply various techniques to solve different types of ODEs, including first-order (separable variables, integrating factors, exact equations), second-order (homogeneous/nonhomogeneous, undetermined coefficients, variation of parameters), and higher-order ODEs (characteristic equation). A.3. Students will gain a deep understanding of the concepts behind Laplace Transforms and Z-Transforms, including their definitions, properties, and relationships to differential equations. A.4. Students will be able to evaluate the convergence of a Z-transform and determine the appropriate technique (partial fraction decomposition, tables, properties) to find the inverse Laplace or Z-transform. A.5. Students will be able to interpret the solutions obtained from Z-transforms in the context of the original engineering problem, understanding the behavior of the system being modeled. A.6. Students will develop the ability to model real-world engineering systems (e.g., circuits, control systems) using appropriate ODEs and apply Laplace or Z-transforms to solve for system behavior. A.7. Students will strengthen their problem-solving skills by applying their knowledge of ODEs, Laplace Transforms, and Z-Transforms to analyze, solve, and interpret engineering problems involving dynamic systems. A.8. students will be able to synthesize their understanding of ODEs, Laplace Transforms, and Z-Transforms, allowing them to choose the appropriate mathematical tool for solving a given engineering problem and effectively analyze its solution. B. The skills goals special to the course of Mathematics IV B.1 Students will be able to proficiently identify and classify ordinary differential equations based on their order (first, second, higher-order) and linearity. B.2 Students will develop the skills to solve various first-order ODEs using techniques like separation of variables, integrating factors, and recognizing exact equations. B.3 This skill focuses on applying methods like homogeneous/nonhomogeneous solutions, undetermined coefficients, and variation of parameters to solve second-order linear ODEs with initial value problems. B.4 Students will gain the ability to complex engineering problems based on higher ODEs. B.5 Students will gain the ability to apply Laplace transforms to solve differential equations with initial value problems. This includes calculating transforms of basic functions, utilizing Laplace transform properties, and performing inverse transforms. B.6 This skill focuses on applying the knowledge of ODEs to model real-world engineering systems. Thus, the students will be able to translate the system dynamics into mathematical equations and utilize appropriate techniques (e.g., Laplace transforms) to analyze their behavior. B.7 Students will develop the skills to analyze discrete-time systems using Z-transforms. This involves calculating Z-transforms of discrete functions, applying Z-transform properties for manipulation, and performing the inverse Z-transform to obtain solutions in the time domain. B.8 A crucial skill involves interpreting the solutions obtained from Z-transforms in the context of the original engineering problem. Students will be able to explain what the solution represents and how it relates to the system's behavior.
Course Structure	
Course Structure: First Semester 01-10-2023	

The week	Hours	Required learning outcomes	Unit/Module or Topic Title	Teaching Method	Assessment Method
Week 1	2 Theoretical	A1, B1, C1	Introduction to ODEs	In class	In class activities
Week 2	2 Theoretical	A1, B1, C1	Solving First-Order ODEs (Variable separable + Homogenous)	In class	In class activities and home duties
Week 3	2 Theoretical	A1, B1, C1	Solving First-Order ODEs (Linear, Bernoulli's equation, and Exact	In class	In class activities
Week 4	2 Theoretical	A2, B2, C2	Second-Order ODEs homogenous and Nonhomogeneous (undetermined Coefficient method)	In class	In class activities
Week 5	2 Theoretical	A2, B2, C2	Second-Order ODEs Nonhomogeneous (variation of parameters method)	In class	In class activities and home duties
Week 6	2 Theoretical	A2, B2, C2	Higher-Order ODEs	In class	In class activities and home duties
Week 7	2 Theoretical		Mid-term Exam	In class	Mid Term
Week 8	2 Theoretical	A3, B3, C3	Introduction to Laplace Transforms	In class	In class activities & Quiz
Week 9	2 Theoretical	A3, B3, C3	Laplace Transforms properties	In class	In class activities & Questions during the lecture
Week 10	2 Theoretical	A3, B3, C3	Inverse Laplace Transforms	In class	In class activities & Questions during the lecture
Week 11	2 Theoretical	A3, B3, C3	Solving ODEs using Laplace Transforms	In class	In class activities
Week 12	2 Theoretical	A4, B4, C4	Introduction to Z-Transforms	In class	In class activities
Week 13	2 Theoretical	A4, B4, C4	Z-Transforms properties	In class	In class activities
Week 14	2 Theoretical	A4, B4, C4	Inverse Z-Transforms	In class	In class activities
Week 15	2 Theoretical	A4, B4, C4	Solving difference equation using Z-Transforms	In class	In class activities
Week 16	3 hrs		Final Exam		Final Exam

Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports etc

Learning and Teaching Resources

Required textbooks (curricular books, if any)

- Thomas Calculus, George B. Thomas, 11th Edition, 2005, Pearson Education Inc.
- Thomas CALCULUS George B. Thomas Maurice D. Weir Global Edition 2010

Main references (sources)

Recommended books and references (scientific journals, reports...)

Electronic References, Websites

Here's a summary of important URLs related to this book:
<https://www.coursera.org/learn/engineering-mathematics-fundamentals>

Electronic IV

Course Name: Electronic IV

Course Code: CR-222

Semester / Year: Semester 2 \ 2025-2026

Description Preparation Date: 01/10/2025

Available Attendance Forms: Offline, In class

Number of Credit Hours (Total) / Number of Units (Total)					
2 hours per week / 30 hours of study in the classroom / 2 unit					
Course administrator's name (mention all, if more than one name)					
Name: - Sarah Waleed Abdulmajeed Email: - sara.waleed@aliraqia.edu.iq					
Course Objectives					
Course Objectives	This course describes the basic tasks of the electronic circuit design cycle, which are as follows: 1.To delve into advanced principles and methodologies pertinent to the design and analysis of electronic circuits. 2.To explore both analog and digital circuit design techniques, emphasizing fundamental concepts such as diode applications, transistor operation, operational amplifiers, logic gates, and integrated circuit design. 3.To emphasize practical circuit design considerations, including component selection, circuit layout, noise analysis, and power dissipation. 4.To provide hands-on experience through lectures, tutorials, and projects, enabling students to design, simulate, and prototype electronic circuits for diverse applications. 5.To foster critical thinking and problem-solving skills in electronic circuit design, preparing students for real-world challenges in the field of electronics engineering.				
Teaching and Learning Strategies					
Strategy	A-Cognitive goals The student will learn the basic and applied concepts of electronic circuit design engineering with the following fundamentals: A.1.Analyzing and understanding advanced electronic circuit concepts and principles. A.2.Applying theoretical knowledge to solve complex circuit design problems. A.3.Evaluating the performance and characteristics of electronic circuits through simulation and analysis. A.4.Synthesizing information from various sources to design and optimize electronic circuits for specific applications. A.5.Developing critical thinking skills to troubleshoot and debug electronic circuits effectively. A.6.Integrating knowledge of emerging technologies and advancements in electronic circuit design. A.7.Collaborating with peers to explore and discuss innovative approaches to circuit design challenges. A.8.Reflecting on the ethical implications and societal impacts of electronic circuit design decisions. A.9.Demonstrating proficiency in using specialized software tools and equipment for electronic circuit design and analysis. A.10.Engaging in lifelong learning and staying updated with the latest developments in electronic circuit design and technology.				
Course Structure					
Course Structure: First Semester 01-10-2023					
The week	Hours	Required learning outcomes	Unit/Module or Topic Title	Teaching Method	Assessment Method
Week 1	2 Theoretical	A1, B1, C1	Operational Amplifiers Single-Ended Input Double-Ended (Differential) Input Double-Ended Output Common-Mode Operation Common-Mode Rejection	In class	In class activities
Week 2	2 Theoretical	A1, B1, C1	Common-Mode Operation Common-Mode Rejection DIFFERENTIAL AND COMMON MODE OPERATION Common-Mode Rejection Common-Mode Rejection Ratio OP-AMP BASICS	In class	In class activities and home duties
Week 3	2 Theoretical	A1, B1, C1	Constant-Magnitude Gain Virtual Ground Practical Op-Amp Circuits Inverting Amplifier Noninverting Amplifier Unity follower	In class	In class activities
Week 4	2 Theoretical	A2, B2, C2	Summing Amplifier Integrator Differentiator OP-AMP Specification DC Offset Parameter Offset Currents and Voltages	In class	In class activities

			Input Offset Voltage VIO		
Week 5	2 Theoretical	A2, B2, C2	Output Offset voltage due to input Offset Current IIO Total Offset Due to VIO and IIO Frequency Parameters Gain-bandwidth Slew Rate (SR) Maximum signal frequency	In class	In class activities and home duties
Week 6	2 Theoretical	A2, B2, C2	Absolute Maximum Ratings CONSTANT-GAIN MULTIPLIER Multiple-stage Gains Voltage Summing Voltage Subtraction	In class	In class activities and home duties
Week 7	2 Theoretical		Voltage Buffer Controlled Sources Voltage-Controlled Voltage Source Voltage-Controlled Current Source Current-Controlled Voltage Source Current-Controlled Current Source	In class	Mid Term
Week 8	2 Theoretical	A3, B3, C3	Instrumentation Circuits dc Millivoltmeter AC Millivoltmeter Display Driver Instrumentation Amplifier Active Filters	In class	In class activities & Quiz
Week 9	2 Theoretical	A3, B3, C3	Low-Pass Filter High-Pass Active Filter Bandpass Filter Feedback Concepts Voltage Summing Gain with Feedback	In class	In class activities & Questions during the lecture
Week 10	2 Theoretical	A3, B3, C3	Voltage-Series Feedback Voltage-Shunt Feedback Input Impedance with Feedback Voltage-Series Feedback Voltage-Shunt Feedback Output Impedance with Feedback Voltage-Series Feedback	In class	In class activities & Questions during the lecture
Week 11	2 Theoretical	A3, B3, C3	Monthly exam	In class	In class activities
Week 12	2 Theoretical	A4, B4, C4	Current-Series Feedback Reduction in Frequency Distortion General Filter Considerations Filter Voltage Regulation and Ripple Voltage Voltage Regulation	In class	In class activities
Week 13	2 Theoretical	A4, B4, C4	Ripple Factor of Rectified Signal Capacitor Filter Output Waveform RC FILTER DISCRETE TRANSISTOR	In class	In class activities
Week 14	2 Theoretical	A4, B4, C4	VOLTAGE REGULATION IC VOLTAGE REGULATORS Three-Terminal Voltage Regulators Fixed-Positive-Voltage Regulators	In class	In class activities
Week 15	2 Theoretical	A4, B4, C4	Operational Amplifiers Single-Ended Input Double-Ended (Differential) Input	In class	In class activities

			Double-Ended Output Common-Mode Operation Common-Mode Rejection		
Week 16	3 hrs		Final Exam		Final Exam
Course Evaluation					
Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports etc					
Learning and Teaching Resources					
Required textbooks (curricular books, if any)			INTRODUCTORY CIRCUIT ANALYSIS. Author: Robert L. Boylestad, Eleven Edition Publishing year: 2007		
Main references (sources)			Electronic Devices and Circuit Theory 11th Edition" by Robert L. Boylestad and Louis Nashelsky Copyright Year: 2013, dissidents.		
Recommended books and references (scientific journals, reports...)					
Electronic References, Websites			https://www.waterstones.com/book/electronic-devices-and-circuit-theory/robert-boylestad/louis-nashelsky/9781292025636		

Microprocessor Application

Course Name: Microprocessor Application					
Course Code: CE223					
Semester / Year: Semester 2 \ 2025-2026					
Description Preparation Date: 01/10/2025					
Available Attendance Forms: Offline, In class					
Number of Credit Hours (Total) / Number of Units (Total)					
2 hours per week / 30 hours of study in the classroom / 2 unit					
Course administrator's name (mention all, if more than one name)					
Name: - Sufyan Othman Zaben Email: - Sufyan.o.zaben@aliraqia.edu.iq					
Course Objectives					
Course Objectives	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				
Teaching and Learning Strategies					
Strategy	The student will learn the basic and applied concepts of Microprocessor application with the following fundamentals: A.1. enabling the student to write a code in assembly language for interfacing A.2. Enabling the student to connect and control the LED A.3.Enabling the student to connect and control the 7-segment A.4. Enabling the student to connect and control the stepper motor A.5. Enabling the student to connect and rotate the stepper motor A.6. Using Switches As Input To Control Mechanical Press A.7. Generating Sine Wave Using DAC				
Course Structure					
Course Structure: First Semester 01-10-2023					
The week	Hours	Required learning outcomes	Unit/Module or Topic Title	Teaching Method	Assessment Method
Week 1	2 Theoretical	A1, B1, C1	Representing Binary Code With LED Array	In class	In class activities
Week 2	2 Theoretical	A1, B1, C1	Representing BCD Code With LED Array	In class	In class activities and home duties
Week 3	2 Theoretical	A1, B1, C1	Seven Segment Interfacing	In class	In class activities
Week 4	2 Theoretical	A2, B2, C2	Square Traffic Light	In class	In class activities
Week 5	2 Theoretical	A2, B2, C2	Light Detected Resistor (LDR).	In class	In class activities and home duties
Week 6	2 Theoretical	A2, B2, C2	IC Tester	In class	In class activities and home duties
Week 7	2 Theoretical		Stepper Motor	In class	Mid Term
Week 8	2 Theoretical	A3, B3, C3	Mid-course Exam	In class	In class activities & Quiz
Week 9	2 Theoretical	A3, B3, C3	Rotate The Stepper Motor Bidirectional	In class	In class activities & Questions during the lecture
Week 10	2 Theoretical	A3, B3, C3	Reading Switches Status And Output To Leds	In class	In class activities & Questions during the lecture
Week 11	2 Theoretical	A3, B3, C3	Using Switches As Input To Control Mechanical Press	In class	In class activities
Week 12	2 Theoretical	A4, B4, C4	Converting Analogue Input (Variable Pot) To Digital	In class	In class activities
Week 13	2 Theoretical	A4, B4, C4	Generating Sine Wave Using DAC	In class	In class activities

Week 14	2 Theoretical	A4, B4, C4	Motor Control, Temperature Control	In class	In class activities
Week 15	2 Theoretical	A4, B4, C4	Representing Binary Code With LED Array	In class	In class activities
Week 16	3 hrs		Final Exam		Final Exam
Course Evaluation					
Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports etc					
Learning and Teaching Resources					
Required textbooks (curricular books, if any)			•Barry B. Brey “The Intel Microprocessors 8th Edition” •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.		
Main references (sources)					
Recommended books and references (scientific journals, reports...)					
Electronic References, Websites			Here’s a summary of important URLs related to this book: https://www.coursera.org/learn/		

Communication Fundamentals II

Course Name: Communication Fundamentals II					
Course Code: CE216					
Semester / Year: Semester 2 \ 2025-2026					
Description Preparation Date: 01/10/2025					
Available Attendance Forms: Offline, In class					
Number of Credit Hours (Total) / Number of Units (Total)					
2 hours per week / 30 hours of study in the classroom / 2 unit					
Course administrator's name (mention all, if more than one name)					
Name: - Hiba Ahmed Jasim					
Email: - hiba.a.jasim@aliraqia.edu.iq					
Course Objectives					
Course Objectives	1.Digital Communication Systems: The subject introduces students to digital communication systems and the underlying concepts. They learn about various modulation schemes used in digital communications, such as phase shift keying (PSK), frequency shift keying (FSK), and frequency shift keying (FSK). The subject also covers, digital modulation, and demodulation. 2.Channel Capacity and Information Theory: Students gain an understanding of channel capacity, which measures the maximum data rate that can be reliably transmitted over a communication channel. 3.Performance Analysis: The subject includes the analysis of communication system performance metrics, such as signal-to-noise ratio (SNR), bit error rate (BER), and bandwidth efficiency. Students learn how to evaluate and compare the performance of different modulation schemes and communication system configurations.				
Teaching and Learning Strategies					
Strategy	A3.Cognitive goals The student will learn the basic and applied concepts of Communication Fundamentals I with the following fundamentals: A3.Signal Conditioning: Digital signals are susceptible to noise and interference. Signal conditioning techniques such as filtering, amplification, and modulation can be used to enhance the quality and integrity of the analog signal before transmission. A3.Bandwidth Optimization: Digital signals require a certain amount of bandwidth for transmission. By employing techniques such as frequency division multiplexing (FDM) or time division multiplexing (TDM), multiple analog signals can be transmitted simultaneously, optimizing the available bandwidth. A3.Noise Reduction: Digital signals are prone to noise, which can degrade the signal quality. Strategies like shielding, grounding, and balanced transmission lines can be used to minimize noise and interference during transmission. B1 - To provide the student with experience in dealing with any signal during the communication process. B2 - Providing the student with knowledge of maintenance of communication system				
Course Structure					
Course Structure: First Semester 01-10-2023					
The week	Hours	Required learning outcomes	Unit/Module or Topic Title	Teaching Method	Assessment Method
Week 1	2 Theoretical	A1, B1, C1	Introduction – Digital communication system	In class	In class activities
Week 2	2 Theoretical	A1, B1, C1	Transition from Analog to Digital Communications	In class	In class activities and home duties
Week 3	2 Theoretical	A1, B1, C1	The sampling Theorem, Pulse-amplitude modulation, The quantization process	In class	In class activities
Week 4	2 Theoretical	A2, B2, C2	Pulse-code modulation, Delta modulation	In class	In class activities
Week 5	2 Theoretical	A2, B2, C2	Multiplexing Systems	In class	In class activities and home duties
Week 6	2 Theoretical	A2, B2, C2	Frequency-Division Multiplexing, Time-Division Multiplexing	In class	In class activities and home duties

Week 7	2 Theoretical		Mid-term Exam	In class	Mid Term
Week 8	2 Theoretical	A3, B3, C3	Digital Band-pass Modulation Techniques	In class	In class activities & Quiz
Week 9	2 Theoretical	A3, B3, C3	Binary Amplitude-Shift Keying	In class	In class activities & Questions during the lecture
Week 10	2 Theoretical	A3, B3, C3	Coherent Detection of ASK Signals, Noncoherent Detection of ASK Signals	In class	In class activities & Questions during the lecture
Week 11	2 Theoretical	A3, B3, C3	Phase-Shift Keying	In class	In class activities
Week 12	2 Theoretical	A4, B4, C4	Binary Frequency-Shift Keying (BFSK)	In class	In class activities
Week 13	2 Theoretical	A4, B4, C4	FSK Bit Rate, Baud, and Bandwidth	In class	In class activities
Week 14	2 Theoretical	A4, B4, C4	Continuous-Phase Frequency-Shift Keying	In class	In class activities
Week 15	2 Theoretical	A4, B4, C4	Preparatory week before the final Exam	In class	In class activities
Week 16	3 hrs		Final Exam		Final Exam
Course Evaluation					
Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports etc					
Learning and Teaching Resources					
Required textbooks (curricular books, if any)			•F.G. Stremler, Introduction to Communication Systems, 2nded, 1982 •A. B. Carlson, Communication Systems, McGraw Hill, 4thed, 2002		
Main references (sources)					
Recommended books and references (scientific journals, reports...)			•S.S. Haykin, Communication Systems, Wiley, 2001. •B Behrouz A. Forouzan, Data communications and networking, 4thed, 2007		
Electronic References, Websites			Here's a summary of important URLs related to this book: https://www.coursera.org/learn/		

Data structures and algorithms

Course Name:	
Data structures and algorithms	
Course Code:	
CR-CE225	
Semester / Year:	
Second semester \ (2023/2024)	
Description Preparation Date:	
10/2/2024	
Available Attendance Forms:	
Attendance (theoretical + practical)	
Number of Credit Hours (Total) / Number of Units (Total): 60	
2 theoretical hours per week = 30 hours per semester	
2 working hours per week = 30 hours per semester	
Course administrator's name:	
Name: Asst. Prof. Ahmed Adeeb Jalal	
Email: ahmedadeeb@aliraqi.edu.iq	
Course Objectives:	
Course Objectives	An overview of programming concepts and discrete mathematics. Teaching the student how to represent data in computer memory. Teaching the student linear and non-linear data structures and their types and programming addition, deletion, and search algorithms. Efficiently perform operations on lists, stack and queues. Understand the non-linear data structures represented by trees, their synthesis and programming. Ability to distribute data by Hashing table and Priority Queues (Heaps). Teaching the student the various methods and techniques of searching and arranging data in each of the data structures.
Teaching and Learning Strategies:	
Strategy	A- Cognitive goals. a1. Understand the principle of recursion function in solving problems. a2. Problem analysis and solution using data structures. a3. Understand the role data structures play in storing information. a4. How to efficiently perform operations on Linked Lists, Linked Stacks, and Linked Queues. a5. Enabling the student to understand three types of tree traversal techniques. a6. Enabling the student to know the principle of Sorting. B- The skills goals special to the course. b1. Enable the student to acquire overwrite skills. b2. How to estimate the time required for a program. b3. How to reduce the running time of a program from days or years to fractions of a second. b4. How to choose one operation to be more efficient if another less efficient. b5. Analyze a problem and determine what problem elements to represent by data structures and algorithms. b6. Apply data structures and algorithms fundamental techniques to develop small scale applications. b7. Trace, analyze, validate and deduce the output of given program code of different complexities. C- Affective and value goals c1. Analysis of a computer program to solve real-world problems based on data structures and algorithms principles. c2. Develop and enhance the student's thinking skill and move him to a higher level of thinking. c3. Creating confidence in the student to design and implement data structures and algorithms to solve practical applied problems. c4. Raise the spirit of cooperation and work within a team. c5. Bring out creative ideas among students by raising the spirit of competition. D- General and rehabilitative transferred skills(other skills relevant to employability and personal development) d1. Work effectively as an individual and as a member of a team d2. Demonstrate efficient IT capabilities d3. Developing capabilities and skills to gain the required level of experience and knowledge for the purposes of employment and personal development. d4. Enable the student to link the course outcomes with practical life. d5. Organized and effective planning for program design. Teaching and Learning Methods 1. Giving theoretical lectures through classrooms. 2. Attendance education in laboratory lessons and implementation of the prescribed programs. 3. Using illustrations and uploading electronic lectures. 4. Direct discussion by asking questions and opening the door for dialogue and interaction with students. Assessment methods 1. Weekly and quarterly exams. 2. Participation during the electronic lecture and answer the questions. 3. Application of software on the computer for the practical laboratory. Teaching and Learning Methods 1. Group thinking skill strategy. 2. Critical thinking strategy in learning. 3. Brainstorming. Assessment methods 1. Application software. 2. Student feedback.

3. Tests of all kinds.					
Course Structure:					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2 theory 2 Lab	a1,a2,b1,b6,b7, c2,c3,c4,d1,d5	Introduction to Data structures and Algorithms, Abstract Data Type, Linear and non-Linear data structures	attendance	Weekly exams, Quarterly exam, Homework.
2	2 theory 2 Lab	a1,a2,b1,b6,b7, c2,c3,c4,d1,d5	A General Overview on recursion function and algorithm analysis	attendance	Weekly exams, Quarterly exam, Homework.
3	2 theory 2 Lab	a2,a3,a4,b1,b6, b7,c2,c3,c4,d1, d5	Linked Lists, three type of Insertion and Deletion on Linked Lists, Double Linked List	attendance	Weekly exams, Quarterly exam, Homework.
4	2 theory 2 Lab	a3,a4,b2,b4,b6, b7,c1, c2,c3,c4,d2	The Stack, The functions associated with stack, Linked Stack, Applications of Stack: Expressions Calculator (Infix, Prefix, and Postfix notation)	attendance	Weekly exams, Quarterly exam, Homework.
5	2 theory 2 Lab	a2,a3,a4,a5,b1, b3,b5,b6,c1,c2, c3,d3,d4,d5	The Queue and Linked Queue	attendance	Weekly exams, Quarterly exam, Homework.
6	2 theory 2 Lab	a2,a3,a5,b1,b3, b5,b6,c1,c2,c3, d3,d4,d5	The Tree, Binary Tree, and Tree Traversals: Inorder, Preorder, and Postorder Traversal	attendance	Weekly exams, Quarterly exam, Homework.
7	2 theory 2 Lab	a2,a3,a5,b1,b5, b7,c2,c3,c4,d2, d3	The Search Tree ADT–Binary Search Trees, AVL Trees, Splay Trees, B-Trees, Sets and Maps in the Standard Library	attendance	Weekly exams, Quarterly exam, Homework.
8	2 theory 2 Lab		Mid-course Exam	attendance	Mid-course Exam
9	2 theory 2 Lab	a2,a3,b1,b2,b5, b7,c2,c3,c4,d2, d3	Hashing: General Idea, Hash Function, Separate Chaining	attendance	Weekly exams, Quarterly exam, Homework.
10	2 theory 2 Lab	a2,a3,a4,a5,a6, b1,b3,b5,b6,c1, c2,c3,c5,d3,d4, d5	Priority Queues (Heaps), Model, Simple Implementations, Binary Heap	attendance	Weekly exams, Quarterly exam, Homework.
11	2 theory 2 Lab	a2,a3,a4,a5,a6, b1,b3,b5,b6,c1, c2,c3,c5,d3,d4, d5	Applications of Priority Queues, d-Heaps, Leftist Heaps, Skew Heaps, Binomial Queues, Priority Queues in the Standard Library	attendance	Weekly exams, Quarterly exam, Homework.
12	2 theory 2 Lab	a2,a3,a6,b1,b5, b7,c2,c3,c4,d2, d3	Sorting: Preliminaries, Insertion Sort, Shellsort, Heapsort, Mergesort	attendance	Weekly exams, Quarterly exam, Homework.
13	2 theory 2 Lab	a2,a3,a6,b4,b5, b7,c1,c2,c3,d2, d3,d4	Quick sort, Bucket Sort, External Sorting	attendance	Weekly exams, Quarterly exam, Homework.
14	2 theory 2 Lab	a2,a3,b1,b5,b7, c2,c3,c4,c5,d2, d3,d4,d5	Algorithm Design Techniques: Greedy Algorithms, Divide and Conquer, Dynamic Programming, Randomized Algorithms, Backtracking Algorithms	attendance	Weekly exams, Quarterly exam, Homework.
15	2 theory 2 Lab		Practices, Exercises, Exams, and Review.	attendance	Practices, Exercises, Exams and Review.
Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports etc					
Learning and Teaching Resources:					
Required textbooks (curricular books, if any)			Data Structures and Algorithm Analysis in C++ (Fourth Edition), by M. A. Weiss. Addison-Wesley, ISBN-10: 032144146X & ISBN-13: 9780321441461		
Main references (sources)			C++ How to Program (5th Edition), by (Harvey & Paul) Deitel & Associates. Prentice Hall, ISBN-10: 0131857576 & ISBN-13: 9780131857575		
Recommended books and references (scientific journals, reports...)			Scientific journals and recent research in various applications that use object-oriented programming to find solutions to practical problems.		
Electronic References, Websites			https://www.w3schools.in/data-structures-tutorial/intro/ https://www.geeksforgeeks.org/data-structures/		

Digital System Design ii

Course Name:	
Digital System Design ii	
Course Code:	
CR-CE224	
Semester / Year:	
Semester II / Second	
Description Preparation Date:	
12-2-2024	
Available Attendance Forms:	
Attendance in class	
Number of Credit Hours (Total) / Number of Units (Total)	
30 Hours (2 Hours/Week) / 2 units	
Course administrator's name (mention all, if more than one name)	
Name: Asst. Prof. Dr. Rasha Thabit Email: rasha.thabit@aliraqia.edu.iq	
Course Objectives	
Course Objectives	Understand Memory Fundamentals: Gain foundational knowledge of computer memory principles. Explore the architecture and functionalities of Random-Access Memory (RAM) and Read-only Memory (ROM). Explore Programmable ROMs and Logic Devices: Investigate Programmable Read-only Memory (PROM) and Erasable Programmable Read-only Memory (EPROM). Understand Simple Programmable Logic Devices (SPLDs) and Complex Programmable Logic Devices (CPLDs). Master Macrocells and their Role: Comprehend the concept and significance of macrocells in programmable logic devices. Explore how macrocells contribute to the functionality of CPLDs and FPGAs. Dive into FPGA Architecture and Applications: Introduce Field-Programmable Gate Arrays (FPGAs) and their architecture. Understand the advantages and applications of FPGAs in real-world scenarios. Hands-on Experience with Altera and Xilinx FPGAs: Compare and contrast FPGAs from Altera and Xilinx. Gain practical skills in programming and configuring FPGAs from both manufacturers. Comprehend Asynchronous Circuit Fundamentals: Gain a foundational understanding of asynchronous sequential circuits and their behavior. Explore the advantages and challenges associated with asynchronous operation in electronic circuits. Master Analysis and Design Techniques: Analyze the structure of asynchronous circuits, including derivation and reduction of primitive flow tables. Investigate cycles, races, and state assignment to optimize the stability and reliability of asynchronous circuits. Develop Practical Asynchronous Circuit Design Skills: Acquire hands-on design skills for asynchronous sequential circuits. Apply knowledge in asynchronous behavior, flow table reduction, and state assignment to design efficient and reliable asynchronous circuits. Master VHDL Fundamentals: Gain a comprehensive understanding of VHDL, including its main features and applications in digital design. Learn to create and organize design units such as entities, architectures, and configurations. Develop Proficiency in Modeling Techniques: Explore various modeling techniques in VHDL, including structural, data flow, and behavioral modeling. Understand how to use mixed-style modeling for comprehensive design representation. Acquire Practical VHDL Skills: Gain hands-on experience in VHDL for simulation, testing, and verification of digital designs. Understand VHDL synthesis principles, facilitating the conversion of VHDL code into hardware.
Teaching and Learning Strategies	
Strategy	• Theoretical lectures and direct discussion are delivered by asking questions and opening the door to dialogue and interaction with students. • Periodic quick tests are conducted to measure the student's level of understanding of a small part of the material. • Monthly, semi-semester and final tests are conducted to measure the level of learning. • Using the thinking skill strategy within a group. • Using critical thinking strategy in learning. • Use a brainstorming strategy.

Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1st	2	Understand the basics of data storage devices	Memory Basics. The Random-Access Memory (RAM).	Theoretical lecture	Discussions and dialogues
2nd	2	Understanding the components of random access memory, the way data is stored in it, and the difference from permanent storage memory	The Read-only memory (ROM). Programmable ROMs.	Theoretical lecture, discussions and dialogues	Quiz
3rd	2	Understanding programmable storage devices, ways to program them, and building circuits using them	Programmable Logic SPLDs and CPLDs, Altera CPLDs, Xilinx CPLDs. Macrocells.	Theoretical lecture, discussions and dialogues	Quiz
4th	2	Understand the internal structure of data storage cells	Programmable Logic: FPGAs Altera FPGAs, Xilinx FPGAs	Theoretical lecture, discussions and dialogues	Monthly exam
5th	2	Understand the basics of asynchronous sequential circuits	Asynchronous Sequential Circuits Asynchronous Behavior.	Theoretical lecture, discussions and dialogues	Quiz
6th	2	Understand methods of analyzing and measuring the outputs of asynchronous series circuits	Structure of Asynchronous Circuits, Analysis of Asynchronous Circuits. Derivative of Primitive Flow Table, Reduction of Primitive Flow Table.	Theoretical lecture, discussions and dialogues	Quiz
7th	2	Learn how to design asynchronous sequential circuits	Cycle and Races State Assignment Asynchronous Circuit Design.	Theoretical lecture, discussions and dialogues	Quiz
8th	Midterm Exam				
9th	2	Learn about a programming language used to define and design components of digital circuits	Main Features of VHDL Design Units.	Theoretical lecture and practical application	Discussions and dialogues
10th	2	Identify the basic units for designing digital components	Structural Modeling.	Theoretical lecture and practical application	Quiz and practical test
11th	2	Learn how to design components for VHDL	Data Flow Modeling. Behavioral Modeling.	Theoretical lecture and practical application	Quiz and practical test
12th	2	Learn to create programs for digital components and how to prepare them	Mixed Style Modeling. Concurrent vs Sequential	Theoretical lecture and practical application	Monthly exam
13th	2	Learn about data types and how to deal with them in VHDL	Data Objects, Data Types. Components and Packages	Theoretical lecture and practical application	Quiz and practical test
14th	2	Learn the basics of independent functions and how to call them	Functions and Procedures VHDL Simulation,	Theoretical lecture and practical application	Report
15th	2	Learn how to run programs, examine circuits, and analyze results	VHDL Synthesis.	Theoretical lecture and practical application	Monthly exam
Course Evaluation					
Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports etc 40 marks includes (assignments + daily tests + monthly tests + commitment to attendance + reports) 60 marks final exam					

Learning and Teaching Resources	
Required textbooks (curricular books, if any)	
Main references (sources)	Thomas L. Floyd (2015) “Digital Fundamentals”, 11th Edition, Pearson. https://bpcbirgunj.edu.np/wp-content/uploads/2019/10/DIGITAL_ELECTRONICS-by-Flyod.pdf
Recommended books and references (scientific journals, reports...)	Thomas L. Floyd and Jain, “Digital Fundamentals”, 8th edition, Pearson Education, 2006 M. Morris Mano, Michael D. (2013) “Digital Design With an Introduction to the Verilog HDL” 5th edition, Prentice Hall
Electronic References, Websites	https://github.com/stevenctang/CSE310/

Arabic Language

Course Name:					
Arabic Language					
Course Code:					
UR 227					
Semester / Year:					
Second semester/year 2024					
Description Preparation Date:					
12/2/2024					
Available Attendance Forms:					
In attendance					
Number of Credit Hours (Total) / Number of Units (Total)					
2 hours = 30 hours per semester					
Course administrator's name (mention all, if more than one name)					
Name: Dr. Anwar Qutaiba Yahya Email: anwar.q.yahya@aliraqia.edu.iq					
Course Objectives					
Course Objectives Know the Regulations of writing by extracting them from the text			Introducing the basic principles of the Arabic language through developing written, expression, and conversation skills The Arabic language is a means of communication. It carries a message between speakers. In order for this message to be clear and understandable, its vocabulary must be arranged according to the grammatical structure of that language. A message spoken or written in a way that differs from the grammatical pattern is unintelligible. Hence, the necessity of teaching grammar in all languages clearly emerged.		
Teaching and Learning Strategies					
Strategy		- The student acquires knowledge of the basic concepts of the Arabic language and their application through examples - The student learns about writing and expression skills and identifies errors to correct the correct pronunciation - Understanding the knowledge of writing the hamzah with the technical controls of writing by differentiating between them - Preserving the Arabic language as it is the language of the Holy Quran - Knowing how to write phonetic speech accurately in terms of correct or defective sounds - The student studies the topic of the number and learns how to write it correctly.			
Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
first	2 theoretical hours	A1, A2, A5 B1, B2, B3, C1, C2	Introduction to punctuation marks	The principle of cooperation in education	Oral questions (individual and group) Written test
Second	2 theoretical hours	A1, A2, A5 B1, B2, B3, C1, C2	Writing the hamza (the hamza of cutting and connecting)	The principle of cooperation in education	Oral questions (individual and group) Written test
Third	2 theoretical hours	A1, A2, A5 B1, B2, B3, C1, C2	Medium hamza and extreme hamza	The principle of cooperation in education	Oral questions (individual and group) Written test
Fourth	2 theoretical hours	A1, A2, A5 B1, B2, B3, C1, C2	Complements to writing controls (intention, intensity, duration)	The principle of cooperation in education	Oral questions (individual and group) Written test
Fifth	2 theoretical hours	A1, A2, A5 B1, B2, B3, C1, C2	The Number	The principle of cooperation in education	Oral questions (individual and group) Written test
Sixth	2 theoretical hours	A1, A2, A5 B1, B2, B3, C1, C2	Arabic calligraphy	The principle of cooperation in education	Oral questions (individual and group) Written test
		A1, A2, A5 B1,		The principle of cooperation in	Oral questions (individual and group)

Seventh	2 theoretical hours	B2, B3, C1, C2 A1, A2, A5 B1, B2, B3, C1, C2	Derivatives (participle, active participle, time and place names, god name) The verb and its types	education The principle of cooperation in education	Written test Oral questions (individual and group) Written test
Eighth	2 theoretical hours	A1, A2, A5 B1, B2, B3, C1, C2	the subject	The principle of cooperation in education	Oral questions (individual and group) Written test
Ninth	2 theoretical hours	A1, A2, A5 B1, B2, B3, C1, C2	object	The principle of cooperation in education	Oral questions (individual and group) Written test
The tenth	2 theoretical hours	A1, A2, A5 B1, B2, B3, C1, C2	Places of deletion of the hamzat al-wasl	The principle of cooperation in education	Oral questions (individual and group) Written test
eleventh	2 theoretical hours	A1, A2, A5 B1, B2, B3, C1, C2	The difference between the ta' and the ha'	The principle of cooperation in education	Oral questions (individual and group) Written test
Twelfth	2 theoretical hours	A1, A2, A5 B1, B2, B3, C1, C2	Al-Muthanna and Collect the Crushing		
Thirteenth	2 theoretical hours	A1, A2, A5 B1, B2, B3, C1, C2	The sound masculine plural and the sound feminine plural Practical lesson in vocabulary		
fourteenth	2 theoretical hours				

Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports etc

Learning and Teaching Resources

Required textbooks (curricular books, if any)	Explanation of Ibn Aqeel on Al-Fiyah by Ibn Malik, Explanation of Al-Ashmouni, Mughni Al-Labib by Ibn Hisham
Main references (sources)	Books on language, grammar, and morphology
Recommended books and references (scientific journals, reports...)	Mughni Al-Labib by Ibn Hisham, easy parsing in Arabic grammar, a collection of Arabic lessons, clear grammar, principles of Arabic grammar
Electronic References, Websites	Lisan Al-Arab website, Endowment Library

LEVEL THREE

Third Year / First Semester

Probability

1. Course Name: Probability					
2. Course Code: PROB300					
3. Semester / Academic Year: First Semester / 2025–2026					
4. Description Preparation Date: 1 October 2025					
5. Available Attendance Modes: In-person, classroom-based learning					
6. Total Credit Hours / Total Units					
2 hours per week / 30 classroom hours / 2 units					
7. Course Coordinator(s)					
Name: — Arwa Abdulmalik Abdulhameed					
Email: — Arwaabdulmalik.a@aliraqia.edu.iq					
8. Course Objectives					
This course introduces the foundations of probability and statistics required in computer engineering. Students learn counting principles, random variables, probability distributions, descriptive statistics, expectation, variance, covariance, and correlation, and apply these concepts to engineering and data-analysis problems.					Course Objectives
9. Teaching and Learning Strategies					
Cognitive Outcomes A1. Explain the fundamental concepts and terminology of the course. A2. Analyze engineering problems using the appropriate mathematical, algorithmic, or design methods. A3. Compare alternative techniques and evaluate their strengths, limitations, and fields of application. A4. Apply course concepts to realistic computer-engineering problems. Skill Outcomes B1. Use appropriate software tools, models, and analytical methods. B2. Develop accurate solutions and communicate the results clearly. B3. Diagnose errors, validate results, and improve the quality of the proposed solution. B4. Work independently and collaboratively in practical assignments and projects. Values C1. Demonstrate professional responsibility, accuracy, and academic integrity. C2. Participate effectively in teamwork and constructive technical discussion.					Strategy
10. Course Structure					
Course Structure: Academic Year 2025–2026					
Assessment Method	Teaching Method	Unit / Topic	Required Learning Outcomes	Hours	Week
In-class activities	In-class lecture and guided activities	Introduction to probability, samples, populations, and sample spaces	A1, B1	2 theoretical hours	Week 1
Class activities and homework	In-class lecture and guided activities	Counting principles, permutations, and combinations	A1, B1	2 theoretical hours	Week 2
In-class activities	In-class lecture and guided activities	Probability functions and types of random variables	A1, B1	2 theoretical hours	Week 3
In-class activities	In-class lecture and guided activities	Probability distributions, tables, and graphical representations	A2, B2, C2	2 theoretical hours	Week 4
Homework and guided exercises	In-class lecture and guided activities	Measures of central tendency	A2, B2, C2	2 theoretical hours	Week 5
Class activities and homework	In-class lecture and guided activities	Measures of central tendency and dispersion	A2, B2, C2	2 theoretical hours	Week 6
Mid-semester assessment	In-class lecture and guided activities	Relationships between measures of location and dispersion	A3, B3, C3	2 theoretical hours	Week 7
Quiz 1	In-class lecture and guided activities	Elementary and conditional probability	A3, B3, C3	2 theoretical hours	Week 8
Mid-semester examination	In-class lecture and guided activities	Mid-semester examination	A3, B3, C3	2 theoretical hours	Week 9
Homework and lecture questions	In-class lecture and guided activities	Expected value and variance	A3, B3, C3	2 theoretical hours	Week 10
Mid-semester assessment	In-class lecture and guided activities	Discrete probability distributions	A3, B3, C3	2 theoretical hours	Week 11
Quiz 2	In-class lecture and guided activities	Continuous probability distributions	A4, B4, C4	2 theoretical hours	Week 12
In-class activities	In-class lecture and guided activities	Joint probability functions	A4, B4, C4	2 theoretical hours	Week 13
Assignment and presentation	In-class lecture and guided activities	Joint expectation, covariance, and correlation	A4, B4, C4	2 theoretical hours	Week 14
Comprehensive review	In-class lecture and guided activities	Comprehensive review and semester examination	A4, B4, C4	2 theoretical hours	Week 15

Final examination	In-class lecture and guided activities	Final examination		3 hours	Week 16
11. Course Assessment					
The final grade is distributed over daily preparation and participation, short quizzes, homework, reports, practical assignments, monthly or semester examinations, and the final examination, in accordance with the approved departmental assessment plan.					
12. Learning and Teaching Resources					
Sheldon Ross, A First Course in Probability; Douglas C. Montgomery and George C. Runger, Applied Statistics and Probability for Engineers.			Required Textbooks		
Sheldon Ross, A First Course in Probability. Douglas C. Montgomery and George C. Runger, Applied Statistics and Probability for Engineers.			Main References		
Department-approved scientific journals, technical reports, and supplementary references.			Recommended Books and References (scientific journals, reports, etc.)		
Department-approved digital resources, scholarly databases, and relevant professional documentation.			Electronic References and Websites		

Control Systems

1. Course Name: Control Systems					
2. Course Code: CR-CE318					
3. Semester / Academic Year: First Semester / 2025–2026					
4. Description Preparation Date: 1 October 2025					
5. Available Attendance Modes: In-person, classroom-based learning					
6. Total Credit Hours / Total Units					
2 hours per week / 30 classroom hours / 2 units					
7. Course Coordinator(s)					
Name: —Ahmed Sabah Noori					
Email: — asabah22@gmail.com					
8. Course Objectives					
This course develops a systematic understanding of classical control systems. It covers transfer functions, block-diagram reduction, signal-flow graphs, feedback, transient and steady-state response, stability analysis, root-locus methods, and PID control. Students apply mathematical tools to model, analyze, and design control systems.					Course Objectives
9. Teaching and Learning Strategies					
Cognitive Outcomes A1. Explain the fundamental concepts and terminology of the course. A2. Analyze engineering problems using the appropriate mathematical, algorithmic, or design methods. A3. Compare alternative techniques and evaluate their strengths, limitations, and fields of application. A4. Apply course concepts to realistic computer-engineering problems. Skill Outcomes B1. Use appropriate software tools, models, and analytical methods. B2. Develop accurate solutions and communicate the results clearly. B3. Diagnose errors, validate results, and improve the quality of the proposed solution. B4. Work independently and collaboratively in practical assignments and projects. Values C1. Demonstrate professional responsibility, accuracy, and academic integrity. C2. Participate effectively in teamwork and constructive technical discussion.					Strategy
10. Course Structure					
Course Structure: Academic Year 2025–2026					
Assessment Method	Teaching Method	Unit / Topic	Required Learning Outcomes	Hours	Week
In-class activities	In-class lecture and guided activities	Introduction to controllers and control systems	A1, B1	2 theoretical hours	Week 1
Class activities and homework	In-class lecture and guided activities	Closed-loop systems	A1, B1	2 theoretical hours	Week 2
In-class activities	In-class lecture and guided activities	Transfer functions and block-diagram reduction	A1, B1	2 theoretical hours	Week 3
In-class activities	In-class lecture and guided activities	Feedback systems	A2, B2, C2	2 theoretical hours	Week 4
Homework and guided exercises	In-class lecture and guided activities	Linear systems and transfer functions: RLC circuits and DC motors	A2, B2, C2	2 theoretical hours	Week 5
Class activities and homework	In-class lecture and guided activities	Block-diagram representation	A2, B2, C2	2 theoretical hours	Week 6
Mid-semester assessment	In-class lecture and guided activities	Signal-flow graphs and Mason's gain formula	A3, B3, C3	2 theoretical hours	Week 7
Mid-semester examination	In-class lecture and guided activities	Mid-semester examination	A3, B3, C3	2 theoretical hours	Week 8
Questions and discussion	In-class lecture and guided activities	System stability and transient response	A3, B3, C3	2 theoretical hours	Week 9
Homework and lecture questions	In-class lecture and guided activities	Steady-state response and error	A3, B3, C3	2 theoretical hours	Week 10
Mid-semester assessment	In-class lecture and guided activities	Routh–Hurwitz stability criterion	A3, B3, C3	2 theoretical hours	Week 11
Quiz 2	In-class lecture and guided activities	State-transition matrix and system representation	A4, B4, C4	2 theoretical hours	Week 12
In-class activities	In-class lecture and guided activities	Root locus and pole–zero locations	A4, B4, C4	2 theoretical hours	Week 13
Assignment and presentation	In-class lecture and guided activities	Proportional–Integral–Derivative (PID) control	A4, B4, C4	2 theoretical hours	Week 14
Comprehensive review	In-class lecture and guided activities	Comprehensive review and semester examination	A4, B4, C4	2 theoretical hours	Week 15
Final examination	In-class lecture and guided activities	Final examination		3 hours	Week 16

11. Course Assessment

The final grade is distributed over daily preparation and participation, short quizzes, homework, reports, practical assignments, monthly or semester examinations, and the final examination, in accordance with the approved departmental assessment plan.

12. Learning and Teaching Resources

Norman S. Nise, Control Systems Engineering; Katsuhiko Ogata, Modern Control Engineering.	Required Textbooks
Norman S. Nise, Control Systems Engineering. Katsuhiko Ogata, Modern Control Engineering.	Main References
Department-approved scientific journals, technical reports, and supplementary references.	Recommended Books and References (scientific journals, reports, etc.)
Department-approved digital resources, scholarly databases, and relevant professional documentation.	Electronic References and Websites

Software Engineering

1. Course Name: Software Engineering					
2. Course Code: SOFT300					
3. Semester / Academic Year: First Semester / 2025–2026					
4. Description Preparation Date: 1 October 2025					
5. Available Attendance Modes: In-person, classroom-based learning					
6. Total Credit Hours / Total Units					
2 hours per week / 30 classroom hours / 2 units					
7. Course Coordinator(s)					
Name: — Sufyan Othman Zaben					
Email: — Sufyan.o.zaben@aliraqia.edu.iq					
8. Course Objectives					
This course introduces disciplined methods for developing reliable software systems. It covers software processes, project planning, requirements engineering, analysis and design, implementation, verification and validation, deployment, maintenance, and system modeling. Students learn to document requirements and use UML and related models to communicate designs.					Course Objectives
9. Teaching and Learning Strategies					
Cognitive Outcomes A1. Explain the fundamental concepts and terminology of the course. A2. Analyze engineering problems using the appropriate mathematical, algorithmic, or design methods. A3. Compare alternative techniques and evaluate their strengths, limitations, and fields of application. A4. Apply course concepts to realistic computer-engineering problems. Skill Outcomes B1. Use appropriate software tools, models, and analytical methods. B2. Develop accurate solutions and communicate the results clearly. B3. Diagnose errors, validate results, and improve the quality of the proposed solution. B4. Work independently and collaboratively in practical assignments and projects. Values C1. Demonstrate professional responsibility, accuracy, and academic integrity. C2. Participate effectively in teamwork and constructive technical discussion.					Strategy
10. Course Structure					
Course Structure: Academic Year 2025–2026					
Assessment Method	Teaching Method	Unit / Topic	Required Learning Outcomes	Hours	Week
In-class activities	In-class lecture and guided activities	Introduction to software development	A1, B1	2 theoretical hours	Week 1
Class activities and homework	In-class lecture and guided activities	Software project planning	A1, B1	2 theoretical hours	Week 2
In-class activities	In-class lecture and guided activities	Requirements engineering	A1, B1	2 theoretical hours	Week 3
In-class activities	In-class lecture and guided activities	Software design principles	A2, B2, C2	2 theoretical hours	Week 4
Homework and guided exercises	In-class lecture and guided activities	Implementation practices	A2, B2, C2	2 theoretical hours	Week 5
Class activities and homework	In-class lecture and guided activities	Acceptance, release, and deployment	A2, B2, C2	2 theoretical hours	Week 6
Mid-semester assessment	In-class lecture and guided activities	Operation and software maintenance	A3, B3, C3	2 theoretical hours	Week 7
Quiz 1	In-class lecture and guided activities	Software-process models	A3, B3, C3	2 theoretical hours	Week 8
Questions and discussion	In-class lecture and guided activities	Iterative refinement and evolutionary development I	A3, B3, C3	2 theoretical hours	Week 9
Homework and lecture questions	In-class lecture and guided activities	Iterative refinement and evolutionary development II	A3, B3, C3	2 theoretical hours	Week 10
Mid-semester assessment	In-class lecture and guided activities	Phased and incremental development	A3, B3, C3	2 theoretical hours	Week 11
Quiz 2	In-class lecture and guided activities	Requirements and specifications	A4, B4, C4	2 theoretical hours	Week 12
In-class activities	In-class lecture and guided activities	Requirements analysis and documentation across development models	A4, B4, C4	2 theoretical hours	Week 13
Assignment and presentation	In-class lecture and guided activities	Needs analysis, elicitation, and modeling techniques	A4, B4, C4	2 theoretical hours	Week 14
Comprehensive review	In-class lecture and guided activities	UML, data-flow models, and entity–relationship modeling	A4, B4, C4	2 theoretical hours	Week 15

Assignment and presentation	In-class lecture and guided activities	Needs analysis, elicitation, and modeling techniques	A4, B4, C4	2 theoretical hours	Week 14
Final examination	In-class lecture and guided activities	Final examination		3 hours	Week 16
11. Course Assessment					
The final grade is distributed over daily preparation and participation, short quizzes, homework, reports, practical assignments, monthly or semester examinations, and the final examination, in accordance with the approved departmental assessment plan.					
12. Learning and Teaching Resources					
Ian Sommerville, Software Engineering; Roger S. Pressman and Bruce R. Maxim, Software Engineering: A Practitioner's Approach.			Required Textbooks		
Ian Sommerville, Software Engineering. Roger S. Pressman and Bruce R. Maxim, Software Engineering: A Practitioner's Approach.			Main References		
Department-approved scientific journals, technical reports, and supplementary references.			Recommended Books and References (scientific journals, reports, etc.)		
Department-approved digital resources, scholarly databases, and relevant professional documentation.			Electronic References and Websites		

Operating Systems I

1. Course Name: Operating Systems I					
2. Course Code: CE312					
3. Semester / Academic Year: First Semester / 2025–2026					
4. Description Preparation Date: 1 October 2025					
5. Available Attendance Modes: In-person, classroom-based learning					
6. Total Credit Hours / Total Units					
2 hours per week / 30 classroom hours / 2 units					
7. Course Coordinator(s)					
Name: — Maad Kamal Al-Anni					
Email: — muad.rashed@aliraqia.edu.iq					
8. Course Objectives					
This course provides a foundation in operating-system concepts and structures. Students study operating-system services, system calls, processes and threads, interprocess communication, CPU scheduling, synchronization, memory management, protection, security, and system implementation. The course develops analytical skills for understanding how operating systems manage hardware and software resources.					Course Objectives
9. Teaching and Learning Strategies					
Cognitive Outcomes A1. Explain the fundamental concepts and terminology of the course. A2. Analyze engineering problems using the appropriate mathematical, algorithmic, or design methods. A3. Compare alternative techniques and evaluate their strengths, limitations, and fields of application. A4. Apply course concepts to realistic computer-engineering problems. Skill Outcomes B1. Use appropriate software tools, models, and analytical methods. B2. Develop accurate solutions and communicate the results clearly. B3. Diagnose errors, validate results, and improve the quality of the proposed solution. B4. Work independently and collaboratively in practical assignments and projects. Values C1. Demonstrate professional responsibility, accuracy, and academic integrity. C2. Participate effectively in teamwork and constructive technical discussion.					Strategy
10. Course Structure					
Course Structure: Academic Year 2025–2026					
Assessment Method	Teaching Method	Unit / Topic	Required Learning Outcomes	Hours	Week
In-class activities	In-class lecture and guided activities	Introduction to operating systems	A1, B1	2 theoretical hours	Week 1
Class activities and homework	In-class lecture and guided activities	Operating-system operations and resource management	A1, B1	2 theoretical hours	Week 2
In-class activities	In-class lecture and guided activities	Process, memory, and storage management	A1, B1	2 theoretical hours	Week 3
In-class activities	In-class lecture and guided activities	Protection, security, kernel data structures, and computing environments	A2, B2, C2	2 theoretical hours	Week 4
Homework and guided exercises	In-class lecture and guided activities	Operating-system services, user interfaces, system calls, and system programs	A2, B2, C2	2 theoretical hours	Week 5
Class activities and homework	In-class lecture and guided activities	Operating-system design, implementation, debugging, generation, and booting	A2, B2, C2	2 theoretical hours	Week 6
Mid-semester assessment	In-class lecture and guided activities	Process concepts and process scheduling	A3, B3, C3	2 theoretical hours	Week 7
Quiz 1	In-class lecture and guided activities	Process operations and interprocess communication	A3, B3, C3	2 theoretical hours	Week 8
Questions and discussion	In-class lecture and guided activities	IPC systems and client–server communication	A3, B3, C3	2 theoretical hours	Week 9
Mid-semester examination	In-class lecture and guided activities	Mid-semester examination	A3, B3, C3	2 theoretical hours	Week 10
Mid-semester assessment	In-class lecture and guided activities	CPU scheduling concepts and criteria	A3, B3, C3	2 theoretical hours	Week 11
Quiz 2	In-class lecture and guided activities	CPU-scheduling algorithms	A4, B4, C4	2 theoretical hours	Week 12
In-class activities	In-class lecture and guided activities	Thread scheduling and multiprocessor scheduling	A4, B4, C4	2 theoretical hours	Week 13
Assignment and presentation	In-class lecture and guided activities	Memory-management unit and address translation	A4, B4, C4	2 theoretical hours	Week 14
Comprehensive review	In-class lecture and guided activities	Scheduling algorithms: applications and comparative analysis	A4, B4, C4	2 theoretical hours	Week 15

Final examination	In-class lecture and guided activities	Final examination		3 hours	Week 16
The final grade is distributed over daily preparation and participation, short quizzes, homework, reports, practical assignments, monthly or semester examinations, and the final examination, in accordance with the approved departmental assessment plan.					
Abraham Silberschatz, Peter B. Galvin, and Greg Gagne, Operating System Concepts. Andrew S. Tanenbaum and Herbert Bos, Modern Operating Systems.			Main References		
			Recommended Books and References (scientific journals, reports, etc.)		
Department-approved digital resources, scholarly databases, and relevant professional documentation.			Electronic References and Websites		

Computer Architecture I

1. Course Name					
Computer Architecture I					
2. Course Code: COAR303					
COAR303					
3. Semester / Academic Year: First Semester / 2025–2026					
First Semester / 2025–2026					
4. Description Preparation Date: 1 October 2025					
1 October 2025					
5. Available Attendance Modes: In-person, classroom-based learning					
Attendance is mandatory.					
6. Total Credit Hours / Total Units					
2 hours per week / 30 classroom hours / 2 units					
7. Course Coordinator(s)					
Name: Hassib Dawood Anjas					
Email: hasseeb.azzawi@gmail.com					
8. Course Objectives					
This course introduces the organization and design of computer systems. It covers register-transfer operations, bus and memory transfers, arithmetic and logic units, instruction formats, control-unit design, the central processing unit, memory organization, reduced-instruction-set computing, and pipelining. Students develop the ability to analyze data movement and processing at the hardware level. Cognitive Outcomes A1. Explain the fundamental concepts and terminology of the course. A2. Analyze engineering problems using the appropriate mathematical, algorithmic, or design methods. A3. Compare alternative techniques and evaluate their strengths, limitations, and fields of application. A4. Apply course concepts to realistic computer-engineering problems. Skill Outcomes B1. Use appropriate software tools, models, and analytical methods. B2. Develop accurate solutions and communicate the results clearly. B3. Diagnose errors, validate results, and improve the quality of the proposed solution. B4. Work independently and collaboratively in practical assignments and projects. Values C1. Demonstrate professional responsibility, accuracy, and academic integrity. C2. Participate effectively in teamwork and constructive technical discussion.			Course Objectives		
9. Teaching and Learning Strategies					
					Strategy
Assessment Method	Teaching Method	Unit / Topic	Required Learning Outcomes	Hours	Week
In-class activities	In-class lecture and guided activities	Register-transfer operations and micro-operations	A1, B1	2 theoretical hours	Week 1
Class activities and homework	In-class lecture and guided activities	Bus and memory transfers	A1, B1	2 theoretical hours	Week 2
		In-class lecture and guided activities Arithmetic and logic unit organization	A1, B1	2 theoretical hours	Week 3
In-class activities	In-class lecture and guided activities	Basic computer organization and design	A2, B2, C2	2 theoretical hours	Week 4
Homework and guided exercises	In-class lecture and guided activities	Memory-reference instructions	A2, B2, C2	2 theoretical hours	Week 5
Class activities and homework	In-class lecture and guided activities	Complete instruction cycle and computer description	A2, B2, C2	2 theoretical hours	Week 6
Mid-semester assessment	In-class lecture and guided activities	Introduction to microprogrammed control	A3, B3, C3	2 theoretical hours	Week 7
Mid-semester examination	In-class lecture and guided activities	Mid-semester examination	A3, B3, C3	2 theoretical hours	Week 8
Questions and discussion	In-class lecture and guided activities	Instruction sequencing	A3, B3, C3	2 theoretical hours	Week 9
Homework and lecture questions	In-class lecture and guided activities	Central processing unit organization	A3, B3, C3	2 theoretical hours	Week 10

Mid-semester examination	In-class lecture and guided activities	Mid-semester examination	A3, B3, C3	2 theoretical hours	Week 8
Mid-semester assessment	In-class lecture and guided activities	General register organization	A3, B3, C3	2 theoretical hours	Week 11
Quiz 2	In-class lecture and guided activities	Data-transfer and manipulation instructions	A4, B4, C4	2 theoretical hours	Week 12
In-class activities	In-class lecture and guided activities	Reduced Instruction Set Computer (RISC) architecture	A4, B4, C4	2 theoretical hours	Week 13
Assignment and presentation	In-class lecture and guided activities	Instruction pipelining	A4, B4, C4	2 theoretical hours	Week 14
Comprehensive review	In-class lecture and guided activities	Practical exercises, tests, and comprehensive review	A4, B4, C4	2 theoretical hours	Week 15

11. Course Assessment

The final grade is distributed over daily preparation and participation, short quizzes, homework, reports, practical assignments, monthly or semester examinations, and the final examination, in accordance with the approved departmental assessment plan.

12. Learning and Teaching Resources

M. Morris Mano, Computer System Architecture. David A. Patterson and John L. Hennessy, Computer Organization and Design.	Required Textbooks
M. Morris Mano, Computer System Architecture. David A. Patterson and John L. Hennessy, Computer Organization and Design.	Main References
Department-approved scientific journals, technical reports, and supplementary references.	Recommended Books and References (scientific journals, reports, etc.)
Department-approved digital resources, scholarly databases, and relevant professional documentation.	Electronic References and Websites

Signals and Systems

1. Course Name: Signals and Systems

2. Course Code: SISY302

3. Semester / Academic Year: First Semester / 2025–2026

4. Description Preparation Date: 1 October 2025

5. Available Attendance Modes: In-person, classroom-based learning

6. Total Credit Hours / Total Units

2 hours per week / 30 classroom hours / 2 units

7. Course Coordinator(s)

Name: — Safa Abood Nama

Email: — Safa.a.nama@aliraqia.edu.iq

8. Course Objectives

This course develops the mathematical foundations needed to analyze continuous-time signals and linear time-invariant systems. Topics include signal classification and operations, system properties, convolution, Fourier-series and Fourier-transform methods, Laplace transforms, frequency response, and introductory filter analysis and design.

Course
Objectives

9. Teaching and Learning Strategies

Cognitive Outcomes

A1. Explain the fundamental concepts and terminology of the course.

A2. Analyze engineering problems using the appropriate mathematical, algorithmic, or design methods.

A3. Compare alternative techniques and evaluate their strengths, limitations, and fields of application.

A4. Apply course concepts to realistic computer-engineering problems.

Skill Outcomes

B1. Use appropriate software tools, models, and analytical methods.

B2. Develop accurate solutions and communicate the results clearly.

B3. Diagnose errors, validate results, and improve the quality of the proposed solution.

B4. Work independently and collaboratively in practical assignments and projects.

Strategy

Values

C1. Demonstrate professional responsibility, accuracy, and academic integrity.

C2. Participate effectively in teamwork and constructive technical discussion.

10. Course Structure

Course Structure: Academic Year 2025–2026

Assessment Method	Teaching Method	Unit / Topic	Required Learning Outcomes	Hours	Week
In-class activities	In-class lecture and guided activities	Fundamental concepts of signals and systems	A1, B1	2 theoretical hours	Week 1
Class activities and homework	In-class lecture and guided activities	Signal classification	A1, B1	2 theoretical hours	Week 2
In-class activities	In-class lecture and guided activities	Operations on signals	A1, B1	2 theoretical hours	Week 3
In-class activities	In-class lecture and guided activities	Systems, system classification, and interconnection	A2, B2, C2	2 theoretical hours	Week 4
Homework and guided exercises	In-class lecture and guided activities	Linear time-invariant systems	A2, B2, C2	2 theoretical hours	Week 5
Class activities and homework	In-class lecture and guided activities	Properties of continuous-time LTI systems	A2, B2, C2	2 theoretical hours	Week 6
Mid-semester examination	In-class lecture and guided activities	Mid-semester examination	A3, B3, C3	2 theoretical hours	Week 7
Quiz 1	In-class lecture and guided activities	Signal convolution using the integral method	A3, B3, C3	2 theoretical hours	Week 8
Questions and discussion	In-class lecture and guided activities	Introduction to the Fourier transform	A3, B3, C3	2 theoretical hours	Week 9
Homework and lecture questions	In-class lecture and guided activities	Laplace transform	A3, B3, C3	2 theoretical hours	Week 10
Mid-semester assessment	In-class lecture and guided activities	Filter analysis	A3, B3, C3	2 theoretical hours	Week 11

Quiz 2	In-class lecture and guided activities	FIR and IIR filter analysis and design	A4, B4, C4	2 theoretical hours	Week 12
In-class activities	In-class lecture and guided activities	Frequency-response analysis and design	A4, B4, C4	2 theoretical hours	Week 13
Assignment and presentation	In-class lecture and guided activities	IIR filter design using analog Butterworth prototypes	A4, B4, C4	2 theoretical hours	Week 14
Comprehensive review	In-class lecture and guided activities	IIR filter design using analog Chebyshev prototypes	A4, B4, C4	2 theoretical hours	Week 15
Final examination	In-class lecture and guided activities	Final examination		3 hours	Week 16

Quiz 2	In-class lecture and guided activities	FIR and IIR filter analysis and design	A4, B4, C4	2 theoretical hours	Week 12
11. Course Assessment					
The final grade is distributed over daily preparation and participation, short quizzes, homework, reports, practical assignments, monthly or semester examinations, and the final examination, in accordance with the approved departmental assessment plan.					
12. Learning and Teaching Resources					
- Alan V. Oppenheim, Signals & Systems 2 Edition, Pearson Education, 2008. - Signals and Systems, Simon Haykin and Ba Van Veen, 2nd edition, Wiley 2005.			Required Textbooks		
Alan V. Oppenheim, Alan S. Willsky, and S. Hamid Nawab, Signals and Systems. Simon Haykin and Barry Van Veen, Signals and Systems.			Main References		
Department-approved scientific journals, technical reports, and supplementary references.			Recommended Books and References (scientific journals, reports, etc.)		
Department-approved digital resources, scholarly databases, and relevant professional documentation.			Electronic References and Websites		

Computer Graphics

1. Course Name: Computer Graphics					
2. Course Code: CR-CE314					
3. Semester / Academic Year: First Semester / 2025–2026					
4. Description Preparation Date: 1 October 2025					
5. Available Attendance Modes: In-person, classroom-based learning					
6. Total Credit Hours / Total Units					
2 hours per week / 30 classroom hours / 2 units					
7. Course Coordinator(s)					
Name: — Abrar Ghaleb Mahmood					
Email: — abrar.g.mahmood@aliraqia.edu.iq					
8. Course Objectives					
This course introduces the principles, algorithms, and technologies of computer graphics. It covers interactive and non-interactive graphics, raster and vector displays, display technologies, line and circle generation, geometric transformations, viewing, clipping, and programming techniques used to create and manipulate two-dimensional graphics.					Course Objectives
9. Teaching and Learning Strategies					
Cognitive Outcomes A1. Explain the fundamental concepts and terminology of the course. A2. Analyze engineering problems using the appropriate mathematical, algorithmic, or design methods. A3. Compare alternative techniques and evaluate their strengths, limitations, and fields of application. A4. Apply course concepts to realistic computer-engineering problems. Skill Outcomes B1. Use appropriate software tools, models, and analytical methods. B2. Develop accurate solutions and communicate the results clearly. B3. Diagnose errors, validate results, and improve the quality of the proposed solution. B4. Work independently and collaboratively in practical assignments and projects. Values C1. Demonstrate professional responsibility, accuracy, and academic integrity. C2. Participate effectively in teamwork and constructive technical discussion.					Strategy
10. Course Structure					
Course Structure: Academic Year 2025–2026					
Assessment Method	Teaching Method	Unit / Topic	Required Learning Outcomes	Hours	Week
In-class activities	In-class lecture and guided activities	Introduction and applications of computer graphics	A1, B1	2 theoretical hours	Week 1
Class activities and homework	In-class lecture and guided activities	Interactive and non-interactive graphics systems	A1, B1	2 theoretical hours	Week 2
In-class activities	In-class lecture and guided activities	Vector graphics versus raster graphics	A1, B1	2 theoretical hours	Week 3
In-class activities	In-class lecture and guided activities	Graphics display systems	A2, B2, C2	2 theoretical hours	Week 4
Homework and guided exercises	In-class lecture and guided activities	Display technologies and graphics hardware	A2, B2, C2	2 theoretical hours	Week 5
Class activities and homework	In-class lecture and guided activities	Random-scan displays	A2, B2, C2	2 theoretical hours	Week 6
Mid-semester assessment	In-class lecture and guided activities	Raster-scan displays	A3, B3, C3	2 theoretical hours	Week 7
Quiz 1	In-class lecture and guided activities	Direct-view storage-tube displays	A3, B3, C3	2 theoretical hours	Week 8
Questions and discussion	In-class lecture and guided activities	Plasma-panel displays	A3, B3, C3	2 theoretical hours	Week 9
Homework and lecture questions	In-class lecture and guided activities	Liquid-crystal displays	A3, B3, C3	2 theoretical hours	Week 10
Mid-semester assessment	In-class lecture and guided activities	Vector graphics representation	A3, B3, C3	2 theoretical hours	Week 11
Quiz 2	In-class lecture and guided activities	Line-generation methods	A4, B4, C4	2 theoretical hours	Week 12
In-class activities	In-class lecture and guided activities	Digital Differential Analyzer (DDA) algorithm	A4, B4, C4	2 theoretical hours	Week 13
Assignment and presentation	In-class lecture and guided activities	Circle-generation algorithms	A4, B4, C4	2 theoretical hours	Week 14
Comprehensive review	In-class lecture and guided activities	Bresenham line-generation algorithm	A4, B4, C4	2 theoretical hours	Week 15
Final examination	In-class lecture and guided activities	Final examination		3 hours	Week 16

11. Course Assessment

The final grade is distributed over daily preparation and participation, short quizzes, homework, reports, practical assignments, monthly or semester examinations, and the final examination, in accordance with the approved departmental assessment plan.

12. Learning and Teaching Resources

Donald Hearn, M. Pauline Baker, and Warren Carithers, Computer Graphics with OpenGL; John F. Hughes et al., Computer Graphics: Principles and Practice.	Required Textbooks
Donald Hearn, M. Pauline Baker, and Warren Carithers, Computer Graphics with OpenGL. John F. Hughes et al., Computer Graphics: Principles and Practice.	Main References
Department-approved scientific journals, technical reports, and supplementary references.	Recommended Books and References (scientific journals, reports, etc.)
Department-approved digital resources, scholarly databases, and relevant professional documentation.	Electronic References and Websites

Database Systems

1. Course Name: Database Systems					
2. Course Code: DASY310					
3. Semester / Academic Year: First Semester / 2025–2026					
4. Description Preparation Date: 1 October 2025					
5. Available Attendance Modes: In-person, classroom-based learning					
6. Total Credit Hours / Total Units					
2 hours per week / 30 classroom hours / 2 units					
7. Course Coordinator(s)					
Name: — Sufyan Othman Zaben					
Email: — Sufyan.o.zaben@aliraqia.edu.iq					
8. Course Objectives					
This course provides a comprehensive introduction to database systems. Students study data models, relational database design, entity–relationship modeling, SQL data definition and manipulation, functional dependencies, normalization, transaction management, concurrency control, security, indexing, query processing, and emerging database technologies.					Course Objectives
9. Teaching and Learning Strategies					
Cognitive Outcomes A1. Explain the fundamental concepts and terminology of the course. A2. Analyze engineering problems using the appropriate mathematical, algorithmic, or design methods. A3. Compare alternative techniques and evaluate their strengths, limitations, and fields of application. A4. Apply course concepts to realistic computer-engineering problems. Skill Outcomes B1. Use appropriate software tools, models, and analytical methods. B2. Develop accurate solutions and communicate the results clearly. B3. Diagnose errors, validate results, and improve the quality of the proposed solution. B4. Work independently and collaboratively in practical assignments and projects. Values C1. Demonstrate professional responsibility, accuracy, and academic integrity. C2. Participate effectively in teamwork and constructive technical discussion.					Strategy
10. Course Structure					
Course Structure: Academic Year 2025–2026					
Assessment Method	Teaching Method	Unit / Topic	Required Learning Outcomes	Hours	Week
In-class activities	In-class lecture and guided activities	Database systems: role, evolution, file systems, and DBMS concepts	A1, B1	2 theoretical hours	Week 1
Class activities and homework	In-class lecture and guided activities	Relational data model, entity–relationship modeling, normalization, and SQL DDL	A1, B1	2 theoretical hours	Week 2
In-class activities	In-class lecture and guided activities	SQL data manipulation, retrieval, joins, and aggregation	A1, B1	2 theoretical hours	Week 3
In-class activities	In-class lecture and guided activities	Database architecture and contemporary database applications	A2, B2, C2	2 theoretical hours	Week 4
Homework and guided exercises	In-class lecture and guided activities	Relational algebra and introductory SQL practice	A2, B2, C2	2 theoretical hours	Week 5
Class activities and homework	In-class lecture and guided activities	Advanced SQL queries and data manipulation	A2, B2, C2	2 theoretical hours	Week 6
Mid-semester examination	In-class lecture and guided activities	Mid-semester practical review	A3, B3, C3	2 theoretical hours	Week 7
Quiz 1	In-class lecture and guided activities	Functional dependencies, normalization, and E–R-to-relational mapping	A3, B3, C3	2 theoretical hours	Week 8
Questions and discussion	In-class lecture and guided activities	Physical database design, transactions, concurrency, integrity, and security	A3, B3, C3	2 theoretical hours	Week 9
Homework and lecture questions	In-class lecture and guided activities	Query processing, cost-based optimization, and indexing	A3, B3, C3	2 theoretical hours	Week 10
Mid-semester assessment	In-class lecture and guided activities	Object-relational databases, NoSQL, big data, and emerging trends	A3, B3, C3	2 theoretical hours	Week 11
Quiz 2	In-class lecture and guided activities	Advanced normalization and schema design	A4, B4, C4	2 theoretical hours	Week 12
In-class activities	In-class lecture and guided activities	Transaction management, concurrency control, and recovery	A4, B4, C4	2 theoretical hours	Week 13
Assignment and presentation	In-class lecture and guided activities	Query optimization and index-performance analysis	A4, B4, C4	2 theoretical hours	Week 14

Comprehensive review	In-class lecture and guided activities	Database project implementation, presentation, and comprehensive review	A4, B4, C4	2 theoretical hours	Week 15
Final examination	In-class lecture and guided activities	Final examination		3 hours	Week 16
11. Course Assessment					
The final grade is distributed over daily preparation and participation, short quizzes, homework, reports, practical assignments, monthly or semester examinations, and the final examination, in accordance with the approved departmental assessment plan.					
12. Learning and Teaching Resources					
Ramez Elmasri and Shamkant B. Navathe, Fundamentals of Database Systems; Abraham Silberschatz, Henry F. Korth, and S. Sudarshan, Database System Concepts.			Required Textbooks		
Ramez Elmasri and Shamkant B. Navathe, Fundamentals of Database Systems. Abraham Silberschatz, Henry F. Korth, and S. Sudarshan, Database System Concepts.			Main References		
Department-approved scientific journals, technical reports, and supplementary references.			Recommended Books and References (scientific journals, reports, etc.)		
Department-approved digital resources, scholarly databases, and relevant professional documentation.			Electronic References and Websites		

Third Year / Second Semester

Numerical Analysis

1. Course Name: Numerical Analysis					
2. Course Code: NUAN306					
3. Semester / Academic Year: Second Semester / 2025–2026					
4. Description Preparation Date: 1 October 2025					
5. Available Attendance Modes: In-person, classroom-based learning					
6. Total Credit Hours / Total Units					
2 hours per week / 30 classroom hours / 2 units					
7. Course Coordinator(s)					
Name: — Arwa Abdulmalik Abdulhameed					
Email: — Arwaabdulmalik.a@aliraqia.edu.iq					
8. Course Objectives					
This course equips students with numerical methods for solving engineering and mathematical problems that are difficult or impossible to solve analytically. Topics include error analysis, root finding, interpolation, curve fitting, numerical differentiation and integration, systems of equations, optimization, and numerical solutions of initial-value problems.					Course Objectives
9. Teaching and Learning Strategies					
Cognitive Outcomes A1. Explain the fundamental concepts and terminology of the course. A2. Analyze engineering problems using the appropriate mathematical, algorithmic, or design methods. A3. Compare alternative techniques and evaluate their strengths, limitations, and fields of application. A4. Apply course concepts to realistic computer-engineering problems. Skill Outcomes B1. Use appropriate software tools, models, and analytical methods. B2. Develop accurate solutions and communicate the results clearly. B3. Diagnose errors, validate results, and improve the quality of the proposed solution. B4. Work independently and collaboratively in practical assignments and projects. Values C1. Demonstrate professional responsibility, accuracy, and academic integrity. C2. Participate effectively in teamwork and constructive technical discussion.					Strategy
10. Course Structure					
Course Structure: Academic Year 2025–2026					
Assessment Method	Teaching Method	Unit / Topic	Required Learning Outcomes	Hours	Week
In-class activities	In-class lecture and guided activities	Introduction to numerical analysis, functions, and error types	A1, B1	2 theoretical hours	Week 1
Class activities and homework	In-class lecture and guided activities	Roots of nonlinear equations: bisection method	A1, B1	2 theoretical hours	Week 2
In-class activities	In-class lecture and guided activities	Roots of nonlinear equations: false-position method	A1, B1	2 theoretical hours	Week 3
In-class activities	In-class lecture and guided activities	Roots of nonlinear equations: Newton–Raphson method	A2, B2, C2	2 theoretical hours	Week 4
Homework and guided exercises	In-class lecture and guided activities	Roots of nonlinear equations: fixed-point and secant methods	A2, B2, C2	2 theoretical hours	Week 5
Class activities and homework	In-class lecture and guided activities	Least-squares curve fitting	A2, B2, C2	2 theoretical hours	Week 6
Mid-semester assessment	In-class lecture and guided activities	Polynomial interpolation I	A3, B3, C3	2 theoretical hours	Week 7
Quiz 1	In-class lecture and guided activities	Polynomial interpolation II	A3, B3, C3	2 theoretical hours	Week 8
Questions and discussion	In-class lecture and guided activities	Numerical approximation and extrapolation	A3, B3, C3	2 theoretical hours	Week 9
Mid-semester examination	In-class lecture and guided activities	Mid-semester examination	A3, B3, C3	2 theoretical hours	Week 10
Mid-semester assessment	In-class lecture and guided activities	Numerical differentiation	A3, B3, C3	2 theoretical hours	Week 11
Quiz 2	In-class lecture and guided activities	Numerical integration	A4, B4, C4	2 theoretical hours	Week 12
In-class activities	In-class lecture and guided activities	Initial-value problems using Euler's method	A4, B4, C4	2 theoretical hours	Week 13
Assignment and presentation	In-class lecture and guided activities	Initial-value problems using Runge–Kutta methods	A4, B4, C4	2 theoretical hours	Week 14
Comprehensive review	In-class lecture and guided activities	Comprehensive review	A4, B4, C4	2 theoretical hours	Week 15

Final examination	In-class lecture and guided activities	Final examination		3 hours	Week 16
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11. Course Assessment

The final grade is distributed over daily preparation and participation, short quizzes, homework, reports, practical assignments, monthly or semester examinations, and the final examination, in accordance with the approved departmental assessment plan.

12. Learning and Teaching Resources

Steven C. Chapra and Raymond P. Canale, Numerical Methods for Engineers; Erwin Kreyszig, Advanced Engineering Mathematics.	Required Textbooks
Steven C. Chapra and Raymond P. Canale, Numerical Methods for Engineers. Erwin Kreyszig, Advanced Engineering Mathematics.	Main References
Department-approved scientific journals, technical reports, and supplementary references.	Recommended Books and References (scientific journals, reports, etc.)
Department-approved digital resources, scholarly databases, and relevant professional documentation.	Electronic References and Websites

Digital Control Systems

1. Course Name: Digital Control Systems

2. Course Code: CR-CE328

3. Semester / Academic Year: Second Semester / 2025–2026

4. Description Preparation Date: 1 October 2025

5. Available Attendance Modes: In-person, classroom-based learning

6. Total Credit Hours / Total Units

2 hours per week / 30 classroom hours / 2 units

7. Course Coordinator(s)

Name: — Ahmed Sabah Noori

Email: — asabah22@gmail.com

8. Course Objectives

This course examines the analysis and design of control systems implemented using digital techniques. Students study sampling, the Z-transform, discrete-time state-space models, system identification, digital implementation of analog controllers, sampled-data systems, stability tests, and performance evaluation.

Course
Objectives

9. Teaching and Learning Strategies

Cognitive Outcomes

A1. Explain the fundamental concepts and terminology of the course.

A2. Analyze engineering problems using the appropriate mathematical, algorithmic, or design methods.

A3. Compare alternative techniques and evaluate their strengths, limitations, and fields of application.

A4. Apply course concepts to realistic computer-engineering problems.

Skill Outcomes

B1. Use appropriate software tools, models, and analytical methods.

B2. Develop accurate solutions and communicate the results clearly.

B3. Diagnose errors, validate results, and improve the quality of the proposed solution.

B4. Work independently and collaboratively in practical assignments and projects.

Strategy

Values

C1. Demonstrate professional responsibility, accuracy, and academic integrity.

C2. Participate effectively in teamwork and constructive technical discussion.

10. Course Structure

Course Structure: Academic Year 2025–2026

Assessment Method	Teaching Method	Unit / Topic	Required Learning Outcomes	Hours	Week
In-class activities	In-class lecture and guided activities	Introduction to digital control systems	A1, B1	2 theoretical hours	Week 1
Class activities and homework	In-class lecture and guided activities	Review of the Z-transform	A1, B1	2 theoretical hours	Week 2
In-class activities	In-class lecture and guided activities	Discrete-time state-space models and stability tests	A1, B1	2 theoretical hours	Week 3
In-class activities	In-class lecture and guided activities	Linear systems and transfer functions: DC-motor model	A2, B2, C2	2 theoretical hours	Week 4
Homework and guided exercises	In-class lecture and guided activities	Closed-loop transfer function in the Z-domain	A2, B2, C2	2 theoretical hours	Week 5
Class activities and homework	In-class lecture and guided activities	Digital implementation of analog controllers	A2, B2, C2	2 theoretical hours	Week 6
Mid-semester assessment	In-class lecture and guided activities	Digital control-system fundamentals	A3, B3, C3	2 theoretical hours	Week 7
Mid-semester examination	In-class lecture and guided activities	Mid-semester examination	A3, B3, C3	2 theoretical hours	Week 8
Questions and discussion	In-class lecture and guided activities	Modeling digital control systems: ADC, DAC, and zero-order hold	A3, B3, C3	2 theoretical hours	Week 9

Homework and lecture questions	In-class lecture and guided activities	Design of sampled-data control systems	A3, B3, C3	2 theoretical hours	Week 10
Mid-semester assessment	In-class lecture and guided activities	Jury stability test	A3, B3, C3	2 theoretical hours	Week 11
Quiz 2	In-class lecture and guided activities	Nyquist stability analysis	A4, B4, C4	2 theoretical hours	Week 12
In-class activities	In-class lecture and guided activities	Performance measures: overshoot, peak time, rise time, and settling time	A4, B4, C4	2 theoretical hours	Week 13
Assignment and presentation	In-class lecture and guided activities	Asymptotic stability conditions	A4, B4, C4	2 theoretical hours	Week 14
Comprehensive review	In-class lecture and guided activities	BIBO stability and internal stability	A4, B4, C4	2 theoretical hours	Week 15
Final examination	In-class lecture and guided activities	Final examination		3 hours	Week 16

Homework and lecture questions	In-class lecture and guided activities	Design of sampled-data control systems	A3, B3, C3	2 theoretical hours	Week 10
11. Course Assessment					
The final grade is distributed over daily preparation and participation, short quizzes, homework, reports, practical assignments, monthly or semester examinations, and the final examination, in accordance with the approved departmental assessment plan.					
12. Learning and Teaching Resources					
Katsuhiko Ogata, Discrete-Time Control Systems; Benjamin C. Kuo, Digital Control Systems.			Required Textbooks		
Katsuhiko Ogata, Discrete-Time Control Systems. Benjamin C. Kuo, Digital Control Systems.			Main References		
Department-approved scientific journals, technical reports, and supplementary references.			Recommended Books and References (scientific journals, reports, etc.)		
Department-approved digital resources, scholarly databases, and relevant professional documentation.			Electronic References and Websites		

Distributed Database Systems

1. Course Name: Distributed Database Systems					
2. Course Code: CR-CE327					
3. Semester / Academic Year: Second Semester / 2025–2026					
4. Description Preparation Date: 1 October 2025					
5. Available Attendance Modes: In-person, classroom-based learning					
6. Total Credit Hours / Total Units					
2 hours per week / 30 classroom hours / 2 units					
7. Course Coordinator(s)					
Name: — Wasseem N. Ibrahim Al-Obaydy Email: — wasseem.nahi@aliraqia.edu.iq					
8. Course Objectives					
This course develops an understanding of distributed data management and the design of database systems whose data and processing are distributed across multiple sites. It covers distributed architectures, fragmentation, replication, transparency, query processing and optimization, distributed transactions, concurrency control, recovery, security, and performance monitoring.					Course Objectives
9. Teaching and Learning Strategies					
Cognitive Outcomes A1. Explain the fundamental concepts and terminology of the course. A2. Analyze engineering problems using the appropriate mathematical, algorithmic, or design methods. A3. Compare alternative techniques and evaluate their strengths, limitations, and fields of application. A4. Apply course concepts to realistic computer-engineering problems. Skill Outcomes B1. Use appropriate software tools, models, and analytical methods. B2. Develop accurate solutions and communicate the results clearly. B3. Diagnose errors, validate results, and improve the quality of the proposed solution. B4. Work independently and collaboratively in practical assignments and projects. Values C1. Demonstrate professional responsibility, accuracy, and academic integrity. C2. Participate effectively in teamwork and constructive technical discussion.					Strategy
10. Course Structure					
Course Structure: Academic Year 2025–2026					
Assessment Method	Teaching Method	Unit / Topic	Required Learning Outcomes	Hours	Week
In-class activities	In-class lecture and guided activities	Introduction to distributed data, algorithms, and data structures	A1, B1	2 theoretical hours	Week 1
Class activities and homework	In-class lecture and guided activities	Overview and analysis of distributed database architectures	A1, B1	2 theoretical hours	Week 2
In-class activities	In-class lecture and guided activities	Data partitioning and distribution strategies	A1, B1	2 theoretical hours	Week 3
In-class activities	In-class lecture and guided activities	Fragmentation, allocation, and localization	A2, B2, C2	2 theoretical hours	Week 4
Homework and guided exercises	In-class lecture and guided activities	Queues and linked structures in distributed data applications	A2, B2, C2	2 theoretical hours	Week 5
Class activities and homework	In-class lecture and guided activities	Data skew and load distribution	A2, B2, C2	2 theoretical hours	Week 6
Mid-semester examination	In-class lecture and guided activities	Mid-semester examination	A3, B3, C3	2 theoretical hours	Week 7
Quiz 1	In-class lecture and guided activities	Design of distributed database networks	A3, B3, C3	2 theoretical hours	Week 8
Questions and discussion	In-class lecture and guided activities	Hashing, hash functions, and distributed storage	A3, B3, C3	2 theoretical hours	Week 9
Homework and lecture questions	In-class lecture and guided activities	Homogeneous and heterogeneous distributed systems	A3, B3, C3	2 theoretical hours	Week 10
Mid-semester assessment	In-class lecture and guided activities	Priority queues and heap structures in distributed applications	A3, B3, C3	2 theoretical hours	Week 11
Quiz 2	In-class lecture and guided activities	Monthly examination	A4, B4, C4	2 theoretical hours	Week 12
In-class activities	In-class lecture and guided activities	Sorting and data-organization techniques	A4, B4, C4	2 theoretical hours	Week 13
Assignment and presentation	In-class lecture and guided activities	Types and architectures of distributed DBMSs	A4, B4, C4	2 theoretical hours	Week 14
Comprehensive review	In-class lecture and guided activities	Practical exercises, examinations, and comprehensive review	A4, B4, C4	2 theoretical hours	Week 15

Mid-semester assessment	In-class lecture and guided activities	Priority queues and heap structures in distributed applications	A3, B3, C3	2 theoretical hours	Week 11
Final examination	In-class lecture and guided activities	Final examination		3 hours	Week 16
11. Course Assessment					
The final grade is distributed over daily preparation and participation, short quizzes, homework, reports, practical assignments, monthly or semester examinations, and the final examination, in accordance with the approved departmental assessment plan.					
12. Learning and Teaching Resources					
M. Tamer Özsu and Patrick Valduriez, Principles of Distributed Database Systems; Stefano Ceri and Giuseppe Pelagatti, Distributed Databases: Principles and Systems.			Required Textbooks		
M. Tamer Özsu and Patrick Valduriez, Principles of Distributed Database Systems. Stefano Ceri and Giuseppe Pelagatti, Distributed Databases: Principles and Systems.			Main References		
Department-approved scientific journals, technical reports, and supplementary references.			Recommended Books and References (scientific journals, reports, etc.)		
Department-approved digital resources, scholarly databases, and relevant professional documentation.			Electronic References and Websites		

Operating Systems I

1. Course Name: Operating Systems II

2. Course Code: CR-CE326

3. Semester / Academic Year: Second Semester / 2025–2026

4. Description Preparation Date: 1 October 2025

5. Available Attendance Modes: In-person, classroom-based learning

6. Total Credit Hours / Total Units

2 hours per week / 30 classroom hours / 2 units

7. Course Coordinator(s)

Name: — Maad Kamal Al-Anni

Email: — muad.rashed@aliraqia.edu.iq

8. Course Objectives

This advanced course focuses on virtual memory, mass-storage management, deadlocks, file-system interfaces and implementation, allocation methods, free-space management, recovery, network file systems, and system performance. Students develop practical problem-solving skills for complex operating-system design and implementation issues.

Course
Objectives

9. Teaching and Learning Strategies

Cognitive Outcomes

A1. Explain the fundamental concepts and terminology of the course.

A2. Analyze engineering problems using the appropriate mathematical, algorithmic, or design methods.

A3. Compare alternative techniques and evaluate their strengths, limitations, and fields of application.

A4. Apply course concepts to realistic computer-engineering problems.

Skill Outcomes

B1. Use appropriate software tools, models, and analytical methods.

B2. Develop accurate solutions and communicate the results clearly.

B3. Diagnose errors, validate results, and improve the quality of the proposed solution.

B4. Work independently and collaboratively in practical assignments and projects.

Strategy

Values

C1. Demonstrate professional responsibility, accuracy, and academic integrity.

C2. Participate effectively in teamwork and constructive technical discussion.

10. Course Structure

Course Structure: Academic Year 2025–2026

Assessment Method	Teaching Method	Unit / Topic	Required Learning Outcomes	Hours	Week
In-class activities	In-class lecture and guided activities	Virtual memory, demand paging, copy-on-write, page replacement, frame allocation, and thrashing	A1, B1	2 theoretical hours	Week 1
Class activities and homework	In-class lecture and guided activities	Memory-mapped files, kernel-memory allocation, and operating-system examples	A1, B1	2 theoretical hours	Week 2
In-class activities	In-class lecture and guided activities	Mass-storage systems, disk structure, and disk attachment	A1, B1	2 theoretical hours	Week 3
In-class activities	In-class lecture and guided activities	Disk scheduling and disk management	A2, B2, C2	2 theoretical hours	Week 4
Homework and guided exercises	In-class lecture and guided activities	Swap-space management, RAID structures, and stable storage	A2, B2, C2	2 theoretical hours	Week 5
Class activities and homework	In-class lecture and guided activities	Deadlock characterization, prevention, and handling methods	A2, B2, C2	2 theoretical hours	Week 6
Mid-semester assessment	In-class lecture and guided activities	Deadlock avoidance, detection, and recovery	A3, B3, C3	2 theoretical hours	Week 7
Quiz 1	In-class lecture and guided activities	Virtual-memory applications and page-replacement review	A3, B3, C3	2 theoretical hours	Week 8
Questions and discussion	In-class lecture and guided activities	File-system interface: file concepts, access methods, and directory structures	A3, B3, C3	2 theoretical hours	Week 9
Homework and lecture questions	In-class lecture and guided activities	File-system mounting, sharing, and protection	A3, B3, C3	2 theoretical hours	Week 10
Mid-semester assessment	In-class lecture and guided activities	File-system structure, directory implementation, and system implementation	A3, B3, C3	2 theoretical hours	Week 11

Quiz 2	In-class lecture and guided activities	Allocation methods and free-space management	A4, B4, C4	2 theoretical hours	Week 12
In-class activities	In-class lecture and guided activities	File-system performance, recovery, and Network File System (NFS)	A4, B4, C4	2 theoretical hours	Week 13
Assignment and presentation	In-class lecture and guided activities	File-system interface and disk/directory structures	A4, B4, C4	2 theoretical hours	Week 14

Quiz 2	In-class lecture and guided activities	Allocation methods and free-space management	A4, B4, C4	2 theoretical hours	Week 12
Comprehensive review	In-class lecture and guided activities	File-system mounting, file sharing, and protection	A4, B4, C4	2 theoretical hours	Week 15
Final examination	In-class lecture and guided activities	Final examination		3 hours	Week 16
11. Course Assessment					
The final grade is distributed over daily preparation and participation, short quizzes, homework, reports, practical assignments, monthly or semester examinations, and the final examination, in accordance with the approved departmental assessment plan.					
12. Learning and Teaching Resources					
Abraham Silberschatz, Peter B. Galvin, and Greg Gagne, Operating System Concepts; Andrew S. Tanenbaum and Herbert Bos, Modern Operating Systems.			Required Textbooks		
Abraham Silberschatz, Peter B. Galvin, and Greg Gagne, Operating System Concepts. Andrew S. Tanenbaum and Herbert Bos, Modern Operating Systems.			Main References		
Department-approved scientific journals, technical reports, and supplementary references.			Recommended Books and References (scientific journals, reports, etc.)		
Department-approved digital resources, scholarly databases, and relevant professional documentation.			Electronic References and Websites		

Graphical User Interface (GUI)

1. Course Name: Graphical User Interface (GUI)					
2. Course Code: CR-CE324					
3. Semester / Academic Year: Second Semester / 2025–2026					
4. Description Preparation Date: 1 October 2025					
5. Available Attendance Modes: In-person, classroom-based learning					
6. Total Credit Hours / Total Units					
2 hours per week / 30 classroom hours / 2 units					
7. Course Coordinator(s)					
Name: — Suphian M. Tariq					
Email: — Suphian.mohammed@aliraqia.edu.iq					
8. Course Objectives					
This course develops practical skills in graphical user-interface programming using Visual Basic .NET and Windows Forms. Students learn event-driven programming, interface design principles, controls, data types, validation, debugging, and the construction of usable client-side applications that solve practical problems.					Course Objectives
9. Teaching and Learning Strategies					
Cognitive Outcomes A1. Explain the fundamental concepts and terminology of the course. A2. Analyze engineering problems using the appropriate mathematical, algorithmic, or design methods. A3. Compare alternative techniques and evaluate their strengths, limitations, and fields of application. A4. Apply course concepts to realistic computer-engineering problems. Skill Outcomes B1. Use appropriate software tools, models, and analytical methods. B2. Develop accurate solutions and communicate the results clearly. B3. Diagnose errors, validate results, and improve the quality of the proposed solution. B4. Work independently and collaboratively in practical assignments and projects. Values C1. Demonstrate professional responsibility, accuracy, and academic integrity. C2. Participate effectively in teamwork and constructive technical discussion.					Strategy
10. Course Structure					
Course Structure: Academic Year 2025–2026					
Assessment Method	Teaching Method	Unit / Topic	Required Learning Outcomes	Hours	Week
In-class activities	In-class lecture and guided activities	Introduction to computer programming and event-driven applications	A1, B1	2 theoretical hours	Week 1
Class activities and homework	In-class lecture and guided activities	Visual Basic .NET for Windows application development	A1, B1	2 theoretical hours	Week 2
In-class activities	In-class lecture and guided activities	Visual Studio integrated development environment	A1, B1	2 theoretical hours	Week 3
In-class activities	In-class lecture and guided activities	Code editor, program statements, and comments	A2, B2, C2	2 theoretical hours	Week 4
Homework and guided exercises	In-class lecture and guided activities	Planning and designing Windows Forms applications	A2, B2, C2	2 theoretical hours	Week 5
Class activities and homework	In-class lecture and guided activities	Windows interface-design standards and guidelines	A2, B2, C2	2 theoretical hours	Week 6
Mid-semester assessment	In-class lecture and guided activities	Access keys and keyboard navigation	A3, B3, C3	2 theoretical hours	Week 7
Quiz 1	In-class lecture and guided activities	Tab order and focus management	A3, B3, C3	2 theoretical hours	Week 8
Questions and discussion	In-class lecture and guided activities	Label controls	A3, B3, C3	2 theoretical hours	Week 9
Homework and lecture questions	In-class lecture and guided activities	TextBox controls	A3, B3, C3	2 theoretical hours	Week 10
Mid-semester assessment	In-class lecture and guided activities	Variables and identifiers	A3, B3, C3	2 theoretical hours	Week 11
Quiz 2	In-class lecture and guided activities	Selecting appropriate data types	A4, B4, C4	2 theoretical hours	Week 12
In-class activities	In-class lecture and guided activities	Control positioning and layout	A4, B4, C4	2 theoretical hours	Week 13
Assignment and presentation	In-class lecture and guided activities	Input validation using TryParse	A4, B4, C4	2 theoretical hours	Week 14
Comprehensive review	In-class lecture and guided activities	Arithmetic expressions and application logic	A4, B4, C4	2 theoretical hours	Week 15
Final examination	In-class lecture and guided activities	Final examination		3 hours	Week 16

10. Course Structure	
11. Course Assessment	
The final grade is distributed over daily preparation and participation, short quizzes, homework, reports, practical assignments, monthly or semester examinations, and the final examination, in accordance with the approved departmental assessment plan.	
12. Learning and Teaching Resources	
Paul Deitel and Harvey Deitel, Visual Basic: How to Program; Microsoft Learn documentation for Visual Basic and Windows Forms.	Required Textbooks
Paul Deitel and Harvey Deitel, Visual Basic: How to Program. Microsoft Learn documentation for Visual Basic and Windows Forms.	Main References
Department-approved scientific journals, technical reports, and supplementary references.	Recommended Books and References (scientific journals, reports, etc.)
Department-approved digital resources, scholarly databases, and relevant professional documentation.	Electronic References and Websites

English Language

1. Course Name: English Language					
2. Course Code: UR330					
3. Semester / Academic Year: Second Semester / 2025–2026					
4. Description Preparation Date: 1 October 2025					
5. Available Attendance Modes: In-person, classroom-based learning					
6. Total Credit Hours / Total Units					
2 hours per week / 30 classroom hours / 2 units					
7. Course Coordinator(s)					
Name: — Hasseeb Dawood Injas Email: — Hasseeb.d.injas@aliraqia.edu.iq					
8. Course Objectives					
This course strengthens academic and professional English for engineering students. It develops grammar, vocabulary, reading, writing, listening, and speaking skills through scientific texts, everyday and professional communication, discussions, presentations, and collaborative activities.					Course Objectives
9. Teaching and Learning Strategies					
Cognitive and Communication Outcomes A1. Apply appropriate grammar and vocabulary in academic and everyday contexts. A2. Read and interpret scientific and technical texts efficiently. A3. Produce coherent written work and deliver clear oral communication. A4. Distinguish between formal and informal language and select language appropriate to the audience. Skill and Value Outcomes B1. Participate effectively in conversations, group work, and presentations. B2. Use reading strategies for different text types and purposes. B3. Revise and edit written work for accuracy and clarity. C1. Demonstrate confidence, respect, and active listening in communication. C2. Collaborate responsibly in group activities.					Strategy
10. Course Structure					
Course Structure: Academic Year 2025–2026					
Assessment Method	Teaching Method	Unit / Topic	Required Learning Outcomes	Hours	Week
In-class activities	In-class lecture and guided activities	Grammar I: present, past, and future time; auxiliary verbs	A1, B1	2 theoretical hours	Week 1
Class activities and homework	In-class lecture and guided activities	Everyday English: common daily situations	A1, B1	2 theoretical hours	Week 2
In-class activities	In-class lecture and guided activities	Grammar II: present simple and present continuous	A1, B1	2 theoretical hours	Week 3
In-class activities	In-class lecture and guided activities	Everyday English: starting and maintaining a conversation	A2, B2, C2	2 theoretical hours	Week 4
Homework and guided exercises	In-class lecture and guided activities	Grammar III: past simple and past continuous	A2, B2, C2	2 theoretical hours	Week 5
Class activities and homework	In-class lecture and guided activities	Vocabulary: positive and negative adjectives	A2, B2, C2	2 theoretical hours	Week 6
Mid-semester assessment	In-class lecture and guided activities	Everyday English: expressing opinions	A3, B3, C3	2 theoretical hours	Week 7
Quiz 1	In-class lecture and guided activities	Everyday English: polite requests and offers	A3, B3, C3	2 theoretical hours	Week 8
Questions and discussion	In-class lecture and guided activities	Integrated speaking and listening practice	A3, B3, C3	2 theoretical hours	Week 9
Homework and lecture questions	In-class lecture and guided activities	Grammar IV: advice, obligation, and permission	A3, B3, C3	2 theoretical hours	Week 10
Mid-semester assessment	In-class lecture and guided activities	Professional English: requests and offers	A3, B3, C3	2 theoretical hours	Week 11
Quiz 2	In-class lecture and guided activities	Grammar V: future forms and future possibility	A4, B4, C4	2 theoretical hours	Week 12
In-class activities	In-class lecture and guided activities	Vocabulary: literal and idiomatic phrasal verbs	A4, B4, C4	2 theoretical hours	Week 13
Assignment and presentation	In-class lecture and guided activities	Everyday English: making suggestions	A4, B4, C4	2 theoretical hours	Week 14
Comprehensive review	In-class lecture and guided activities	Review, presentations, and integrated-language activities	A4, B4, C4	2 theoretical hours	Week 15
Final examination	In-class lecture and guided activities	Final examination		3 hours	Week 16

Comprehensive review	In-class lecture and guided activities	Review, presentations, and integrated-language activities	A4, B4, C4	2 theoretical hours	Week 15
The final grade is distributed over daily preparation and participation, short quizzes, homework, reports, practical assignments, monthly or semester examinations, and the final examination, in accordance with the approved departmental assessment plan.					
Raymond Murphy, English Grammar in Use. Mark Ibbotson, Cambridge English for Engineering.			Main References		
			Recommended Books and References (scientific journals, reports, etc.)		
Department-approved digital resources, scholarly databases, and relevant professional documentation.			Electronic References and Websites		

Digital Signal Processing

1. Course Name: Digital Signal Processing					
2. Course Code: DISP311					
3. Semester / Academic Year: Second Semester / 2025–2026					
4. Description Preparation Date: 1 October 2025					
5. Available Attendance Modes: In-person, classroom-based learning					
6. Total Credit Hours / Total Units					
2 hours per week / 30 classroom hours / 2 units					
7. Course Coordinator(s)					
Name: — Safa Abood Nama					
Email: — Safa.a.nama@aliraqia.edu.iq					
8. Course Objectives					
This course provides the theoretical foundation and practical skills needed to analyze and process digital signals. It covers sampling, discrete-time signals and systems, convolution, Fourier analysis, the discrete Fourier transform, the fast Fourier transform, the Z-transform, and the analysis and design of FIR and IIR digital filters.					Course Objectives
9. Teaching and Learning Strategies					
Cognitive Outcomes A1. Explain the fundamental concepts and terminology of the course. A2. Analyze engineering problems using the appropriate mathematical, algorithmic, or design methods. A3. Compare alternative techniques and evaluate their strengths, limitations, and fields of application. A4. Apply course concepts to realistic computer-engineering problems. Skill Outcomes B1. Use appropriate software tools, models, and analytical methods. B2. Develop accurate solutions and communicate the results clearly. B3. Diagnose errors, validate results, and improve the quality of the proposed solution. B4. Work independently and collaboratively in practical assignments and projects. Values C1. Demonstrate professional responsibility, accuracy, and academic integrity. C2. Participate effectively in teamwork and constructive technical discussion.					Strategy
10. Course Structure					
Course Structure: Academic Year 2025–2026					
Assessment Method	Teaching Method	Unit / Topic	Required Learning Outcomes	Hours	Week
In-class activities	In-class lecture and guided activities	Introduction to discrete-time signals and systems	A1, B1	2 theoretical hours	Week 1
Class activities and homework	In-class lecture and guided activities	Sampling of continuous-time signals, aliasing, and the Nyquist rate	A1, B1	2 theoretical hours	Week 2
In-class activities	In-class lecture and guided activities	Types of discrete-time signals and operations on signals	A1, B1	2 theoretical hours	Week 3
In-class activities	In-class lecture and guided activities	Types and properties of discrete-time systems	A2, B2, C2	2 theoretical hours	Week 4
Homework and guided exercises	In-class lecture and guided activities	Impulse-response evaluation for discrete-time systems	A2, B2, C2	2 theoretical hours	Week 5
Class activities and homework	In-class lecture and guided activities	Discrete-time convolution: graphical, tabular, and analytical methods	A2, B2, C2	2 theoretical hours	Week 6
Mid-semester examination	In-class lecture and guided activities	Mid-semester examination	A3, B3, C3	2 theoretical hours	Week 7
Quiz 1	In-class lecture and guided activities	Discrete-time Fourier series and its properties	A3, B3, C3	2 theoretical hours	Week 8
Questions and discussion	In-class lecture and guided activities	Discrete Fourier transform and its properties	A3, B3, C3	2 theoretical hours	Week 9
Homework and lecture questions	In-class lecture and guided activities	Fast Fourier transform (FFT)	A3, B3, C3	2 theoretical hours	Week 10
Mid-semester assessment	In-class lecture and guided activities	Z-transform and its properties	A3, B3, C3	2 theoretical hours	Week 11
Quiz 2	In-class lecture and guided activities	Poles and zeros in the Z-plane	A4, B4, C4	2 theoretical hours	Week 12
In-class activities	In-class lecture and guided activities	Digital FIR filter analysis and design	A4, B4, C4	2 theoretical hours	Week 13
Assignment and presentation	In-class lecture and guided activities	Digital IIR filter design using analog Butterworth prototypes	A4, B4, C4	2 theoretical hours	Week 14
Comprehensive review	In-class lecture and guided activities	Digital IIR filter design using analog Chebyshev prototypes	A4, B4, C4	2 theoretical hours	Week 15
Final examination	In-class lecture and guided activities	Final examination		3 hours	Week 16

Mid-semester assessment	In-class lecture and guided activities	Z-transform and its properties	A3, B3, C3	2 theoretical hours	Week 11
11. Course Assessment					
The final grade is distributed over daily preparation and participation, short quizzes, homework, reports, practical assignments, monthly or semester examinations, and the final examination, in accordance with the approved departmental assessment plan.					
12. Learning and Teaching Resources					
John G. Proakis and Dimitris G. Manolakis, Digital Signal Processing; Alan V. Oppenheim and Ronald W. Schafer, Discrete-Time Signal Processing.			Required Textbooks		
John G. Proakis and Dimitris G. Manolakis, Digital Signal Processing. Alan V. Oppenheim and Ronald W. Schafer, Discrete-Time Signal Processing.			Main References		
Department-approved scientific journals, technical reports, and supplementary references.			Recommended Books and References (scientific journals, reports, etc.)		
Department-approved digital resources, scholarly databases, and relevant professional documentation.			Electronic References and Websites		

Computer Architecture II

1. Course Name: Computer Architecture II					
2. Course Code: COAR312					
3. Semester / Academic Year: Second Semester / 2025–2026					
4. Description Preparation Date: 1 October 2025					
5. Available Attendance Modes: In-person, classroom-based learning					
6. Total Credit Hours / Total Units					
2 hours per week / 30 classroom hours / 2 units					
7. Course Coordinator(s)					
Name: — Yaqoob Yousif Mahdi					
Email: — Yaqoob.y.mahdi@aliraqia.edu.iq					
8. Course Objectives					
This course extends the study of computer architecture to vector and array processing, computer arithmetic, input/output organization, peripheral devices, memory organization, asynchronous data transfer, multiprocessors, and high-performance computer systems.					Course Objectives
9. Teaching and Learning Strategies					
Cognitive Outcomes A1. Explain the fundamental concepts and terminology of the course. A2. Analyze engineering problems using the appropriate mathematical, algorithmic, or design methods. A3. Compare alternative techniques and evaluate their strengths, limitations, and fields of application. A4. Apply course concepts to realistic computer-engineering problems. Skill Outcomes B1. Use appropriate software tools, models, and analytical methods. B2. Develop accurate solutions and communicate the results clearly. B3. Diagnose errors, validate results, and improve the quality of the proposed solution. B4. Work independently and collaboratively in practical assignments and projects. Values C1. Demonstrate professional responsibility, accuracy, and academic integrity. C2. Participate effectively in teamwork and constructive technical discussion.					Strategy
10. Course Structure					
Course Structure: Academic Year 2025–2026					
Assessment Method	Teaching Method	Unit / Topic	Required Learning Outcomes	Hours	Week
In-class activities	In-class lecture and guided activities	Vector processing	A1, B1	2 theoretical hours	Week 1
Class activities and homework	In-class lecture and guided activities	Array processors	A1, B1	2 theoretical hours	Week 2
In-class activities	In-class lecture and guided activities	Computer arithmetic and numerical representation	A1, B1	2 theoretical hours	Week 3
In-class activities	In-class lecture and guided activities	Introduction to arithmetic-unit organization	A2, B2, C2	2 theoretical hours	Week 4
Homework and guided exercises	In-class lecture and guided activities	Addition and subtraction algorithms	A2, B2, C2	2 theoretical hours	Week 5
Class activities and homework	In-class lecture and guided activities	Multiplication algorithms	A2, B2, C2	2 theoretical hours	Week 6
Mid-semester assessment	In-class lecture and guided activities	Division algorithms	A3, B3, C3	2 theoretical hours	Week 7
Quiz 1	In-class lecture and guided activities	High-performance computing and FLOPS metrics	A3, B3, C3	2 theoretical hours	Week 8
Questions and discussion	In-class lecture and guided activities	Decimal arithmetic unit	A3, B3, C3	2 theoretical hours	Week 9
Homework and lecture questions	In-class lecture and guided activities	Advanced computer arithmetic	A3, B3, C3	2 theoretical hours	Week 10
Mid-semester assessment	In-class lecture and guided activities	Input/output organization	A3, B3, C3	2 theoretical hours	Week 11
Quiz 2	In-class lecture and guided activities	Peripheral devices	A4, B4, C4	2 theoretical hours	Week 12
In-class activities	In-class lecture and guided activities	I/O interfaces and data transfer	A4, B4, C4	2 theoretical hours	Week 13
Assignment and presentation	In-class lecture and guided activities	Asynchronous data transfer	A4, B4, C4	2 theoretical hours	Week 14
Comprehensive review	In-class lecture and guided activities	Data-transfer modes and direct memory access	A4, B4, C4	2 theoretical hours	Week 15
Final examination	In-class lecture and guided activities	Final examination		3 hours	Week 16

Assessment Method	Teaching Method	Unit / Topic	Required Learning Outcomes	Hours	Week
11. Course Assessment					
The final grade is distributed over daily preparation and participation, short quizzes, homework, reports, practical assignments, monthly or semester examinations, and the final examination, in accordance with the approved departmental assessment plan.					
12. Learning and Teaching Resources					
William Stallings, Computer Organization and Architecture; John L. Hennessy and David A. Patterson, Computer Architecture: A Quantitative Approach.			Required Textbooks		
William Stallings, Computer Organization and Architecture. John L. Hennessy and David A. Patterson, Computer Architecture: A Quantitative Approach.			Main References		
Department-approved scientific journals, technical reports, and supplementary references.			Recommended Books and References (scientific journals, reports, etc.)		
Department-approved digital resources, scholarly databases, and relevant professional documentation.			Electronic References and Websites		

Computer Networks

1. Course Name: Computer Networks

2. Course Code: CONE315

3. Semester / Academic Year: Second Semester / 2025–2026

4. Description Preparation Date: 1 October 2025

5. Available Attendance Modes: In-person, classroom-based learning

6. Total Credit Hours / Total Units

2 hours per week / 30 classroom hours / 2 units

7. Course Coordinator(s)

Name: — Basheer Husham Ali

Email: — basheer.husham@aliraqia.edu.iq

8. Course Objectives

This course develops a comprehensive understanding of computer-network principles and architectures. It covers the OSI and TCP/IP models, physical and data-link technologies, Ethernet and IEEE 802 standards, internetworking, network and transport protocols, addressing, routing, switching, performance, and network security.

Course
Objectives

9. Teaching and Learning Strategies

Cognitive Outcomes

A1. Explain the fundamental concepts and terminology of the course.

A2. Analyze engineering problems using the appropriate mathematical, algorithmic, or design methods.

A3. Compare alternative techniques and evaluate their strengths, limitations, and fields of application.

A4. Apply course concepts to realistic computer-engineering problems.

Skill Outcomes

B1. Use appropriate software tools, models, and analytical methods.

B2. Develop accurate solutions and communicate the results clearly.

B3. Diagnose errors, validate results, and improve the quality of the proposed solution.

B4. Work independently and collaboratively in practical assignments and projects.

Strategy

Values

C1. Demonstrate professional responsibility, accuracy, and academic integrity.

C2. Participate effectively in teamwork and constructive technical discussion.

10. Course Structure

Course Structure: Academic Year 2025–2026

Assessment Method	Teaching Method	Unit / Topic	Required Learning Outcomes	Hours	Week
In-class activities	In-class lecture and guided activities	Networking principles and fundamentals	A1, B1	2 theoretical hours	Week 1
Class activities and homework	In-class lecture and guided activities	Introduction to computer networks	A1, B1	2 theoretical hours	Week 2
In-class activities	In-class lecture and guided activities	Physical and data-link layers	A1, B1	2 theoretical hours	Week 3
In-class activities	In-class lecture and guided activities	Network architecture and protocol layering	A2, B2, C2	2 theoretical hours	Week 4
Homework and guided exercises	In-class lecture and guided activities	Network topologies and hardware components	A2, B2, C2	2 theoretical hours	Week 5
Class activities and homework	In-class lecture and guided activities	Network types and optical networks	A2, B2, C2	2 theoretical hours	Week 6
Mid-semester assessment	In-class lecture and guided activities	Wireless sensor networks	A3, B3, C3	2 theoretical hours	Week 7
Quiz 1	In-class lecture and guided activities	Physical and data-link layer review	A3, B3, C3	2 theoretical hours	Week 8
Questions and discussion	In-class lecture and guided activities	Data-communication fundamentals and transmission media	A3, B3, C3	2 theoretical hours	Week 9
Homework and lecture questions	In-class lecture and guided activities	IEEE 802 standards and LAN technologies: Ethernet and token ring	A3, B3, C3	2 theoretical hours	Week 10

Mid-semester assessment	In-class lecture and guided activities	Internetworking and network-layer services	A3, B3, C3	2 theoretical hours	Week 11
Quiz 2	In-class lecture and guided activities	Transport layer	A4, B4, C4	2 theoretical hours	Week 12
In-class activities	In-class lecture and guided activities	Transport services and elements of transport protocols	A4, B4, C4	2 theoretical hours	Week 13
Assignment and presentation	In-class lecture and guided activities	UDP and TCP protocols	A4, B4, C4	2 theoretical hours	Week 14
Comprehensive review	In-class lecture and guided activities	Network performance issues and quality of service	A4, B4, C4	2 theoretical hours	Week 15
Final examination	In-class lecture and guided activities	Final examination		3 hours	Week 16

11. Course Assessment

The final grade is distributed over daily preparation and participation, short quizzes, homework, reports, practical assignments, monthly or semester examinations, and the final examination, in accordance with the approved departmental assessment plan.

12. Learning and Teaching Resources

Andrew S. Tanenbaum and David J. Wetherall, Computer Networks; James F. Kurose and Keith W. Ross, Computer Networking: A Top-Down Approach.	Required Textbooks
Andrew S. Tanenbaum and David J. Wetherall, Computer Networks. James F. Kurose and Keith W. Ross, Computer Networking: A Top-Down Approach.	Main References
Department-approved scientific journals, technical reports, and supplementary references.	Recommended Books and References (scientific journals, reports, etc.)
Department-approved digital resources, scholarly databases, and relevant professional documentation.	Electronic References and Websites

LEVEL FOUR

Fourth Year / First Semester

Soft Computing I

Course Name: Soft Computing I					
Course Code: CR- CE431					
Semester / Year: Semester 1 \ 2025-2026					
Description Preparation Date: 01/10/2025					
Available Attendance Forms: Offline, In class					
Number of Credit Hours (Total) / Number of Units (Total)					
2 hours per week / 30 hours of study in the classroom / 2 unit					
Course administrator's name (mention all, if more than one name)					
Name: - Suphian M. Tariq					
Email: - Suphian.mohammed@aliraqia.edu.iq					
Course Objectives					
Course Objectives	1.The objectives of this course are to: 2.Study the concepts and algorithms involved in evolutionary computation (Genetic algorithm and Genetic Programming) and fuzzy logic. 3.Apply genetic algorithms to provide solutions to real world problems. 4.Identify crisp and fuzzy sets theories. 5. Introduce fuzzy systems and its applications. 6.Apply Fuzzy rules in the design process of various fuzzy systems. 7.Describe soft computing techniques and their roles in building intelligent machines.				
Teaching and Learning Strategies					
Strategy	A-Cognitive goals The student will learn the basic and applied concepts of Soft Computing with the following fundamentals: A.1.Learn about soft computing techniques and their applications A.2.Analyze various neural network architectures A.3.Understand Chromosome encoding and selection techniques A.4.Understand the genetic algorithm concepts and their applications. A.5. Analyze the genetic algorithms and their applications. A.6. Define the fuzzy systems. A.7. Identify and select a suitable Soft Computing technology to solve the problem construct a solution and implement a Soft Computing solution B. The skills goals special to the course B.1 increase students' knowledge skills about Soft Computing. B.2 The students get the skills for designing specialized Soft Computing. B.3 Determine their quality standards and the applications used for this purpose. B.4 Students can find the optimal and right solutions to real complex problems. B.5 Developing engineering and intellectual sense and expanding student concepts about the use of computer technologies for Soft Computing tasks. B.6 Design, research and write reports and proposals on Soft Computing projects to address specific community needs.				
Course Structure					
Course Structure: Second Semester 01-10-2023					
The week	Hours	Required learning outcomes	Unit/Module or Topic Title	Teaching Method	Assessment Method
Week 1	2 Theoretical	A1, B1, C1	Introduction to Soft Computing	In class	In class activities
Week 2	2 Theoretical	A1, B1, C1	Concept exploration of Neural networks, Genetic algorithm and Fuzzy logic	In class	In class activities and home duties
Week 3	2 Theoretical	A1, B1, C1	Biological and artificial neurons, classifications of artificial neural networks	In class	In class activities
Week 4	2 Theoretical	A2, B2, C2	Types of NN Activation Functions and Neuron response calculation	In class	In class activities

Week 5	2 Theoretical	A2, B2, C2	NN Learning Algorithms and Decision Boundary	In class	In class activities and home duties
Week 6	2 Theoretical	A2, B2, C2	Hebbian, Perceptron and Delta Learning Rules	In class	In class activities and home duties
Week 7	2 Theoretical		Back Propagation NN	In class	In class activities and home duties
Week 8	2 Theoretical	A3, B3, C3	Hopfield Network	In class	Quiz 1
Week 9	2 Theoretical	A3, B3, C3	Bidirectional Associative Memory (BAM) NN	In class	Questions during the lecture
Week 10	2 Theoretical	A3, B3, C3	Adaline Neural Network	In class	Home duties and questions during the lecture
Week 11	2 Theoretical	A3, B3, C3	Monthly exam	In class	Mid Term
Week 12	2 Theoretical	A4, B4, C4	Kohonen Network	In class	Quiz 2
Week 13	2 Theoretical	A4, B4, C4	Self-organizing Network, Adaptive Resonance Theory (ART)	In class	In class activities
Week 14	2 Theoretical	A4, B4, C4	Hybrid approaches (neural networks, fuzzy logic, genetic algorithms sets)	In class	Assignment Presentation
Week 15	2 Theoretical	A4, B4, C4	Presentations	In class	In class activities
Week 16	3 hrs		Final Exam		Final Exam
Course Evaluation					
Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports etc					
Learning and Teaching Resources					
Required textbooks (curricular books, if any)			J. Fodor and R. Fuller (Eds.). Advances in Soft Computing, Intelligent Robotics and Control. Springer, 2014		
Main references (sources)			F. O. Karray and C. W. Silva. Soft Computing and Intelligent Systems Design: Theory, Tools and Applications. 1st Edition Addison-Wesley, 2004.		
Recommended books and references (scientific journals, reports...)			Research in research engines specialized in scientific research such as: •Google scholar •Science direct •IEEE.		
Electronic References, Websites					

Internet Programming

Course Name: Internet Programming					
Course Code: CR- CE442					
Semester / Year: Semester 1 \ 2025-2026					
Description Preparation Date: 01/10/2025					
Available Attendance Forms: Offline, In class					
Number of Credit Hours (Total) / Number of Units (Total)					
2 hours per week / 30 hours of study in the classroom / 2 unit					
Course administrator's name (mention all, if more than one name)					
Name: - Wasseem N. Ibrahim Al-Obaydy					
Email: - wasseem.nahi@aliraqia.edu.iq					
Course Objectives					
Course Objectives	The aim of this course is to enable the students to learn the techniques of the world wide web programming. The focus will be on building robust client-side web-based applications that are useful in engineering and other disciplines. Students will quickly learn how to program in HTML and JavaScript to construct interactive, dynamic and user-friendly web applications that solve real-world problems.				
Teaching and Learning Strategies					
Strategy	A. Cognitive goals: A1. Enabling the student to acquire and understand the theoretical and fundamental concepts of the Internet and World Wide Web (WWW). A2. Enabling the student to acquire knowledge about web development technologies. A3. Enabling the student to acquire practical skills in developing effective, efficient and user-friendly websites for different purposes. A4. Enabling the student to build static web pages using HTML language. A5. Enabling the student to build dynamic interactive web pages using JavaScript language. B. The skills goals special to the course. B1. The student will acquire web design skills. B2. The student will acquire website development skills. B3. The student will acquire scripting and editing skills, and error detection and correction. C. Affective and value goals C1. Developing the student's thinking and design skills to create high level web sites. C2. Creating the confidence of the students to use web programming to solve practical problems. C3. Encourage the students to the cooperative and team work. C4. Encourage the students to become innovative through competition.				
Course Structure					
Course Structure: Second Semester 01-10-2023					
The week	Hours	Required learning outcomes	Unit/Module or Topic Title	Teaching Method	Assessment Method
Week 1	2 Theoretical	A1, B1, C1	Introduction to Internet, WWW, client-side and server-side programming.	In class	In class activities
Week 2	2 Theoretical	A1, B1, C1	HTML tags, headings, titles, body, paragraphs, line breaks, fonts, physical and logical tags, and hypertext links	In class	In class activities and home duties
Week 3	2 Theoretical	A1, B1, C1	HTML backgrounds, colors, and images	In class	In class activities
Week 4	2 Theoretical	A2, B2, C2	HTML Lists	In class	In class activities
Week 5	2 Theoretical	A2, B2, C2	HTML Tables	In class	In class activities and home duties
Week 6	2 Theoretical	A2, B2, C2	HTML Forms	In class	In class activities and home duties
Week 7	2 Theoretical		HTML Marquees and Multimedia	In class	In class activities and home duties

Week 8	2 Theoretical	A3, B3, C3	Mid-Term Exam	In class	Quiz 1
Week 9	2 Theoretical	A3, B3, C3	Introduction to JavaScript: Embedding JavaScript in HTML JavaScript Basics: alert dialog, prompt dialog, variables, operators, conditional statements (if, if-else, switch-case, conditional operator (? :))	In class	Questions during the lecture
Week 10	2 Theoretical	A3, B3, C3	JavaScript Basics: loop statements (while, do/while, for, for/in), break and continue statements, and labels	In class	Home duties and questions during the lecture
Week 11	2 Theoretical	A3, B3, C3	JavaScript Arrays (1D and 2D)	In class	Mid Term
Week 12	2 Theoretical	A4, B4, C4	JavaScript Functions	In class	Quiz 2
Week 13	2 Theoretical	A4, B4, C4	JavaScript Events and Event Handlers	In class	In class activities
Week 14	2 Theoretical	A4, B4, C4	JavaScript Objects (user-defined objects, built-in objects, document object model (DOM, and image object)	In class	Assignment Presentation
Week 15	2 Theoretical	A4, B4, C4	JavaScript Form Validation	In class	In class activities
Week 16	3 hrs		Final Exam		Final Exam
Course Evaluation					
Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports etc					
Learning and Teaching Resources					
Required textbooks (curricular books, if any)			Internet and World Wide Web: How to program, fifth edition by Paul Deitel, Harvey Deitel, and Abbey Deitel. Pearson Education, 2012.		
Main references (sources)			•Beginning HTML, XHTML, CSS, and JavaScript by Jon Duckett. Wiley Publishing, 2010. •Web design the complete reference, second edition by Thomas Powell. McGraw-Hill, 2002.		
Recommended books and references (scientific journals, reports...)			Research in research engines specialized in scientific research such as: •Google scholar •Science direct •IEEE.		
Electronic References, Websites			•The Complete Internet and World Wide Web Programming Training course by Harry M.Deitel, Paul J. Deitel, and Tom Nieto. Prentice Hall, 2000. •W3schools website. https://www.w3schools.com/ •Codecademy website. https://www.codecademy.com/		

Embedded Systems

Course Name: Embedded Systems					
Course Code: CR- CE433					
Semester / Year: Semester 1 \ 2025-2026					
Description Preparation Date: 01/10/2025					
Available Attendance Forms: Offline, In class					
Number of Credit Hours (Total) / Number of Units (Total)					
2 hours per week / 30 hours of study in the classroom / 2 unit					
Course administrator's name (mention all, if more than one name)					
Name: - Mamoun Jassim Mohammed Email: - mamoun.jassim@aliraqia.edu.iq					
Course Objectives					
Course Objectives	1.Understand the basic architecture and components of embedded systems. 2.Learn principles of embedded software design and development. 3.Gain proficiency in programming microcontrollers and microprocessors. 4.Explore techniques for interfacing sensors, actuators, and other peripheral devices. 5.Understand real-time operating systems (RTOS) and their application in embedded systems. 6.Gain hands-on experience in designing and implementing embedded systems projects. 7.Explore advanced topics such as wireless communication, IoT integration, and embedded system security.				
Teaching and Learning Strategies					
Strategy	A.Cognitive goals The student will learn the basic and applied concepts of Software Engineering with the following fundamentals: A.1. Understand the fundamentals of Embedded System. A.2. Express the concepts of Embedded System and their different types which can be used in a wide variety of disciplines in engineering. A.3. Identify and report system properties such as causality, stability, linearity, and time invariance etc. A.4. Apply the convolution formula to determine the output of time systems. A.5. Understand and resolve the analog time signals in frequency domain using Fourier series and Fourier transforms. A.6. Understand the concept of Filter Analysis and design and its types (FIR & IIR) and applications. A.7. Understand the concept of FIR filter design and develop the ability to design filters using different windows. A.8. Understand the concept of IIR filter design and develop the ability to design filters using different methods.				
Course Structure					
Course Structure: Second Semester 01-10-2023					
The week	Hours	Required learning outcomes	Unit/Module or Topic Title	Teaching Method	Assessment Method
Week 1	2 Theoretical	A1, B1, C1	Introduction to embedded systems: course intro	In class	In class activities
Week 2	2 Theoretical	A1, B1, C1	Embedded system design: Arduino intro, basic circuit diagrams: Microprocessors and microcontrollers:-Basic organization, Address/data bus, Memories, I/O ports, Timing subsystems, Interrupt handling.	In class	In class activities and home duties
Week 3	2 Theoretical	A1, B1, C1	Instruction sets, registers and memory access, digital I/O: Interfacing techniques:-Basic I/O ports, Memories, Interface support devices, CISC&RISC.	In class	In class activities
Week 4	2 Theoretical	A2, B2, C2	Communication Methods: - Serial Parallel, Basic wireless schemes.	In class	In class activities
Week 5	2 Theoretical	A2, B2, C2	pulse width modulation (PWM), Analog input	In class	In class activities and home duties
Week 6	2 Theoretical	A2, B2, C2	CPU bus, communication protocols (UART, SPI, I2C)	In class	In class activities and home duties

Week 7	2 Theoretical		Embedded System Architecture	In class	In class activities and home duties
Week 8	2 Theoretical	A3, B3, C3	Mid-course Exam	In class	Quiz 1
Week 9	2 Theoretical	A3, B3, C3	Peripherals, Sensors	In class	Questions during the lecture
Week 10	2 Theoretical	A3, B3, C3	Communicating with Peripherals	In class	Home duties and questions during the lecture
Week 11	2 Theoretical	A3, B3, C3	Embedded algorithms	In class	Mid Term
Week 12	2 Theoretical	A4, B4, C4	Embedded Operating Systems	In class	Quiz 2
Week 13	2 Theoretical	A4, B4, C4	Embedded System Applications	In class	In class activities
Week 14	2 Theoretical	A4, B4, C4	Embedded Systems Applications	In class	Assignment Presentation
Week 15	2 Theoretical	A4, B4, C4	Embedded Systems Applications	In class	In class activities
Week 16	3 hrs		Final Exam		Final Exam
Course Evaluation					
Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports etc					
Learning and Teaching Resources					
Required textbooks (curricular books, if any)			•Marilyn Wolf, " Principles of Embedded Computing System Design", Fourth Edition, Elsevier Publishing, 2015, ISBN: 978-0-12-805387-4 •Elecia White," Making Embedded Systems Design Pattern for Great Software", A Publication in the O'Reilly Media Publishers, 2011, ISBN: 978-1-449-30214-6 .		
Main references (sources)					
Recommended books and references (scientific journals, reports...)			Research in research engines specialized in scientific research such as: •Google scholar •Science direct •IEEE.		
Electronic References, Websites			Here's a summary of important URLs related to this book: https://www.coursera.org/learn/ Embedded systems fundamentals		

Real Time System

Course Name: Real Time System					
Course Code: CR-CE441					
Semester / Year: Semester 1 \ 2025-2026					
Description Preparation Date: 01/10/2025					
Available Attendance Forms: Offline, In class					
Number of Credit Hours (Total) / Number of Units (Total)					
2 hours per week / 30 hours of study in the classroom / 2 unit					
Course administrator's name (mention all, if more than one name)					
Name: - Hassan F. Hassan Email: - hasanfalahh@gmail.com					
Course Objectives					
Course Objectives	•Foster a solid understanding of Real-Time Systems (RTS) concepts, providing students with a foundational knowledge of the principles, applications, and significance of real-time computing in various domains. •Enable students to proficiently articulate and define the specific requirements of real-time systems, emphasizing the critical link between functional specifications and the successful development of RTS solutions. •Develop insights into the challenges and considerations of interfacing real-time systems with the physical world, ensuring students comprehend the practical implications and constraints associated with real-world connections. •Equip students with the skills to design effective and efficient real-time systems, encompassing both hardware and software aspects, emphasizing the importance of reliability, responsiveness, and adaptability in system design. •Provide in-depth knowledge of real-time hardware components and their role in achieving optimal input/output response times, emphasizing the hardware-software interface for seamless integration. •advanced concepts such as real-time task scheduling, emphasizing the integration of hardware and software components to create cohesive and responsive real-time systems. •Instruct students on performance measurement methodologies for real-time systems, and impart practical skills in testing and verification to ensure the reliability and correctness of real-time applications. By the end of the course, students should be adept at assessing and optimizing the performance of real-time systems in diverse environments.				
Teaching and Learning Strategies					
Strategy	B. The skills goals special to the course of Real-Time Systems (RTS) Studying the Real-Time Systems (RTS) subject provides students with a range of valuable skills that are essential in the field of computer engineering. These skills include: B.1. System Design: Ability to design and architect real-time systems, considering both hardware and software components, and ensuring they meet specified requirements. B.2. Requirements Analysis: Proficiency in defining and analyzing requirements for real-time systems, translating them into functional specifications that guide the development process. B.3. Hardware Integration: Skills in integrating hardware components to achieve optimal performance, responsiveness, and reliability in real-time systems. B.4. Software Development: Competence in developing real-time software, including writing code that adheres to strict timing constraints and meets real-world application needs. B.5. Task Scheduling: Understanding and application of real-time task scheduling algorithms, ensuring efficient allocation of resources to meet deadlines and maintain system responsiveness. B.6. Performance Measurement: Ability to measure and analyze the performance of real-time systems, employing metrics such as response time, throughput, and reliability. B.7. Testing and Verification: Proficiency in testing and verifying real-time systems to ensure correctness, reliability, and adherence to specifications, employing various testing methodologies.				
Course Structure					
Course Structure: Second Semester 01-10-2023					
The week	Hours	Required learning outcomes	Unit/Module or Topic Title	Teaching Method	Assessment Method
Week 1	2 Theoretical	A1, B1, C1	Introduction to Real-Time Systems (RTS)	In class	In class activities
Week 2	2 Theoretical	A1, B1, C1	Concepts of RTS	In class	In class activities and home duties
Week 3	2 Theoretical	A1, B1, C1	Requirements definition and functional specification of RTS	In class	In class activities

Week 4	2 Theoretical	A2, B2, C2	Physical connection to the real world	In class	In class activities
Week 5	2 Theoretical	A2, B2, C2	Monthly exam	In class	In class activities and home duties
Week 6	2 Theoretical	A2, B2, C2	Design of RTS	In class	In class activities and home duties
Week 7	2 Theoretical		RTS Hardware	In class	In class activities and home duties
Week 8	2 Theoretical	A3, B3, C3	Mid term	In class	Quiz 1
Week 9	2 Theoretical	A3, B3, C3	Input/ Output Response time	In class	Questions during the lecture
Week 10	2 Theoretical	A3, B3, C3	RTS Software	In class	Home duties and questions during the lecture
Week 11	2 Theoretical	A3, B3, C3	Real-Time Task Scheduling	In class	Mid Term
Week 12	2 Theoretical	A4, B4, C4	Monthly exam	In class	Quiz 2
Week 13	2 Theoretical	A4, B4, C4	Integration of Hardware and Software in RTS	In class	In class activities
Week 14	2 Theoretical	A4, B4, C4	Performance Measures for RTS	In class	Assignment Presentation
Week 15	2 Theoretical	A4, B4, C4	Testing and Verification	In class	In class activities
Week 16	3 hrs		Final Exam		Final Exam
Course Evaluation					
Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports etc					
Learning and Teaching Resources					
Required textbooks (curricular books, if any)			Laplante, P.A., Ovaska, S.J.: Real-Time Systems Design and Analysis: Tools for the Practitioner, 4th edition. Wiley, Hoboken (2011)		
Main references (sources)			Liu, Jane WS. Real-time systems. Pearson Education India, 2006. https://www.amazon.com/Real-Time-Systems-Jane-W-Liu/dp/0130996513		
Recommended books and references (scientific journals, reports...)			Research in research engines specialized in scientific research such as: •Google scholar •Science direct •IEEE.		
Electronic References, Websites					

Parallel processing

Course Name: Parallel processing					
Course Code: CR- CE432					
Semester / Year: Semester 1 \ 2025-2026					
Description Preparation Date: 01/10/2025					
Available Attendance Forms: Offline, In class					
Number of Credit Hours (Total) / Number of Units (Total)					
2 hours per week / 30 hours of study in the classroom / 2 unit					
Course administrator's name (mention all, if more than one name)					
Name: - Maad Kamal Al-Anni					
Email: - muad.rashed@aliraqia.edu.iq					
Course Objectives					
Course Objectives	This is a graduate level course on parallel computing with the objective to familiarize students with the fundamental concepts, techniques, and tools of parallel computing. Participation in this course will enable students to better use parallel computing in application area, and will prepare them to take advanced courses in more specific areas of parallel computing.				
Teaching and Learning Strategies					
Strategy	A.Cognitive goals A1. Understand the evolution of High Performance Computing (HPC) with respect to laws and the contemporary notion that involves mobility for data, hardware devices and software agents A2. Understand, appreciate and apply parallel and distributed algorithms in problem Solving. A3. Evaluate the impact of network topology on parallel/distributed algorithm formulations and traffic their performance. A4. Gain hand-on experience with the agent-based and Internet-based parallel and distributed programming techniques. A5. Master skills to measure the performance of parallel and distributed programs. B. The skills goals special to the course of Parallel processing B1. Describe different parallel architectures, inter-connect networks, programming models B2. Develop an efficient parallel algorithm to solve given problem B3 Analyze and measure performance of modern parallel computing systems. B4 Develop an efficient parallel algorithms for sorting and Graph				
Course Structure					
Course Structure: Second Semester 01-10-2023					
The week	Hours	Required learning outcomes	Unit/Module or Topic Title	Teaching Method	Assessment Method
Week 1	2 Theoretical	A1, B1, C1	Introduction, Parallel architectures	In class	In class activities
Week 2	2 Theoretical	A1, B1, C1	Parallel algorithm design.	In class	In class activities and home duties
Week 3	2 Theoretical	A1, B1, C1	Shared memory programming	In class	In class activities
Week 4	2 Theoretical	A2, B2, C2	Message passing programming	In class	In class activities
Week 5	2 Theoretical	A2, B2, C2	Combining MPI and OpenMP, Debugging MPI programs	In class	In class activities and home duties
Week 6	2 Theoretical	A2, B2, C2	Floyd's algorithm	In class	In class activities and home duties
Week 7	2 Theoretical		Performance analysis	In class	In class activities and home duties
Week 8	2 Theoretical	A3, B3, C3	Mid-course Exam	In class	Quiz 1

Week 9	2 Theoretical	A3, B3, C3	Matrix-vector multiplication	In class	Questions during the lecture
Week 10	2 Theoretical	A3, B3, C3	Matrix multiplication, Finite difference methods	In class	Home duties and questions during the lecture
Week 11	2 Theoretical	A3, B3, C3	Sorting	In class	Mid Term
Week 12	2 Theoretical	A4, B4, C4	Combinatorial search,	In class	Quiz 2
Week 13	2 Theoretical	A4, B4, C4	External memory sorting	In class	In class activities
Week 14	2 Theoretical	A4, B4, C4	Heterogeneous architectures	In class	Assignment Presentation
Week 15	2 Theoretical	A4, B4, C4	Load balancing	In class	In class activities
Week 16	3 hrs		Final Exam		Final Exam
Course Evaluation					
Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports etc					
Learning and Teaching Resources					
Required textbooks (curricular books, if any)			John Hennessy and David Patterson, Computer Architecture: A Quantitative Approach, Morgan Kauffman Publisher.		
Main references (sources)			Parallel Programming in C with MPI and OpenMP by M.J. Quinn, McGraw-Hill Science/Engineering/Math, 1 st edition, 2003, ISBN: 0072822562.		
Recommended books and references (scientific journals, reports...)			Research in research engines specialized in scientific research such as: •Google scholar •Science direct •IEEE.		
Electronic References, Websites					

Fourth Year / Second Semester Soft Computing II

Course Name: Soft Computing II					
Course Code: CR- CE434					
Semester / Year: Semester 2 \ 2025-2026					
Description Preparation Date: 01/10/2025					
Available Attendance Forms: Offline, In class					
Number of Credit Hours (Total) / Number of Units (Total)					
2 hours per week / 30 hours of study in the classroom / 2 unit					
Course administrator's name (mention all, if more than one name)					
Name: - Suphian M. Tariq					
Email: - Suphian.mohammed@aliraqia.edu.iq					
Course Objectives					
Course Objectives	1.The objectives of this course are to: 2.Study the concepts and algorithms involved in evolutionary computation (Genetic algorithm and Genetic Programming) and fuzzy logic. 3.Apply genetic algorithms to provide solutions to real world problems. 4.Identify crisp and fuzzy sets theories. 5. Introduce fuzzy systems and its applications. 6.Apply Fuzzy rules in the design process of various fuzzy systems. 7.Describe soft computing techniques and their roles in building intelligent machines.				
Teaching and Learning Strategies					
Strategy	A-Cognitive goals The student will learn the basic and applied concepts of Soft Computing with the following fundamentals: A.1.Learn about soft computing techniques and their applications A.2.Analyze various neural network architectures A.3.Understand Chromosome encoding and selection techniques A.4.Understand the genetic algorithm concepts and their applications. A.5. Analyze the genetic algorithms and their applications. A.6. Define the fuzzy systems. A.7. Identify and select a suitable Soft Computing technology to solve the problem construct a solution and implement a Soft Computing solution B. The skills goals special to the course B.1 increase students’ knowledge skills about Soft Computing. B.2 The students get the skills for designing specialized Soft Computing. B.3 Determine their quality standards and the applications used for this purpose. B.4 Students can find the optimal and right solutions to real complex problems. B.5 Developing engineering and intellectual sense and expanding student concepts about the use of computer technologies for Soft Computing tasks. B.6 Design, research and write reports and proposals on Soft Computing projects to address specific community needs.				
Course Structure					
Course Structure: Second Semester 01-10-2023					
The week	Hours	Required learning outcomes	Unit/Module or Topic Title	Teaching Method	Assessment Method
Week 1	2 Theoretical	A1, B1, C1	Learn about soft computing techniques and their applications	In class	In class activities
Week 2	2 Theoretical	A1, B1, C1	Learn about soft computing techniques and their applications	In class	In class activities and home duties
Week 3	2 Theoretical	A1, B1, C1	Chromosome encoding and selection techniques	In class	In class activities
Week 4	2 Theoretical	A2, B2, C2	GA operators and their types	In class	In class activities
Week 5	2 Theoretical	A2, B2, C2	Applied Examples using GA	In class	In class activities and home duties

Week 6	2 Theoretical	A2, B2, C2	Genetic Programming	In class	In class activities and home duties
Week 7	2 Theoretical		Concepts of fuzzy logic	In class	In class activities and home duties
Week 8	2 Theoretical	A3, B3, C3	create fuzzy logic	In class	Quiz 1
Week 9	2 Theoretical	A3, B3, C3	Basic elements of fuzzy system	In class	Questions during the lecture
Week 10	2 Theoretical	A3, B3, C3	Universe of discourse, and crisp and fuzzy sets definitions	In class	Home duties and questions during the lecture
Week 11	2 Theoretical	A3, B3, C3	Monthly exam	In class	Mid Term
Week 12	2 Theoretical	A4, B4, C4	Types of fuzzy membership functions	In class	Quiz 2
Week 13	2 Theoretical	A4, B4, C4	Fuzzy Relations	In class	In class activities
Week 14	2 Theoretical	A4, B4, C4	Fuzzy Projections and decompositions Fuzzy Rules and Algorithm	In class	Assignment Presentation
Week 15	2 Theoretical	A4, B4, C4	Presentations	In class	In class activities
Week 16	3 hrs		Final Exam		Final Exam
Course Evaluation					
Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports etc					
Learning and Teaching Resources					
Required textbooks (curricular books, if any)		J. Fodor and R. Fuller (Eds.). Advances in Soft Computing, Intelligent Robotics and Control. Springer, 2014			
Main references (sources)		F. O. Karray and C. W. Silva. Soft Computing and Intelligent Systems Design: Theory, Tools and Applications. 1st Edition Addison-Wesley, 2004.			
Recommended books and references (scientific journals, reports...)		Research in research engines specialized in scientific research such as: •Google scholar •Science direct •IEEE.			
Electronic References, Websites					

English

Course Name: English					
Course Code: UR449					
Semester / Year: Semester 2 \ 2025-2026					
Description Preparation Date: 01/10/2025					
Available Attendance Forms: Offline, In class					
Number of Credit Hours (Total) / Number of Units (Total)					
2 hours per week / 30 hours of study in the classroom / 2 unit					
Course administrator's name (mention all, if more than one name)					
Name: - Hasseeb Dawood Injas Email: - Hasseeb.d.injas@aliraqia.edu.iq					
Course Objectives					
Course Objectives	•Explaining and clarifying through lectures. •Presenting scientific materials using presentation devices: data projectors, interactive whiteboards, and screens with speakers. •Encouraging self-learning through homework assignments and mini-projects integrated within the lectures.				
Teaching and Learning Strategies					
Strategy	Cognitive objectives: A1-Making students familiar with the rules of the English language. A2-Enabling students to understand how to interact with English speakers. A3-Instilling in students the recognition of the significance of English as a global language. Affective and values-based objectives: B1-Encouraging students to learn English vocabulary and grammar rules. B2-Developing students' verbal communication skills. B3-Acquiring the required skills for post-graduation plans and advanced studies. Skills-based objectives: C1-Listening to English speakers and making continuous efforts to speak for linguistic development. C2-Preparing students with a broad understanding of English grammar rules so that graduates can employ this knowledge in their respective fields of specialization. C3-Acquiring knowledge and understanding of the English language, along with the ability to write research in it.				
Course Structure					
Course Structure: Second Semester 01-10-2023					
The week	Hours	Required learning outcomes	Unit/Module or Topic Title	Teaching Method	Assessment Method
Week 1	2 Theoretical	A1, B1, C1	Present perfect	In class	In class activities
Week 2	2 Theoretical	A1, B1, C1	Simple and continuous	In class	In class activities and home duties
Week 3	2 Theoretical	A1, B1, C1	Passive and adverbs	In class	In class activities
Week 4	2 Theoretical	A2, B2, C2	Time expression	In class	In class activities
Week 5	2 Theoretical	A2, B2, C2	Spoken English	In class	In class activities and home duties
Week 6	2 Theoretical	A2, B2, C2	Verb + ing	In class	In class activities and home duties
Week 7	2 Theoretical		Verb + infinitive	In class	In class activities and home duties
Week 8	2 Theoretical	A3, B3, C3	Adjective + + infinitive	In class	Quiz 1
Week 9	2 Theoretical	A3, B3, C3	Spoken English	In class	Questions during the lecture
Week 10	2 Theoretical	A3, B3, C3	Conditionals	In class	Home duties and questions during the

					lecture
Week 11	2 Theoretical	A3, B3, C3	Second conditionals	In class	Mid Term
Week 12	2 Theoretical	A4, B4, C4	Third Conditionals	In class	Quiz 2
Week 13	2 Theoretical	A4, B4, C4	Might have done\	In class	In class activities
Week 14	2 Theoretical	A4, B4, C4	Could have done	In class	Assignment Presentation
Week 15	2 Theoretical	A4, B4, C4	Mid-course Exam	In class	In class activities
Week 16	3 hrs		Final Exam		Final Exam
Course Evaluation					
Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports etc					
Learning and Teaching Resources					
Required textbooks (curricular books, if any)			Text book: Head Way Intermediate Level Fourth Edition; Liz and John Soars; OXFORD.		
Main references (sources)					
Recommended books and references (scientific journals, reports...)			Research in research engines specialized in scientific research such as: •Google scholar •Science direct •IEEE.		
Electronic References, Websites			https://elt.oup.com/student/headway/int/?cc=global&selLanguage=en		

Project Management

Course Name: Project Management					
Course Code: CE436					
Semester / Year: Semester 2 \ 2025-2026					
Description Preparation Date: 01/10/2025					
Available Attendance Forms: Offline, In class					
Number of Credit Hours (Total) / Number of Units (Total)					
2 hours per week / 30 hours of study in the classroom / 2 unit					
Course administrator's name (mention all, if more than one name)					
Name: - Yasmine Mustafa Khazaal Email: - Yasmin.m.khazaal@aliraqia.edu.iq					
Course Objectives					
Course Objectives	The objective of this course is to develop an understanding of the basic ideas of project management encountered in engineering. Focus will be on the methods for understanding project initiation and lifecycle in addition to fundamentals of the project planning techniques such as Bar chart, CPM, and project networks. Students will learn some about program evaluation and review technique (PERT) and time-cost relationship in PM (project crashing) that are useful for the understanding of different engineering projects. Another objective is to teach the Engineering student about Cash flow forecasting, Linear programming problem, managing Project Stakeholders, and project quality control and assurance. Finally, the student will learn the concept of using MS project software for designing real-life projects.				
Teaching and Learning Strategies					
Strategy	A.Cognitive goals The student will learn the basic and applied concepts of Project management with the following fundamentals: A.1. Understand the fundamentals and importance of project management in achieving organizational goals and objectives. A.2. Developing skills in project initiation and planning. A.3. Gaining knowledge of project planning. A.4 Understand and apply network planning techniques (A.O.N & A.O.A). A.5. Apply network planning techniques such as Bar chart, CPM, and project networks. A.6. Express the concepts of time-cost relationship in PM (project crashing). A.7. Understand the concept of cash flow forecasting. A.8 Understand the concept of Linear programming problem. A.9. Express the concepts of Managing Project Stakeholders and Project Quality control. A.10. Gaining practical experience in developing and managing projects using MS project software.				
Course Structure					
Course Structure: Second Semester 01-10-2023					
The week	Hours	Required learning outcomes	Unit/Module or Topic Title	Teaching Method	Assessment Method
Week 1	2 Theoretical	A1, B1, C1	Introduction to Project Management (PM)	In class	In class activities
Week 2	2 Theoretical	A1, B1, C1	Project Methodologies and Processes	In class	In class activities and home duties
Week 3	2 Theoretical	A1, B1, C1	Project Planning	In class	In class activities
Week 4	2 Theoretical	A2, B2, C2	Project Planning: The	In class	In class activities
Week 5	2 Theoretical	A2, B2, C2	Work Breakdown Structure (WBS)	In class	In class activities and home duties
Week 6	2 Theoretical	A2, B2, C2	Developing the Project Schedule: Critical Path Management (CPM)	In class	In class activities and home duties
Week 7	2 Theoretical		Project Network Diagrams:	In class	In class activities and home duties
Week 8	2 Theoretical	A3, B3, C3	A.O.N & A.O.A	In class	Quiz 1
Week 9	2 Theoretical	A3, B3, C3	Bar Charts & Program	In class	Questions during the lecture

Week 10	2 Theoretical	A3, B3, C3	evaluation and review technique (PERT)	In class	Home duties and questions during the lecture
Week 11	2 Theoretical	A3, B3, C3	Mid-course Exam	In class	Mid Term
Week 12	2 Theoretical	A4, B4, C4	Time-Cost Relationship	In class	Quiz 2
Week 13	2 Theoretical	A4, B4, C4	in PM (project crashing)	In class	In class activities
Week 14	2 Theoretical	A4, B4, C4	Cash flow forecasting	In class	Assignment Presentation
Week 15	2 Theoretical	A4, B4, C4	Linear programming problem	In class	In class activities
Week 16	3 hrs		Final Exam		Final Exam
Course Evaluation					
Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports etc					
Learning and Teaching Resources					
Required textbooks (curricular books, if any)			•Information Technology Project Management, Jack T. Marchewka, Wiley, 2015. •PMP in Depth: Project Management Professional Study PMP in Depth, 2nd Edition, ISBN: 159863996X •Project Management Professional Study Guide for the PMP Exam		
Main references (sources)					
Recommended books and references (scientific journals, reports...)			Research in research engines specialized in scientific research such as: •Google scholar •Science direct •IEEE.		
Electronic References, Websites			Here's a summary of important URLs related to this book: https://www.coursera.org/learn/		

Digital Multimedia Processing

Course Name: Digital Multimedia Processing	
Course Code: CE435	
Semester / Year: Semester 2 \ 2025-2026	
Description Preparation Date: 01/10/2025	
Available Attendance Forms: Offline, In class	
Number of Credit Hours (Total) / Number of Units (Total)	
2 hours per week / 30 hours of study in the classroom / 2 unit	
Course administrator's name (mention all, if more than one name)	
Name: - Mamoun Jassim Mohammed Email: - mamoun.jassim@aliraqia.edu.iq	
Course Objectives	
Course Objectives	1.Understand the fundamental concepts and characteristics of multimedia data. 2.Learn the principles and techniques of digital image processing, video processing, audio processing, and graphics processing. 3.Gain proficiency in using digital multimedia processing tools and software libraries. 4.Explore advanced topics such as multimedia compression, multimedia retrieval, and multimedia applications. 5.Develop practical skills through hands-on projects and assignments in digital multimedia processing.
Teaching and Learning Strategies	
Strategy	A.Cognitive goals Cognitive goals in digital multimedia processing refer to the objectives related to the cognitive aspects of understanding, analyzing, and interpreting multimedia content. These goals aim to enhance human perception, cognition, and interaction with multimedia data. Here are some cognitive goals associated with digital multimedia processing: 1.AEnhancing Perceptual Experience: Digital multimedia processing aims to enhance the perceptual experience of users by improving the quality and realism of multimedia content. This includes techniques such as image enhancement, noise reduction, color correction, and spatial filtering to make multimedia content more visually appealing and engaging. 2.AFacilitating Understanding and Interpretation: Multimedia processing techniques can aid in facilitating understanding and interpretation of complex multimedia content. For example, techniques such as image segmentation, object recognition, and scene understanding help in extracting meaningful information from images and videos, making it easier for users to comprehend the content. 3.ASupporting Cognitive Load Management: Effective multimedia processing techniques can help manage cognitive load by presenting information in a way that is easy to process and understand. For instance, multimedia compression techniques reduce the size of multimedia files without significant loss of quality, making it easier for users to access and process multimedia content efficiently. 4.AImproving Learning and Retention: Multimedia processing can enhance learning and retention by presenting information in multiple modalities, such as text, images, audio, and video. This facilitates better comprehension and memory retention compared to traditional text-based learning methods. For example, multimedia presentations and educational videos leverage multimedia processing techniques to deliver engaging and interactive learning experiences. 5.AEnabling Multimodal Interaction: Digital multimedia processing enables multimodal interaction, allowing users to interact with multimedia content using multiple modalities such as gestures, voice commands, and touch inputs. This enhances user engagement and interaction with multimedia applications and systems, leading to a more immersive and intuitive user experience. 6.ASupporting Cognitive Accessibility: Multimedia processing techniques can be employed to support cognitive accessibility by adapting multimedia content to the diverse cognitive abilities and preferences of users. This includes providing alternative representations of multimedia content, such as subtitles, audio descriptions, and simplified visualizations, to cater to users with different cognitive needs. 7.AFacilitating Decision Making: Multimedia processing techniques can aid in decision making by providing users with relevant information and insights from multimedia data. For example, data visualization techniques help users analyze and interpret large datasets through interactive visual representations, facilitating informed decision making in various domains such as business, healthcare, and scientific research. 8.APromoting Creativity and Expression: Digital multimedia processing fosters creativity and expression by providing users with tools and techniques to manipulate and transform multimedia content in novel ways. This includes creative applications such as digital art, photo editing, video editing, and multimedia storytelling, which empower users to express themselves creatively through multimedia content. B. The skills goals special to the course of Digital Multimedia Processing In a course focused on Digital Multimedia Processing, the skills goals are tailored to equip students with the necessary knowledge and competencies to effectively work with multimedia data, manipulate various types of media, and apply digital processing techniques to enhance and analyze multimedia content. Here are some skills goals special to such a course: 1.BImage Processing Skills: •Ability to apply a range of image processing techniques such as filtering, segmentation, feature extraction,

	and morphological operations to manipulate and analyze images. •Proficiency in using image processing software libraries (e.g., OpenCV, MATLAB Image Processing Toolbox) to implement image processing algorithms and workflows. 2.BVideo Processing Skills: •Competence in processing and analyzing video data, including tasks such as video enhancement, motion estimation, object tracking, and video compression. •Understanding of video codecs, compression standards (e.g., MPEG, H.264), and video processing techniques for efficient storage and transmission of video content. 3.BAudio Processing Skills: •Proficiency in audio processing techniques such as filtering, spectral analysis, noise reduction, speech recognition, and audio compression. •Familiarity with audio processing software tools and libraries (e.g., MATLAB, Audacity) for implementing audio processing algorithms and applications. 4.BGraphics Processing Skills: •Competence in 2D and 3D graphics rendering techniques, including geometric transformations, texture mapping, shading, and rendering optimization. •Proficiency in using graphics programming frameworks (e.g., OpenGL, WebGL) and graphics software tools for creating and manipulating graphical content. 5.BMultimedia Compression Skills: •Understanding of multimedia compression principles, algorithms, and standards (e.g., JPEG, MPEG, MP3) for reducing the size of multimedia data while preserving perceptual quality. •Ability to implement and optimize multimedia compression algorithms and codecs for efficient storage, transmission, and playback of multimedia content. 6.BMultimedia Retrieval and Analysis Skills: •Proficiency in multimedia retrieval techniques, including content-based retrieval, feature extraction, similarity matching, and indexing of multimedia data. •Competence in using multimedia analysis tools and software platforms for extracting insights, patterns, and trends from large-scale multimedia datasets. 7.BProgramming and Software Development Skills: •Strong programming skills in languages commonly used for multimedia processing such as Python, MATLAB, C/C++, and Java. •Ability to design, implement, and debug multimedia processing algorithms and applications using appropriate programming languages and software development tools. 8.BCritical Thinking and Problem-Solving Skills: •Capacity to analyze multimedia processing problems, identify appropriate algorithms and techniques, and develop innovative solutions to address them. •Ability to evaluate the performance and effectiveness of multimedia processing techniques through experimentation, testing, and validation. 9.BCollaboration and Communication Skills: •Effective communication and collaboration skills for working in multidisciplinary teams on multimedia processing projects. •Ability to communicate technical concepts, methodologies, and findings effectively through written reports, presentations, and demonstrations. 10.BEthical and Professional Conduct: •Understanding of ethical considerations and best practices in multimedia processing, including issues related to privacy, intellectual property, and responsible use of multimedia data. •Adherence to professional standards and codes of conduct in the collection, processing, and dissemination of multimedia content. These skills goals are essential for students to succeed in applying digital multimedia processing techniques across various domains such as entertainment, education, healthcare, communications, and multimedia content production.
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Course Structure

Course Structure: Second Semester 01-10-2023

The week	Hours	Required learning outcomes	Unit/Module or Topic Title	Teaching Method	Assessment Method
Week 1	2 Theoretical	A1, B1, C1	1 Introduction to Multimedia.	In class	In class activities
Week 2	2 Theoretical	A1, B1, C1	2 Media and data streams. Sound and audio.	In class	In class activities and home duties
Week 3	2 Theoretical	A1, B1, C1	3 Digital sampling and representation.	In class	In class activities
Week 4	2 Theoretical	A2, B2, C2	4 Image & video types. Color Model	In class	In class activities
Week 5	2 Theoretical	A2, B2, C2	5 Digital Multimedia & Pattern Recognition	In class	In class activities and home duties

Week 6	2 Theoretical	A2, B2, C2	6 Speech recognition and synthesis.	In class	In class activities and home duties
Week 7	2 Theoretical		7 Digital images processing and recognition.	In class	In class activities and home duties
Week 8	2 Theoretical	A3, B3, C3	8 Mid-Course Exam	In class	Quiz 1
Week 9	2 Theoretical	A3, B3, C3	9 Image filtering. Image segmentation.	In class	Questions during the lecture
Week 10	2 Theoretical	A3, B3, C3	10 Augmented imagery. Video.	In class	Home duties and questions during the lecture
Week 11	2 Theoretical	A3, B3, C3	11 -Animation and time - Synchronization.	In class	Mid Term
Week 12	2 Theoretical	A4, B4, C4	12 Media compression. Multimedia storage.	In class	Quiz 2
Week 13	2 Theoretical	A4, B4, C4	13 Content analysis and multimedia databases	In class	In class activities
Week 14	2 Theoretical	A4, B4, C4	14 Games and game design.	In class	Assignment Presentation
Week 15	2 Theoretical	A4, B4, C4	15 Hypermedia and World Wide Web.	In class	In class activities
Week 16	3 hrs		Final Exam		Final Exam
Course Evaluation					
Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports etc					
Learning and Teaching Resources					
Required textbooks (curricular books, if any)		“Multimedia Image and Video Processing”, 2012, Second Edition, By Ling Guan, Yifeng He, Sun-Yuan Kung ISBN 9781439830864			
Main references (sources)		Fundamentals of Multimedia: Ze-Nian Li & Mark S. Drew, Pearson Prentice Hall, 2004			
Recommended books and references (scientific journals, reports...)		Research in research engines specialized in scientific research such as: •Google scholar •Science direct •IEEE.			
Electronic References, Websites		Here's a summary of important URLs related to this book: https://www.coursera.org/learn/ Digital Multimedia Processings fundamentals			

I/O Interfacing devices

Course Name: I/O Interfacing devices					
Course Code: CODE: 447					
Semester / Year: Semester 2 \ 2025-2026					
Description Preparation Date: 01/10/2025					
Available Attendance Forms: Offline, In class					
Number of Credit Hours (Total) / Number of Units (Total)					
2 hours per week / 30 hours of study in the classroom / 2 unit					
Course administrator's name (mention all, if more than one name)					
Name: - Wasseem N. Ibrahim Al-Obaydy					
Email: - wasseem.nahi@aliraqia.edu.iq					
Course Objectives					
Course Objectives	The aim of this course is to develop an understanding of the basic ideas of the Input &output encountered in engineering. The focus will be on the methods for characterizing and analyzing Cpu request and orders to I/O devices through memory. Students will learn some transform techniques.				
Teaching and Learning Strategies					
Strategy	A.Cognitive goals The student will learn the basic and applied concepts of Input output devices with the following fundamentals: A.1. Understand the fundamentals of Input /Output Devices. A.2. Express the concepts of input output Devices and their different types which can be used in a wide variety of disciplines in engineering. A.3. Identify and report logic families & specifications and bidirectional ports A.4. Identify Binary input/output devices Binary input/output devices. A.5. Understand Synchronization, time multiplexing, and modules interfacing. A.6. Understand Sensors: Applications and interfacing implementation. A.7. Understand DAC interfacing and applications. B. The skills goals special to the course of Signals and Systems B.1 Develop proficiency in analyzing signals, understanding their characteristics, and interpreting information embedded in different types of input output devices. B.2 Acquire skills in modeling engineering systems, translating real-world systems into mathematical representations for analysis and design. B.3 Master transform techniques, particularly Fourier transforms, to analyze input output in into system behavior. B.4 Learn to design filters for various applications, such as signal processing and communication systems, considering specifications and constraints. B.5 Understand and apply time and frequency domain analysis methods to evaluate system performance and behavior. B. Comprehend how systems respond to different inputs, studying transient and steady-state behavior.				
Course Structure					
Course Structure: Second Semester 01-10-2023					
The week	Hours	Required learning outcomes	Unit/Module or Topic Title	Teaching Method	Assessment Method
Week 1	2 Theoretical	A1, B1, C1	Fundamental Concepts of I/O devices - Introduction	In class	In class activities
Week 2	2 Theoretical	A1, B1, C1	logic families & specifications and bidirectional ports.	In class	In class activities and home duties
Week 3	2 Theoretical	A1, B1, C1	Software I/O control techniques	In class	In class activities
Week 4	2 Theoretical	A2, B2, C2	a. polling / programmed	In class	In class activities
Week 5	2 Theoretical	A2, B2, C2	b. interrupt-driven	In class	In class activities and home duties
Week 6	2 Theoretical	A2, B2, C2	c. direct memory access	In class	In class activities and home duties

Week 7	2 Theoretical		d. multiplexed I/O	In class	In class activities and home duties
Week 8	2 Theoretical	A3, B3, C3	Digital Interfacing:	In class	Quiz 1
Week 9	2 Theoretical	A3, B3, C3	Binary input/output devices.	In class	Questions during the lecture
Week 10	2 Theoretical	A3, B3, C3	Binary input/output devices.	In class	Home duties and questions during the lecture
Week 11	2 Theoretical	A3, B3, C3	Mid-term Exam	In class	Mid Term
Week 12	2 Theoretical	A4, B4, C4	Synchronization, time multiplexing, and modules interfacing.	In class	Quiz 2
Week 13	2 Theoretical	A4, B4, C4	Digital I/O expansion.	In class	In class activities
Week 14	2 Theoretical	A4, B4, C4	Analog Interfacing	In class	Assignment Presentation
Week 15	2 Theoretical	A4, B4, C4	DAC interfacing and applications.	In class	In class activities
Week 16	3 hrs		Final Exam		Final Exam
Course Evaluation					
Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports etc					
Learning and Teaching Resources					
Required textbooks (curricular books, if any)			•Alan V. Oppenheim, Signals & Systems 2nd Edition, Pearson Education, 2008. •Signals and Systems, Simon Haykin and Barry Van Veen, 2nd edition, Wiley 2005.		
Main references (sources)					
Recommended books and references (scientific journals, reports...)			Research in research engines specialized in scientific research such as: •Google scholar •Science direct •IEEE.		
Electronic References, Websites					

Computer Security

Course Name: Computer Security					
Course Code: CE446					
Semester / Year:					
4/2					
Description Preparation Date:					
2/10/2024					
Available Attendance Forms:					
Classroom, virtual zoom meet					
Number of Credit Hours (Total) / Number of Units (Total) 125/5					
125/5					
Course administrator's name (mention all, if more than one name)					
Name: Prof.Dr. Tayseer S. Atia Email: Tayseer.salman@aliraqia.edu.iq					
Course Objectives					
Course Objectives		Computer security is an essential subject that covers a wide range of topics related to protecting computer systems and networks from unauthorized access, theft, damage, or disruption. Some possible objectives of computer security subject include: 1. Understanding the threats: Computer security subject can help students understand the various types of threats that computer systems and networks face, such as malware, phishing attacks, and social engineering. 2. Developing security policies: Computer security subject can help students learn how to develop effective security policies and procedures for organizations to ensure that sensitive data is protected. 3. Implementing security controls: Computer security subject can help students learn how to implement various security controls, such as firewalls, intrusion detection systems, and encryption, to protect computer systems and networks. 4. Cybersecurity awareness: Computer security subject can help students become more aware of cybersecurity issues and best practices, such as how to create strong passwords, avoid phishing scams, and protect personal information online. 5. Incident response: Computer security subject can help students learn how to respond to security incidents, such as data breaches or cyber attacks, in a timely and effective manner to minimize damage and prevent future incidents.			
Teaching and Learning Strategies					
Strategy	1. Lectures: Lectures are an effective way to deliver theoretical knowledge to students. Lectures can cover topics such as the basic concepts of computer security, security threats, cryptography, and network security. 2. Case studies: Case studies can be used to illustrate real-world examples of security incidents and how they were handled. This can help students understand the importance of incident response and the impact of security incidents. 3. Lab exercises: Lab exercises can provide students with hands-on experience in implementing security controls, such as firewalls, intrusion detection systems, and encryption. This can help students develop practical skills that are essential for securing computer systems and networks. 4. Group projects: Group projects can be used to encourage collaboration and teamwork among students. Group projects can involve developing security policies and procedures for organizations or conducting vulnerability assessments on computer systems. 5. Online resources: Online resources such as videos, podcasts, and articles can be used to supplement lectures and provide additional learning materials for students.				
Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method

1	2	1. Understanding of security concepts: Students should have a solid understanding of the fundamental concepts of computer security, including confidentiality, integrity, and availability. 2. Knowledge of security threats: Students should be able to identify and analyze various types of security threats, such as malware, phishing, and social engineering attacks. 3. Ability to develop security policies: Students should be able to develop effective security policies and procedures for organizations to ensure that sensitive data is protected.	Computer security, Computer Security Goal (confidentiality, integrity, and availability), Vulnerabilities, Threats (interruption, interception, modification and fabrication), Attacks, and Controls, H.W,SW, data Vulnerabilities and controls, method of defense.	-lectures -case studies	Homework +quiz
2+3	4	Implementing security controls: Computer security subject can help students learn how to encrypt data by classical method of encryption(substitution, permutation)	Cryptography Terminology and Background(encryption, decryption , plain text, cipher text, key), encryption services, Substitution Ciphers(Caesar cipher, Scrambled alphabet , Substitution with key as a sentence Transpositions (Columnar transposition)	lecture	Homework +lab exercises
4+5	4	Implementing security controls: Computer security subject can help students learn how to encrypt data by symmetric method of encryption(DES)	Symmetric Encryption Systems , Stream and Block Ciphers, Confusion and Diffusion, The Data Encryption Standard(DES) , Encryption on DES, Decryption of DES, Security of DES Weakness of DDES	lectures	Homework, lab lab exercise, quiz
6+7	4	Implementing security controls: Computer security subject can help students learn how to encrypt data by asymmetric method of encryption(RSA)	Public key cryptosystem The uses of public key Number theory concept The RSA algorithm Security and threat on RSA	lectures	Homework, lab lab exercise, quiz
8+9	4	Implementing security controls: Computer security subject can help students learn how to encrypt data by one way hash function(SHA-1)	One-Way Hash Functions Properties and application of SHA Details of SHA-1	lectures	Homework, lab lab exercise, quiz
10		. Knowledge of security controls: Students should be able to implement various security controls, such as firewalls, intrusion detection systems, and encryption, to	-Authentication -Identification versus -Authentication Based on Phrases and Facts (Password, attack on password(dictionary	lectures	Homework, lab lab exercise, quiz

		protect computer systems and networks.	exhaustive), good password.) Authentication Based on Biometrics Authentication Based on Tokens: Multifactor Authentication Secure Authentication		
11	4	. Knowledge of security controls: Students should be able to implement various security controls, such as firewalls, intrusion detection systems, and encryption, to protect computer systems and networks.	Program Flaws Non-malicious Program Errors(Buffer Overflow, Incomplete Mediation, Time-of-Check to Time-of-Use Errors) 2. Intentional Program error Malicious Code(virus, Trojan horse, Worm) Developmental Controls (Modularity, Encapsulation, and Information Hiding)	lectures	Homework, lab lab exercise, quiz
12	2	. Knowledge of security controls: Students should be able to implement various security controls, such as firewalls, intrusion detection systems, and encryption, to protect computer systems and networks. 5. Awareness of cybersecurity best practices: Students should be aware of cybersecurity best practices, such as how to create strong passwords, avoid phishing scams, and protect personal information online. 6. Ability to respond to security incidents: Students should be able to respond to security incidents in a timely and effective manner to minimize damage and prevent future incidents.	Network security	Group project	assignments
13	2	4. Knowledge of security controls: Students should be able to implement various security controls, such as firewalls, intrusion detection systems, and encryption, to protect computer systems and networks. 5. Awareness of cybersecurity best practices: Students should be aware of cybersecurity best practices, such as how to create strong passwords, avoid phishing scams, and protect personal information online. 6. Ability to respond to security incidents: Students should be able to respond to	web security	Group project	assignments

		security incidents in a timely and effective manner to minimize damage and prevent future incidents.			
14	2	5. Awareness of cybersecurity best practices: Students should be aware of cybersecurity best practices, such as how to create strong passwords, avoid phishing scams, and protect personal information online. 6. Ability to respond to security incidents: Students should be able to respond to security incidents in a timely and effective manner to minimize damage and prevent future incidents.	Cyber security	Group project	assignments
15	2	4. Knowledge of security controls: Students should be able to implement various security controls, such as firewalls, intrusion detection systems, and encryption, to protect computer systems and networks. 6. Ability to respond to security incidents: Students should be able to respond to security incidents in a timely and effective manner to minimize damage and prevent future incidents.	IoT security	Group project	assignments

Course Evaluation

Learning and Teaching Resources

Required textbooks (curricular books, if any)	1. "Security in Computing" by Charles P. Pfleeger and Shari Lawrence Pfleeger, 5th ed., Prentice Hall.
Recommended books and references (scientific journals, reports...)	1. "Computer Security: Principles and Practice" by William Stallings and Lawrie Brown: 2. "Applied Cryptography: Protocols, Algorithms, and Source Code in C" by Bruce Schneier.
Electronic References, Websites	- The Hacker News (https://thehackernews.com/) - Krebs on Security (https://krebsonsecurity.com/) - Dark Reading (https://www.darkreading.com/) - Threatpost (https://threatpost.com/) - SecurityWeek (https://www.securityweek.com/)