Academic Program Description Form

University Name: University of Babylon
Faculty/Institute: College of Engineering
Scientific Department: Dept. of Electrical Engineering
Academic or Professional Program Name: Academic Program
Final Certificate Name: BSC
Academic System: college of engineering
Description Preparation Date: 2024/10/16
File Completion Date: 2024/10/8

Signature:
Head of Department Name: Prof. Dr. Qais Kareem Omran

Date: 29/10/2024

Signature:
Scientific Associate Name:

Date:

The file is checked by:
Department of Quality Assurance and University Performance
Director of the Quality Assurance and University Performance Department:
Date:
Signature:
Zainab Ali Omran

Approval of the Dean

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

Academic Program and Course Description Guide

Introduction:

The Electrical Engineering Department at Babylon University creates an inspiring education and research environment for students, faculty, and staff to expand knowledge and improve life through innovation in research and engineering education. It acts as a "living laboratories" that successfully prepares tomorrow forward-thinking leaders with experience needed to succeed.

B.1. Degree Titles

Bachelor of Science in Electrical Engineering

B.2. Program Delivery Modes

The program in Electrical Engineering (EE) is offered as a full-time day mode program, requiring the completion of 158 credit hours for graduation. It is delivered in form of traditional lectures and laboratories in addition to summer training.

B.3. Contact Information

- The college works within the general organizational structure of the University of Babylon which is connected with the Ministry of Higher Education and Scientific Research where the instructions are centralized by the ministry.

It's possible to contact the college within the University of Babylon units by using the internal network (Intranet). Sites and internal e-mail addresses were created for the college and staff but it's partial

- in order to facilitate the communication between the college and the university president's offices. These e-mail addresses were created within the university of Babylon site and has the domain:

  www.uobabylon.edu.iq

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1. Program Vision

To be a world-class college and a pioneer in engineering education, innovative research and building knowledge society.

2. Program Mission

The department can be pointed out the following points:
Prepare students to graduate as engineers with strong technical, scientific and professional skills in the field of electrical engineering that responds the needs of the community focusing on analysis and decision making.
1. Activate postgraduate studies.
2. Participate in scientific activities through updated research and taking part in symposiums and conferences.
3. Playing a leading role in improving public services with regard to the electricity sector through scientific consultations with state institutions and the private sector.

3. Program Objectives

The EE department has defined a set of objectives that translates its mission into measurable and defined tasks. The objectives of the EE program objectives are as follows:
1. To prepare graduates who are able to practice electrical engineering in its major areas, such as communications, electric power, electronics and digital systems.
2. To further develop skills pertinent to electrical engineering problem definition, formulation, design, and analysis.
3. To apply and practice the electrical engineering knowledge in a professional setting such as ethics and safety.
4. To demonstrate ability for scholarship, long life learning, leadership and service among the graduates.
5. To produce graduates who further develop team work and effective communications skills.

4. Program Accreditation

Yes, Accreditation Board for Engineering and Technology
(ABET)

5. Other external influences

Higher Education and Scientific Research

* This can include notes whether the course is basic or optional.

6. Program Structure

Program Structure	Number of Courses	Credit hours	Percentage	Reviews*
Institution Requirements	13	15	10.4895%	-
College Requirements	6	18	12.5874%	-
Department Requirements				
Summer Training	Summer Break			
Other	Workshops and industrial visits			
Department Requirements	45	110	76.9231%	-
Summer Training	1	-	-	-
Other	-	-	-	-

7. Program Description

Year/Level	Course Code	Course Name	Credit Hours	
			theoretic	practical
Second	EnElMaIII21601 (3,1,0)	Mathematics III	3	-
	EnElMaIV22409 (3,1,0)	Mathematics IV	3	-
Second	EnElEsI21803 (2,1,0)	Electronics I	2	-
	EnElEsII22611 (2,1,0)	Electronics II	2	-
Second	EnElEmI21904 (2,1,0)	Electrical Machines I	2	-
	EnElEmII22712 (2,1,0)	Electrical Machines II	2	-
Second	EnElCpI22005 (1,1,2)	Computers	1 1	1 1

	EnElCpII22813 (1,1,2)	Programming I Computer Programming II		
Second	EnElLaIII22207 (0,0,6) EnElLaIV23015 (0,0,6)	Laboratories III Laboratories IV	- -	6 6
Second	EnElEl22308(1,1,0) EnElEl23116(1,1,0)	English Language II English Language IV	1 1	
Second	EnElEn21702 (4,1,0)	Electrical Networks	4	
Second	EnElFd22106 (1,1,0)	Freedom and Democracy	1	- -
Second	EnElEf22510 (4,0,0)	Electromagnetic Fields	4	-
Second	EnElMm22914 (3,1,2)	Microprocessor and Microcontroller	3	2
Third	EnElEaI33201 (3,1,0) EnElEaII34009 (3,1,0)	Engineering Analysis I Engineering Analysis II	3 3	- -
Third	EnElEsIII33302 (2,1,0) EnElEsIV34110 (2,1,0)	Electronics III Electronics IV	2 2	- -
Third	EnElCoI33403 (3,1,0) EnElCoII34211 (3,1,0)	Communications I Communications II	3 3	- -
Third	EnElEpI33504 (2,1,0) EnElEpII34312 (2,1,0)	Electrical Power I Electrical Power II	2 2	- -
Third	EnElEmIII33605 (2,1,0 EnElEmIV34413 (2,1,0)	Electrical Machines III Electrical Machines IV	2 2	- -
Third	EnElLaV33807 (0,0,6) EnElLaVI34615 (0,0,6)	Laboratories V Laboratories VI	6 6	- -
Third	EnElEl33908(1,1,0) EnElEl34716 (1,1,0)	English Language V English Language VI	1 1	- -
Third	EnElOc33706 (3,1,0)	Optical Communications	3	-

Third	EnElAw34514 (3,1,0)	Antennas & Waves Propagations	3	-
Fourth	EnElCoIII44801 (3,1,0) EnElCoIV45609 (3,1,0)	Communications III Communications IV	3 3	- -
Fourth	EnElPsI44902 (3,1,0) EnElPsII45710 (3,1,0)	Electrical Power System Analysis I Electrical Power System Analysis II	3 3	- -
Fourt Fourth h	EnElPeI45003 (3,0,0) EnElPeII45811 (3,0,0)	Power Electronics I Power Electronics II	3 3	- -
Fourth	EnElCeI45104 (3,1,0) EnElCtII45912 (3,1,0)	Control Engineering I Control Engineering II	3 3	- -
Fourth	EnElLaVII45205(0,0,6) EnElLaVIII46013 (0,0,6)	Laboratories VII Laboratories VIII	6 6	- -
Fourth	EnElPr45306 (1,0,3) EnElPr46114 (1,0,3)	Project I ProjectII	1 1	3 3
Fourth	EnElEl45508 (1,1,0) EnElEl46316 (1,1,0)	English Language VII English Language VIII	1 1	
Fourth	EnElDe45407 (4,1,0)	Digital Electronics	4	
Fourth	EnElIm46215 (3,1,0)	Instrumentation Engineering & Microcontroller Systems	3	-

8. Expected learning outcomes of the program

Knowledge	
Cognitive goals	To know the concept of electrical engineering. To classify electrical engineering vocabulary. The student understands electrical engineering systems. To manage engineering matters
Skills	
The skills goals special to the programme .	The skills goals special to the program The student's knowledge of the concept of electrical circuits. The student's ability to analyze the electrical circuit and systems. The student's ability to design the electrical circuit and systems.
Ethics	
Teacher-student relationships: Trust, respect, and fairness should underpin every interaction. Ethical considerations guide teachers in fostering safe and supportive	Honesty: is a very important trait to have in Education. Honesty means being loyal, truthful, trustworthy, sincere, and fair. It is admirable in several cultures and religions.

9. Teaching and Learning Strategies

1- VERBAL COMMUNICATION
Student able to express his ideas clearly and confidently in speech:
- Verbal communication.
- Able to Express ideas clearly and confidence at talk.

2- TEAMWORK
Work confidently within a group:
- Teamwork
- The work in confidence within a group

3- ANALYSING & INVESTIGATING
Gather information systematically to establish facts & principles. Problem solving:
- Analysis and investigation.
- Collect information systematically and scientifically to establish facts and principles for a solution to a problem.

4- INITIATIVE/SELF MOTIVATION
Able to act on initiative, identify opportunities & proactive in putting forward ideas & solutions:
- Initiative.
- Motivation to work and the ability to take initiative, identify opportunities and develop ideas and solutions.

5- WRITTEN COMMUNICATION

10. Evaluation methods

1- Exams
2- Project discussion
3- Summer training
4- Practical exams

11. Faculty

Faculty Members

Academic Rank	Specialization		Special Requirements/ (if applicable)		Number of the teaching s	
	General	Special			Staff	Lecturer
	40	40			41	5

Professional Development

Mentoring new faculty members

Successful mentoring relationships go through four phases: preparation, negotiating, enabling growth, and closure. These sequential phases build on each other and vary in length. In each phase, there are specific steps and strategies that lead to mentoring excellence.

Professional development of faculty members

The Electrical Engineering curriculum emphasizes the continuous integration of classical and modern engineering principles with the life sciences. Electrical Engineers apply these skills to innovation in the industry, basic biological sciences, and the application.
Consistent with the mission of Babylon University and the College of Engineering, the Bachelor of Science program in Electrical Engineering aims to create world-class engineers who will, after graduation, contribute to social and economic development through the application of engineering to the solution of problems in industry.

12. Acceptance Criterion

central

13. The most important sources of information about the program

College and University website
University Guide
The most important books and resources for the department

14. Program Development Plan

The Electrical Engineering Department has significant plans for future development The Department has committees for this purpose. These committees are th Curriculum, Laboratory Development, and the Planning Committees. The purpos of these committees is to study, update and improve the program. The Electrica Engineering Department has prepared this report on the development of th department in accordance with the 5-year plan 2017-2022. Assume the department' target is to maintain a student/faculty ratio of 20. This number has been translated i the past few years in multi-sections of 35-40 students per class, crowded by al standards.

Year / Level	Course Code	Course Title	Core or Elective	Knowledge and understanding				The skills goals special to the course				Thinking Skills			
				A1	A2	A3	A4	B 1	B2	B3	B4	c1	C2	C3	C4
The second stage	EnElPm11313 (4,0,2)	Principles of Mechanical Engineering	Core	*	*	*	*	*	*	*	*	*	*	*	
	EnElLaII11414 (0,0,3)	Laboratories II	Core	*	*	*	*	*	*	*	*	*	*	*	
	EnElEl11515(1,1,0)	English Language II	Core	*	*	*	*	*	*	*	*	*	*	*	
	EnElMaIII21601 (3,1,0)	Mathematics III	Core												
	EnElEn21702 (4,1,0)	Electrical Networks	Core	*	*	*	*	*	*	*	*	*	*	*	
	EnElEsI21803 (2,1,0)	Electronics I	Core	*	*	*	*	*	*	*	*	*	*	*	
	EnElEmI21904 (2,1,0)	Electrical Machines I	Core	*	*	*	*	*	*	*	*	*	*	*	
	EnElCpI22005 (1,1,2)	Computers Programming I	Core	*	*	*	*	*	*	*	*	*	*	*	
	EnElFd22106 (1,1,0)	Freedom and Democracy	Core	*	*	*	*	*	*	*	*	*	*	*	
	EnElLaIII22207 (0,0,6)	Laboratories III	Core	*	*	*	*	*	*	*	*	*	*	*	
	EnElEl22308(1,1,0)	English Language III	Core	*	*	*	*	*	*	*	*	*	*	*	
	EnElMaIV22409 (3,1,0)	Mathematics IV	Core	*	*	*	*	*	*	*	*	*	*	*	
	EnElEf22510 (4,0,0)	Electromagnetic Fields	Core	*	*	*	*	*	*	*	*	*	*	*	
	EnElEsII22611 (2,1,0)	Electronics II	Core	*	*	*	*	*	*	*	*	*	*	*	

	EnElEmII22712 (2,1,0)	Electrical Machines II	Core	*	*	*	*	*	*	*	*	*	*	*	
	EnElCpII22813 (1,1,2)	Computer Programming II	Core	*	*	*	*	*	*	*	*	*	*	*	
	EnElMm22914 (3,1,2)	Microprocessor and Microcontroller	[illegible]	*	*	*	*	*	*	*	*	*	*	*	
	EnElLaIV23015 (0,0,6)	Laboratories IV	Core	*	*	*	*	*	*	*	*	*	*	*	
	EnElEl23116(1,1,0)	English Language IV	Core	*	*	*	*	*	*	*	*	*	*	*	
The third stage	EnElEaI33201 (3,1,0)	Engineering Analysis I	Core	*	*	*	*	*	*	*	*	*	*	*	
	EnElEsIII33302 (2,1,0)	Electronics III	Core	*	*	*	*	*	*	*	*	*	*	*	
	EnElCoI33403 (3,1,0)	Communications I	Core	*	*	*	*	*	*	*	*	*	*	*	
	EnElEpI33504 (2,1,0)	Electrical Power I	Core	*	*	*	*	*	*	*	*	*	*	*	
	EnElEmIII33605 (2,1,0)	Electrical Machines III	Core	*	*	*	*	*	*	*	*	*	*	*	
	EnElOc33706 (3,1,0)	Optical Communications	Elective	*	*	*	*	*	*	*	*	*	*	*	
	EnElLaV33807 (0,0,6)	Laboratories V	Core	*	*	*	*	*	*	*	*	*	*	*	
	EnElEl33908(1,1,0)	English Language V	Core	*	*	*	*	*	*	*	*	*	*	*	
	EnElEaII34009 (3,1,0)	Engineering Analysis II	Core	*	*	*	*	*	*	*	*	*	*	*	
	EnElEsIV34110 (2,1,0)	Electronics IV	Core	*	*	*	*	*	*	*	*	*	*	*	
	EnElCoII34211 (3,1,0)	Communications II	Core	*	*	*	*	*	*	*	*	*	*	*	
	EnElEpII34312 (2,1,0)	Electrical Power II	Core	*	*	*	*	*	*	*	*	*	*	*	
	EnElEmIV34413 (2,1,0)	Electrical Machines IV	Core	*	*	*	*	*	*	*	*	*	*	*	
	EnElAw34514 (3,1,0)	Antennas & Waves	Elective	*	*	*	*	*	*	*	*	*	*	*	

		Propagations													
	EnElLaVI34615 (0,0,6)	Laboratories VI	Core	*	*	*	*	*	*	*	*	*	*	*	
	EnElEl34716 (1,1,0)	English Language VI	Core	*	*	*	*	*	*	*	*	*	*	*	
The fourth stage	EnElCoIII44801 (3,1,0)	Communications III	Core	*	*	*	*	*	*	*	*	*	*	*	
	EnElPsI44902 (3,1,0)	Electrical Power System Analysis I	Core	*	*	*	*	*	*	*	*	*	*	*	
	EnElPeI45003 (3,0,0)	Power Electronics I	Core	*	*	*	*	*	*	*	*	*	*	*	
	EnElCeI45104 (3,1,0)	Control Engineering I	Core	*	*	*	*	*	*	*	*	*	*	*	
	EnElLaVII45205(0, 0,6)	Laboratories VII	Core	*	*	*	*	*	*	*	*	*	*	*	
	EnElPr45306 (1,0,3)	Project	Core	*	*	*	*	*	*	*	*	*	*	*	
	EnElDe45407 (4,1,0)	Digital Electronics	Elective	*	*	*	*	*	*	*	*	*	*	*	
	EnElEl45508 (1,1,0)	English Language VII	Core	*	*	*	*	*	*	*	*	*	*	*	
	EnElCoIV45609 (3,1,0)	Communications IV	Core	*	*	*	*	*	*	*	*	*	*	*	
	EnElPsII45710 (3,1,0)	Electrical Power System Analysis II	Core	*	*	*	*	*	*	*	*	*	*	*	
	EnElPeII45811 (3,0,0)	Power Electronics II	Core	*	*	*	*	*	*	*	*	*	*	*	
	EnElCtII45912 (3,1,0)	Control Engineering II	Core	*	*	*	*	*	*	*	*	*	*	*	
	EnElLaVIII46013 (0,0,6)	Laboratories VIII	Core	*	*	*	*	*	*	*	*	*	*	*	
	EnElPr46114 (1,0,3)	Project	Core	*	*	*	*	*	*	*	*	*	*	*	
	EnElIm46215 (3,1,0)	Instrumentation Engineering & Microcontroller	Elective	*	*	*	*	*	*	*	*	*	*	*	

		Systems													
	EnElEl46316 (1,1,0)	English Language VIII	Core	*	*	*	*	*	*	*	*	*	*	*	

- **Please tick the boxes corresponding to the individual program learning outcomes under evaluation.**

Course Description Form

1. Course Name: English Language V
2. Course Code: EnEIE33908(1,1,0)
3. Semester / Year: First Semester / Third
4. Description Preparation Date:
30/1/2025
5. Available Attendance Forms:
Room Lectures
6. Number of Credit Hours (Total) / Number of Units (Total) 1
30 hours.
7. Course administrator's name (mention all, if more than one name)
Name: Dr. Haider Abdallatif Mohamed-Kazim Email: haider.abdallatif@uobabylon.edu.iq
8. Course Objectives

Course Objectives	..... Module Objectives: ..... 1. Reading Comprehension: Enhance students' ability to understand and analyze different types of texts, including fiction, non-fiction, articles, and literary works. Improve vocabulary acquisition and develop critical reading skills. 2. Writing Skills: Develop students' writing skills by focusing on different text types, such as essays, reports, narratives, and argumentative pieces. Emphasize the use of appropriate grammar, vocabulary, and organization to convey ideas effectively. 3. Speaking and Listening: Improve students' oral communication skills through various activities such as discussions, presentations, role-plays, and listening exercises. Enhance their ability to express opinions, engage in conversations, and

	understand different accents and speech patterns. 4. Grammar and Vocabulary: Consolidate and expand students' understanding of English grammar rules and structures. Introduce new vocabulary and idiomatic expressions to enrich their language repertoire. 5. Cultural Awareness: Foster an appreciation for diverse cultures and perspectives through the study of English literature, history, and contemporary issues. Encourage critical thinking and discussion of cultural topics. 6. Language Integration: Promote the integration of language skills by providing opportunities for students to apply their knowledge in meaningful contexts. Encourage collaborative projects and language immersion activities.
9. Teaching and Learning Strategies	
Strategy	1. Learning Strategies: • Active Engagement: Encourage students to actively participate in class activities, discussions, and exercises to enhance their language skills. • Independent Reading: Assign reading materials that align with students' language proficiency level and interests, allowing them to practice reading comprehension and vocabulary acquisition. • Vocabulary Expansion: Incorporate various techniques such as flashcards, word games, and context-based exercises to help students expand their vocabulary. • Peer Collaboration: Promote collaborative learning through group projects, pair work, and peer feedback, enabling students to practice their speaking and listening skills. • Self-Assessment and Reflection: Encourage students to assess their own language skills, set goals, and reflect on their progress to foster a sense of ownership and self-improvement. 2. Teaching Strategies: • Differentiated Instruction: Tailor instruction to meet the diverse learning needs of students by providing a variety of materials, tasks, and assessments. • Scaffolded Learning: Provide step-by-step guidance and support to help students gradually build their language skills, moving from simple to more complex tasks. • Authentic Materials: Incorporate authentic texts, audiovisual resources, and real-life examples to make the learning experience more engaging and relevant. • Multimodal Instruction: Utilize a combination of visual aids, multimedia presentations, and hands-on activities to cater to different learning styles and enhance understanding. • Error Correction and Feedback: Provide timely and constructive feedback to students to help them improve their language accuracy and fluency.

	• Real-Life Application: Create opportunities for students to apply their language skills in practical, real-life situations through role-plays, simulations, and authentic communication tasks. 3. Assessment Strategies: • Formative Assessment: Use ongoing formative assessments such as quizzes, class discussions, and short writing assignments to monitor students' progress and provide timely feedback. • Performance-based Assessments: Incorporate tasks that require students to demonstrate their language skills in authentic contexts, such as presentations, debates, and group projects. • Portfolio Assessment: Encourage students to maintain a portfolio of their work, including written assignments, recordings, and reflections, to showcase their language development over time. • Self-Assessment and Peer Assessment: Involve students in self-assessment and peer assessment activities to promote self-reflection and peer learning.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2		• Introduction to the course and syllabus • Diagnostic assessment to gauge students' proficiency levels • Speaking: Introduction and icebreaker activities • Grammar: Verb tenses (present, past, future) • Vocabulary: Daily routines and activities	Lectures, Tutorial and discussions	Discussions
2	2		• Reading: Comprehension strategies and practice • Writing: Sentence structure and paragraph development • Speaking: Describing people and places • Grammar: Present continuous and present simple • Vocabulary: Adjectives to describe	Lectures, Tutorial and discussions	Discussions

			personality traits		
3	2		• Listening: Understanding conversations and dialogues • Writing: Narrative writing and storytelling • Speaking: Expressing opinions and giving reasons • Grammar: Past continuous and past simple • Vocabulary: Jobs and occupations	Lectures, Tutorial and discussions	Quiz
4	2		• Reading: Reading for specific information • Writing: Writing formal emails or letters • Speaking: Making suggestions and offering advice • Grammar: Present perfect and present perfect continuous • Vocabulary: Travel and transportation	Lectures, Tutorial and discussions	Discussions
5	2		• Listening: Understanding lectures and presentations • Writing: Writing informative or explanatory texts • Speaking: Discussing cultural traditions and customs • Grammar: Past perfect and past perfect continuous	Lectures, Tutorial and discussions	Discussions

			• Vocabulary: Food and cooking		
6	2		• Reading: Understanding opinion articles and editorials • Writing: Developing persuasive arguments • Speaking: Debating and defending a viewpoint • Grammar: Future forms (will, going to, present continuous) • Vocabulary: Health and wellness	Lectures, Tutorial and discussions	Quiz
7	2		• Listening: Listening for main ideas and details • Writing: Writing a formal report or review • Speaking: Making suggestions and giving recommendations • Grammar: Modals (can, could, may, might) • Vocabulary: Technology and social media • Midterm Exam	Lectures, Tutorial and discussions	Discussions
8	2		• Reading: Understanding literary texts (short stories or excerpts) • Writing: Creative writing and storytelling • Speaking: Role-plays and simulations • Grammar: Modals (must, should,	Lectures, Tutorial and discussions	Discussions

			have to) • Vocabulary: Education and learning		
9	2		• Listening: Understanding interviews and podcasts • Writing: Writing a persuasive essay • Speaking: Giving presentations and using visual aids • Grammar: Reported speech • Vocabulary: Environment and sustainability	Lectures, Tutorial and discussions	Quiz
10	2		• Reading: Analyzing and interpreting poetry • Writing: Writing a reflective essay or journal entry • Speaking: Discussing personal experiences and reflections • Grammar: Conditionals (zero, first, and second) • Vocabulary: Art and culture	Lectures, Tutorial and discussions	Discussions
11	2		• Listening: Understanding news broadcasts and documentaries • Writing: Writing a research paper or informative essay • Speaking: Engaging in group discussions and debates • Grammar: Passive voice • Vocabulary:	Lectures, Tutorial and discussions	Discussions

			Social issues and current events		
12	2		• Reading: Reading for critical analysis and evaluation • Writing: Reviewing and editing written work • Speaking: Giving persuasive speeches or presentations • Grammar: Relative clauses • Vocabulary: Business and entrepreneurship	Lectures, Tutorial and discussions	Discussions
13	2		• Listening: Practicing listening comprehension with different accents • Writing: Finalizing and polishing written assignments • Speaking: Role-plays and real-life communication scenarios • Grammar: Indirect questions and embedded clauses • Vocabulary: Idioms and expressions	Lectures, Tutorial and discussions	Quiz
14	2		• Reviewing key grammar and vocabulary concepts • Practicing exam-style questions and exercises • Revisiting areas of difficulty or confusion • Individual or group discussions on	Lectures, Tutorial and discussions	Discussions

			progress and challenges		
15	2		• Assessment • Course wrap-up and reflection on learning journey • Feedback and discussion on performance and progress • Discussion on next steps and further learning opportunities	Lectures, Tutorial and discussions	Discussions

11. course evaluation
1) Exams. 2) Homework. 3) Quizzes. 4) Oral presentation 5) Reports

12. Learning and teaching resources	
Required textbooks (curricular books, if any)	
Main references (sources)	New Headway Intermediate Fourth Edition, Liz and John Soars, Oxford University Press.
Recommended books and references (scientific journals, reports…).	
Electronic references, Internet sites…	Any English learning website will be useful for improving English skills

Course Description Form

1. Course Name:
Electrical Machines III
2. Course Code:
3. Semester / Year:
First/ 2024
4. Description Preparation Date:
30/1/2025
5. Available Attendance Forms:
Room lectures
6. Number of Credit Hours (Total) / Number of Units (Total)
45 hours /
7. Course administrator's name (mention all, if more than one name)
Name: **Dr. Tahani Hamodi Al-Mhana** Email: **eng.tahany.hamodi@uobabylon.edu.iq**
8. Course Objectives

Course Objectives	• To give a broad understanding of electrical AC machines and their applications. • Appreciate the complexity of design of electromechanical devices, identify different types of Induction machines and compare their operation.

	• Derive equations describing operation of Induction machines, formulate relevant equivalent circuits and analyze problems related to operation of Induction machines.
9. Teaching and Learning Strategies	
Strategy	In this module "Electrical machines III", Various teaching and learning approaches will be adopted to enhance students' understanding and engagement. Some common strategies are listed below: 1. Learning Technologies on Campus using Whiteboard and TV monitor. On campus Lectures are the main teaching method in this module. It can include visual aids such as slides and diagrams to facilitate in-depth subject understanding. Instructors may also provide real-life examples and applications to make the content more relatable. 2. Multimedia and Interactive Tools: Multimedia resources, such as video lectures on YouTube channel and google classroom can be used to enhance understanding and engage students. 3. Practical Examples and Problem-Solving: Instructors can use practical examples and problem-solving exercises to help students apply theoretical concepts to real-world situations. By presenting and solving problems related to electrical circuits, students can develop critical thinking and analytical skills. 4. Group Discussions and Collaborative Learning: Students can work together to solve problems, analyze case studies, or discuss challenging concepts. This promotes peer learning, critical thinking, and communication skills. 5. Inquiry-Based Teaching: Encouraging students to ask a lot of questions is an effective teaching strategy that does not only motivate students to think more practically but also helps them to become independent learners. 6. Tutorials: Tutorials offer opportunities for students to seek additional help and clarification on specific topics. 7. Assessments and Feedback: Regular assessments, such as quizzes, assignments, and exams, can be used to evaluate students' understanding and progress. Constructive feedback helps students identify areas for improvement and reinforces their learning. 8. Online Resources and Platforms: Online resources, such as e-learning platforms, online forums, and educational websites, can support student learning outside the

	classroom. These resources can provide additional readings, practice exercises, and interactive modules to supplement classroom teaching. 9. Self-directed Learning: Encouraging students to take ownership of their learning through self-directed study.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
Week 1	3		Welcome to this course, syllabus, and expectations. Textbook. Introduction to AC Machines. Power relationship, Faraday' Law, Lenz' Law. Induced voltage. Electromechanical Energy conversion.	Lectures and tutorials	Quizes, Midterm exam, final exam
Week 2	3		Three-phase induction machines. Introduction to three-phase Induction motor (I.M), construction, rotor types: Squirrel cage and wound rotor. Induction motors applications.		
Week 3			Principle of operation of a three-phase Induction motor, Rotating Magnetic Field and Induced Voltages.		

Week4			Speed of magnetic field rotation. Slip, voltage and frequency induced in the rotor, Motor Under load.		
Week5			Equivalent circuit model of the three-phase I.M: Transformer model of the three-phase I.M, rotor circuit model, Final equivalent circuit.		
Week6			Solving the equivalent circuit using Thevenin Theorem.		
Week7			Power and torque in three-phase induction Motor, losses efficiency. Power-flow diagram.		
Week8			Induction machines torque-speed characteristics. Derivation of induced torque equation, maximum torque equation, starting torque equation.		
Week9			Speed control methods of three-phase induction motors: Stator voltage control, Stator frequency control, V/F control.		

Week10			Static rotor resistance control and pole changing method.		
Week11			Starting induction motors: reduced voltage starting, series resistance starting, delta-wye starting.		
Week 12			Determination of equivalent circuit model parameters: no-load and locked-rotor tests, dc test for stator resistance.		
Week 13			Single-phase induction motors, double-revolving field theory. Starting of single-phase induction motors: split phase motors, capacitor-start motors, capacitor-start capacitor-run (permanent-split capacitor) motors. Shaded pole motor.		
Week 14			Equivalent circuit model of single-phase induction motors with forward and reverse magnetic fields.		
Week 15			Induction generators, induction generators operating alone, induction generators in wind power		

			plants. Power stage, DIFIG.		

11. Course Evaluation

10% quizzes and homework, 30% Midterm exams, and 60% end semester exam.

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	
Main references (sources)	Electric Machinery Fundamental, fifth edition, Stephen J. Chapman.
Recommended books and references (scientific journals, reports…)	Electrical Machines, Drives, and Power System, 5th edition, Theodore
Electronic References, Websites	

Course Description Form

1. Course Name: Electronics III

2. Course Code: Basics of Electrical Eng. I/ EnElBeI10303

3. Semester / Year: First Semester

4. Description Preparation Date:

30/1/2025

5. Available Attendance Forms: Weekly

6. Number of Credit Hours (Total) / Number of Units (Total): 45/6

7. Course administrator's name (mention all, if more than one name)

Name: Osama Qasim Jumah Khamees Al-Thahab
Email: Eng.osama.qasim@uobabylon.edu.iq

8. Course Objectives

Course Objectives

The student should understands the principles of analogue electronics and knows the basics of analysis and response of electronic circuits to different frequencies. The student also learns about the laws of analytical electronics, the possibility of analysis the feedback systems and high-current signal amplifiers, in addition to analyzing and studying harmonic reduction in these circuits.

9. Teaching and Learning Strategies

Strategy	1) Learning Technologies on Campus using data show or TV screen. 2) White board. 3) Hand out lecture notes. 4) Hand out some kinds of pictures related to specific topics. 5) Video lectures on YouTube and google classroom, Online lecture using google meet platform.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	3	Cognitive goals Understand the syllabus	Frequency small signal models of JFETs, and BJTs	White Board and TV Screen	Homework Quizzes

2	3	and concept of AC analyzing of electronic circuit. Understand the rules and regulations for this type of course. Analysis the electronic circuits by different circuit analysis. Learning how to avoid the distortion from increasing the current. Understand the principle of F.B Amp. and its effect on frequency.	Frequency response of various amplifier configurations	White Board and TV Screen	Homework Quizzes
3	3		Frequency response concepts	White Board and TV Screen	Homework Quizzes
4	3		Transistors at high frequency	White Board and TV Screen	Homework Quizzes
5	3		Multistage Amplifier at low & high frequency	White Board and TV Screen	Homework Quizzes
6	3		FET amplifier at low & high frequency.	White Board and TV Screen	Homework Quizzes
7	3		Feedback concepts	White Board and TV Screen	Homework Quizzes
8	3		Types, effects & topologies	White Board and TV Screen	Exam
9	3		feedback analysis, voltage series, voltage shunt	White Board and TV Screen	Homework Quizzes
10	3		Current series, and current shunt F.B	White Board and TV Screen	Homework Quizzes
11	3		F.B stability	White Board and TV Screen	Homework Quizzes
12	3		Time Response of feedback amplifier	White Board and TV Screen	Homework Quizzes
13	3		Frequency Response of feedback amplifier	White Board and TV Screen	Homework Quizzes
14	3		Power Amp, Class A, class B	White Board and TV Screen	Homework Quizzes
15	3		Class AB and push-pull amplifier	White Board and TV Screen	Exam

11. Course Evaluation				
Term Tests	Laboratory	Quizzes	Project	Final Exam
30%	-----	10%	----	60%

12. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	**1- Operational Amplifiers. By Dan I. Porat. Second edition. John Wily &sons, 1988.** **2- Electronic Engineering. By Charles L. Ally, and Kenneth W. Atwood. Third Edition. John Wily &sons, 1973.** **3- Electronic Measurement Systems. By Anton F P Van Putten. Second Edition. Institute of Physics Publishing, 1996.**
Main references (sources)	**1- Integrated Electronic, Analog And Digital Circuits And Systems. By Millman Halkias. Mcgraw Hill 1972.** **2- Electronic Devices and Circuit Theory. By R. Boylested and L. Nashelesky. Sixth edition. Prentice – Hall international, 1996.**
Recommended books and references (scientific journal, reports…)	**1- The Art of Electronics. By Paul Horowitz, and Winfield Hill. Second Edition. Cambridge University Press, 2001.** **2- Feedback. By Fred D. Walohouer. Second Edition. John Wily &sons, 1982.** **3- Analysis and design of Analog Integrated circuit. By P. R. Gray. John Wily 2000.**
Electronic References, Websites	**https://ajaybolar.weebly.com/analog-electronic-circuits.html**

Course Description Form

1. Course Name:
Optical Communication
2. Course Code:
EnElElII 3 36 12
3. Semester / Year:
1st/ 2023
4. Description Preparation Date:
30/1/2025
5. Available Attendance Forms:
Internal
6. Number of Credit Hours (Total) / Number of Units (Total)
56 / 3
7. Course administrator's name (mention all, if more than one name)
Name: MUTHANNA JAAFAR ABBAS Email: eng.muthanna.j@uobabylon.edu.iq
8. Course Objectives

Course Objectives	Students learned different principles related to optical concepts: 1- The student should be able to describe models of signal transmission lines mathematically and physically. 2- The student should be able to explain the importance and uses of signal transmission lines 3 - The student should be able to describe models of electromagnetic wave vectors mathematically and physically 4- The student should be able to explain the importance and uses of electromagnetic wave vectors. 5- The student should be able to describe optical fiber models mathematically and physically. 6- The student should be able to explain the importance and uses of optical fibers.

9. Teaching and Learning Strategies	
Strategy	• Lectures. • Dialogue and discussion. • Brainstorming. • Tutorials (Problem solving).

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	Explain the basic concepts of optical communication	The General Communication System	. Lectures and Tutorials	• Exam
2	4	=	Ray Transmission Theory	. Lectures and Tutorials	• Exam
3	4	=	Optical Rays Types	. Lectures and Tutorials	• Exam
4	4	=	Normalized Frequency (V number)	. Lectures and Tutorials	• Exam
5	4	=	Number of Modes (M)	. Lectures and Tutorials	• Exam
6	4	=	Optical Fiber Types		
7	4	= =	TRANSMISSION CHARACTERISTICS OF OPTICAL FIBERS	. Lectures and Tutorials	• Exam
8	4	=	Attenuation	. Lectures and Tutorials	• Exam
9	4	=	Dispersion in Optical Fibers	. Lectures and Tutorials	• Exam
10	4	=	1-Chromatic (Intramodal)dispersion	. Lectures and Tutorials	• Exam
12	4	=	OPTICAL SOURCES AND FIBER OPTIC TRANSMITTERS	. Lectures and Tutorials	• Exam
13	4	=	Light Sources - Types:	. Lectures and Tutorials	• Exam
14	4	=	Modulation Formats	. Lectures and Tutorials	• Exam

15	4	=	Fiber Optical Receivers	. Lectures and Tutorials	• Exam
16	4	=	Photodetector – Types	. Lectures and Tutorials	• Exam
				. Lectures and Tutorials	• Exam

11. Course Evaluation

Quizzes 10% (10), Assignments 10% (10), Report10% (10), Midterm Exam10% (10), Final Exam 60% (60)

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	
Main references (sources)	
Recommended books and references (scientific journals, reports…)	
Electronic References, Websites	

Course Description Form

1. Course Name: Electrical Power I
2. Course Code:
3. Semester / Year: First semester/2024
4. Description Preparation Date:
30/1/2025
5. Available Attendance Forms:
6. Number of Credit Hours (Total) / Number of Units (Total): 45/3
7. Course administrator's name (mention all, if more than one name)
Name: HAYDER HUSSEIN KADHUM AL-HASSNAWI Email: eng.hayder.kadhum@uobabylon.edu.iq
8. Course Objectives

Course Objectives	▪ Gain knowledge about the fundamental principles, Mechanical Design of Overhead Lines and characteristics of Main Components of Overhead Lines : Conductor Materials, Line Supports , Supports Types , Insulators , Types of Insulators ▪ Developing the skills of analyzing the performance of transmission lines and knowledge of each, 1-Potential Distribution over Suspension Insulator String 2- String Efficiency 3- Corona. 4- Sag in Overhead Lines, 5- Effect of wind and ice loading. ▪ Gain knowledge about the fundamental principles, Electrical Design of Overhead Lines and Constants of a Transmission Line ; Resistance of a Transmission Line., ▪ Inductance of a Transmission Line: (i) Inductance of a Single Phase Two-wire Line

	(ii) Inductance of a 3-Phase Overhead Line 3- Concept of Self-GMD and Mutual-GMD 4-Bundled Conductors on transmission lines 5- Capacitance of a Transmission Line. 6-Electrical Field And Potential Difference 7-Capacitance of a Single Phase Two-wire Line 8-Capacitance of a 3-Phase Transmission Line Learn about Flux Linkages: 1. Flux linkages due to a single current carrying conductor. (i) Flux linkages due to internal flux. (ii) Flux linkages due to external flux 2. Flux linkages in parallel current carrying conductors.
4-	Learn about Underground Cables Construction of Cables Insulating Materials for Cables Classification of Cables Insulation Resistance of a Single-Core Cable Capacitance of a Single-Core Cable Dielectric Stress in a Single-Core Cable Most Economical Conductor Size in a Cable Capacitance of 3-Core Cables Measurements of Ce and Cc Permissible Current Loading

9. Teaching and Learning Strategies

Strategy	1. Learning Technologies on Campus using Whiteboard and TV monitor. 2. Hand out lecture notes. 3. Video lectures on YouTube and Google Classroom.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	3	Understanding Overhead Transmission Lines	Electrical Design of Overhead Lines	Whiteboard and TV monitor	Homework assignment and Quiz
2	3	Classification of Constants of a Transmission Line.	Electrical Design of Overhead Lines	Whiteboard and TV monitor	Homework assignment and Quiz
3	3	Understanding Resistance of a Transmission Line.	Electrical Design of Overhead Lines	Whiteboard and TV monitor	Homework assignment and Quiz
4	3	Understanding Flux Linkages	Electrical Design of Overhead Lines		

		Understanding Inductance of a Transmission Line.	Electrical Design of Overhead Lines	Whiteboard and TV monitor	Homework assignment and Quiz
5	3	Understanding Inductance of a 3-Phase Overhead Line	Electrical Design of Overhead Lines		
6	3	Understanding Capacitance of a Transmission Line	Electrical Design of Overhead Lines	Whiteboard and TV monitor	Homework assignment and Quiz
		Mid-term Exam		Whiteboard and TV monitor	Homework assignment and Quiz
7	3	Understanding Mechanical Design of Overhead Lines	Mechanical Design of Overhead Lines	Whiteboard and TV monitor	Homework assignment and Quiz
8	2	Understanding Main Components of Overhead Lines	Mechanical Design of Overhead Lines		
9	3	Understanding Conductor Materials	Mechanical Design of Overhead Lines	Whiteboard and TV monitor	Homework assignment and Quiz
		Understanding Supports Types and Types of Insulators	Mechanical Design of Overhead Lines		
10	3	Understanding Potential Distribution over Suspension Insulator String	Mechanical Design of Overhead Lines	Whiteboard and TV monitor	Homework assignment and Quiz
		Understanding Sag in Overhead Lines	Mechanical Design of Overhead Lines		
11	3	Understanding Effect of wind and ice loading.	Mechanical Design of Overhead Lines Mechanical Design of Overhead Lines	Whiteboard and TV monitor	Homework assignment and Quiz
12	3	Understanding Construction and Classification of Cables	Underground Cables	Whiteboard and TV monitor	Homework assignment and Quiz
13	3	Capacitance of a Single- and 3-Core Cables	Underground Cables	Whiteboard and TV monitor	Homework assignment and Quiz
14	3	Insulation Resistance and	Underground Cables	Whiteboard and	Homework

		Dielectric Stress in a Single-Core Cable		TV monitor	assignment and Quiz
15	3	Insulating Materials for Cables and Most Economical Conductor Size in a Cable	Underground Cables	Whiteboard and TV monitor	Homework assignment and Quiz
16	3	**The preparatory week before the Final Exam**			

11. Course Evaluation

Homework assignments = 15%, Quizzes=15%, Mid-term Exams=50%, Report =5%, Participate =10%, Attendance=5%.

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	
Main references (sources)	Principles of Power System, V.K. Mehta, Rohit Mehta
Recommended books and references (scientific journals, reports…)	
Electronic References, Websites	https://www.coursera.org

Course Description Form

1. Course Name: Communications I

2. Course Code: EnElCoI 3 27 03

3. Semester / Year: Third

4. Description Preparation Date:

30/1/2025

5. Available Attendance Forms: Attendance in a Class

6. Number of Credit Hours (Total) / Number of Units (Total): 63/5

7. Course administrator's name (mention all, if more than one name)

Name: Dr. Samir Jasim Mohammed
Email: Dr.samiralmuraab@uobabylon.edu.iq

8. Course Objectives

Course Objectives	**This Course** aims to equip students with a comprehensive understanding of communication systems, signal processing, and modulation techniques. It covers a wide range of topics, from the basics of communication systems to the advanced concepts of Modulation and demodulation. Students will gain practical skills in analyzing and designing efficient communication systems, as follows: 1- Provide a comprehensive understanding of communication systems and the functionality of their elements. 2- Cover the classification of systems and signals, including an in-depth study of noise signals and their classification. 3- Discuss the modulation types and their advantages in communication systems. 5- Explore linear modulation techniques such as AM, DSB, and SSB. 6- Examine standard AM broadcast receivers and Frequency Division Multiplexing (FDM) systems. 7- Discuss nonlinear modulation techniques (FM and PM) and their applications. 8- Understand the methods of producing Narrowband FM (NBFM) and Wideband FM (WBFM) signals. 9- Learn the bandwidth calculation in both linear and nonlinear modulation systems. 10- Learn the average power calculations in both linear and nonlinear modulation systems. 11- Study the generation and demodulation processes for both linear and nonlinear modulation techniques.

9. Teaching and Learning Strategies

Strategy	1.Learning Technologies on Campus using Whiteboard and TV monitor. 2.Hand out lecture notes. 3.Video lectures on YouTube and google classroom.

10. Course Structure

Week	Hours Per week	Requir Outcom	Unit or subject name	Learning method	Evaluation method
Week 1	4		Basic Definitions and Terms of the Communication System	Lectures	Midterm Exam + Quizzes+ Final Exam
	4		Signal and System	Lectures	=
	4		Noise Signals	Lectures	=
	4		Linear Modulation	Lectures	=
	4		Generation of AM. DSB. SSB	Lectures	=
	4		Demodulation of AM. DSB. SSB	Lectures	=
	4		Standard AM Receiver & Examples	Lectures	=
	4		Commercial AM Receivers & Examples	Lectures	=
	4		Multiplexing techniques (FDM) + Quiz	Lectures	=
	1.5		**Midterm Exam**	---------	=
	4		Nonlinear Modulation (Angle Modulation) & NBFM for a single-tone waveform	Lectures	=
	4		WBFM for a single-tone waveform	Lectures	=
	4		Generation of WBFM signal	Lectures	=
	4		Demodulation of FM signals	Lectures	=
	4		Bandwidth and Power Calculation & Examples + Quiz	Lectures	=
	3		**Final Exam**	----------	=

11. Course Evaluation

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	
Main references (sources)	
Recommended books and references (scientific journals, reports…)	
Electronic References, Websites	

Learning and Teaching Resources

	Text	Available in the Library?
Required Texts	1-Introduction to Communication Systems (Ferrel G. Stremler) 2-Communication Systems (A. Bruce Carlson)	Yes
Recommended Texts	Introduction to Communication Systems (Ferrel G. Stremler)	No
Websites		

Course Description Form

1. Course Name: Engineering Analysis II

2. Course Code: EnElEaII 3 31 07

3. Semester / Year: Third

4. Description Preparation Date:

30/1/2025

5. Available Attendance Forms: Attendance in a Class

6. Number of Credit Hours (Total) / Number of Units (Total): 125/5

7. Course administrator's name (mention all, if more than one name)

Name: Dr. Muthana AL-Amidie
Email: engmuthana_iq@yahoo.com

8. Course Objectives

Course Objectives	This course aims to provide a comprehensive understanding of Fourier methods, statistics, Power signal, equipping students with the necessary skills to apply these concepts in various scientific and engineering contexts, as follows: 1. **Periodic Functions** o Condition of Expansion 2. **Principles of Fourier Series:** o Decompose the following function in terms of its Fourier series. ... o Evaluate the constant term. ... o Evaluate the Fourier coefficients. 3. **Even and odd Functions:** o Identify the even and odd parts of the function. ... o Grasp the basic concepts of matrices and vectors. o Perform Fourier series on those functions. 4. **Fourier Series: General Form:** o Solve math function using Fourier Series: General Form o Understand the concepts of linearly dependent and independent. 5. **Half range Expansion:** o Understand the properties of the half-range function. o Calculate **Fourier Series** using half-range expansion. 6. **Principles of the Alternative Form of Fourier series:** o Introduce the alternative Form of the Fourier series. o Calculate **Fourier Series** using alternative Form.

7. **Electrical circuit Application:**
   - Learn how to solve the electrical circuit using Fourier series forms.
   - Calculate **Fourier Series** using alternative Forms to different kinds of electrical circuits.
8. **Signal Spectrum and Parseval theorem:**
   - Define the **Parseval theorem**
   - Calculate the power of the fundamental frequency.
9. **Fourier integral**
   - Learn how to analyze electrical signals; using Fourier integral forms.
   - Introduce the concept of the Fourier integral.
10. **Digital Sigal processing application**
   - Solving the signal processing problems.

9. Teaching and Learning Strategies

Strategy	1.Learning Technologies on Campus using Whiteboard and TV monitor. 2.Hand out lecture notes. 3.Video lectures on YouTube and google classroom.

10. Course Structure

Week	Hours	Require	Unit or subject name	Learning method	Evaluation method
	Per week	Outcom			
Week 1	4		Principle of numerical analysis: Introduction, Finding periodic and nonperiodic functions	Lectures	Midterm Exam + Quizzes+ Final Exam
Week 2			Condition of expansion		
Week 3			Fourier Series: General Form		
Week 4			Fourier Series: General Form		
Week 5			Half range Expansion		
Week 6			The Alternative Form of Fourier series		
Week 7			The Complex Form of the Fourier series		
Week 8			Electrical circuit Application		
Week 9			Signal Spectrum and Parseval theorem		
Week 10			Introduction to Fourier integral		
Week 11			Theorems of Fourier integral.		
Week 12			Fourier integral properties		
Week 13			Digital Sigal processing application		
Week 14			Digital Sigal processing application		
Week 15					

11. Course Evaluation

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	
Main references (sources)	
Recommended books and references (scientific journals, reports…)	
Electronic References, Websites	

Learning and Teaching Resources

	Text	Available in the Library?
Required Texts	1. Advance Engineering Mathematics – WILEY-2000	Yes
Recommended Texts	1. "Probability: For the Enthusiastic Beginner" by David J. Morin (2020) 2. "Probability: Theory and Examples" by Rick Durrett (2019) 3. "Introduction to Probability" by Joseph K. Blitzstein and Jessica Hwang (2019)	Yes
Websites		

Course Description Form

1. Course Name:
Antennas & Waves Propagations
2. Course Code:
EnElElII 3 36 12
3. Semester / Year:
2nd/ 2024
4. Description Preparation Date:
30/1/2025
5. Available Attendance Forms:
Internal
6. Number of Credit Hours (Total) / Number of Units (Total)
56 / 4
7. Course administrator's name (mention all, if more than one name)
Name: MUTHANNA JAAFAR ABBAS Email: eng.muthanna.j@uobabylon.edu.iq

8. Course Objectives	
Course Objectives	To equip students with various issues related to basic antenna concepts, different types of dipole antenna, small loop antenna, array of point sources, microwave antennas, wave propagation characteristics, link power budget calculations, and radar range equation.

9. Teaching and Learning Strategies	
Strategy	• Lectures. • Dialogue and discussion. • Brainstorming. • Tutorials (Problem solving).

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	Explain the basic concepts of antennas And its spread in different mediations	Basic Antenna Concepts	. Lectures and Tutorials	• Exam
2	4	=	Ideal Dipole	. Lectures and Tutorials	• Exam
3	4	=	Short Dipole	. Lectures and Tutorials	• Exam
4	4	=	Thin Linear Dipole	. Lectures and Tutorials	• Exam
5	4	=	Small Loop Antenna	. Lectures and Tutorials	• Exam
6	4	=	Array of Point Sources	. Lectures and Tutorials	• Exam
7	4	=	Microwave Antennas	. Lectures and Tutorials	• Exam
8	4	=	Wave Propagation Characteristics	. Lectures and Tutorials	• Exam
9	4	=	Reflection and Refraction of EMWs	. Lectures and Tutorials	• Exam
10	4	=	Radio Wave Propagation	. Lectures and Tutorials	• Exam
12	4	=	Ionosphere Propagation	. Lectures and Tutorials	• Exam
13	4	=	Tropospheric propagation:	. Lectures and Tutorials	• Exam
14	4	=	Ground Wave propagation	. Lectures and Tutorials	• Exam
15	4	=	Link Power Budget Calculations	. Lectures and Tutorials	• Exam

16	4	=	Radar Range Equation	. Lectures and Tutorials	• Exam

11. Course Evaluation

Quizzes 10% (10), Assignments 10% (10), Report10% (10), Midterm Exam10% (10), Final Exam 60% (60)

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	
Main references (sources)	
Recommended books and references (scientific journals, reports…)	
Electronic References, Websites	

Course Description Form

1. Course Name: Electronic IV
2. Course Code:
3. Semester / Year: Second Semester
4. Description Preparation Date:
30/1/2025
5. Available Attendance Forms: Weekly
6. Number of Credit Hours (Total) / Number of Units (Total): 45/6
7. Course administrator's name (mention all, if more than one name)
Name: Osama Qasim Jumah Khamees Al-Thahab Email: Eng.osama.qasim@uobabylon.edu.iq
8. Course Objectives

Course Objectives	The student will understand the principles of analogue electronics and analyze the Operational Amplifier and its wide applications. The student will also learn about the idea of oscillators and methods of analyzing them. He will also learn how to derive the outputs after entering the signal into the filters, along with knowing how to deal with the types of analogue filters and how to fabricate Integrated Circuits, in addition to implement the circuits by using Multisim program.

9. Teaching and Learning Strategies

Strategy	1) Learning Technologies on Campus using data show or TV screen. 2) White board. 3) Hand out lecture notes. 4) Hand out some kinds of pictures related to specific topics. 5) Video lectures on YouTube and Google classroom, Online lecture using Google meet platform.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method

1	3	Cognitive goals Understand the syllabus and concept of some important electronic circuit. Understand the rules and regulations for this type of course. Analysis the Op-Amp. electronic circuits by different circuit analysis. Learning how to make sinusoid, square and triangle signals Understand the steps of semiconductor fabrication. Understand the idea behind studying the OP-Amp, OSC, Active filters and F.B circuits threw connecting them by using Multisim Program.	OP-Amp characteristics and structure, Difference amplifier (DC and AC analysis)	White Board and TV Screen	Homework Quizzes
2	3		Inverting and non – inverting amplifier, integrator	White Board and TV Screen	Homework Quizzes
3	3		Differentiator, adder, subtractor, comparator	White Board and TV Screen	Homework Quizzes
4	3		Precision diode, rectifier, precision clamps	White Board and TV Screen	Homework Quizzes
5	3		sample and hold circuit, and peak detector	White Board and TV Screen	Homework Quizzes
6	3		Oscillator concept, RC Oscillator	White Board and TV Screen	Homework Quizzes
7	3		LC oscillator, crystal oscillator	White Board and TV Screen	Homework Quizzes
8	3		Filter concept, types, approximations	White Board and TV Screen	Exam
9	3		Active RC and ladder design.	White Board and TV Screen	Homework Quizzes
10	3		GIC and biquad structure.	White Board and TV Screen	Homework Quizzes
11	3		Fabrication process, IC components, resistors, capacitors, transistor fabrication	White Board and TV Screen	Homework Quizzes
12	3		layout design rules, full custom	White Board and TV Screen	Homework Quizzes
13	3		Semicustom design, phase locked loop (PLL).	White Board and TV Screen	Homework Quizzes
14	3		Introduction to Multisim program, Feed Back, Oscillators applications.	White Board and TV Screen	Homework Quizzes
15	3		OP-Amp Applications and Active filters.	White Board and TV Screen	Exam

11. Course Evaluation				
Term Tests	Laboratory	Quizzes	Project	Final Exam
30%	-----	10%	----	60%

12. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	**1- Operational Amplifiers. By Dan I. Porat. Second edition. John Wily &sons, 1988.** **2- Electronic Engineering. By Charles L. Ally, and Kenneth W. Atwood. Third Edition. John Wily &sons, 1973.** **3- Electronic Measurement Systems. By Anton F P Van Putten. Second Edition. Institute of Physics Publishing, 1996.**
Main references (sources)	**1- Integrated Electronic, Analog And Digital Circuits And Systems. By Millman Halkias. Mcgraw Hill 1972.** **2- Electronic Devices and Circuit Theory. By R. Boylested and L. Nashelesky. Sixth edition. Prentice – Hall international, 1996.**
Recommended books and references (scientific journal, reports…)	**1- The Art of Electronics. By Paul Horowitz, and Winfield Hill. Second Edition. Cambridge University Press, 2001.** **2- Feedback. By Fred D. Walohouer. Second Edition. John Wily &sons, 1982.** **3- Analysis and design of Analog Integrated circuit. By P. R. Gray. John Wily 2000.**
Electronic References, Websites	**https://ajaybolar.weebly.com/analog-electronic-circuits.html**

Course Description Form

1. Course Name: **Electrical Machines IV**
2. Course Code:
3. Semester / Year: **Second/ 2024**
4. Description Preparation Date:
30/1/2025
5. Available Attendance Forms:
6. Number of Credit Hours (Total) / Number of Units (Total)
45 hours /
7. Course administrator's name (mention all, if more than one name)
Name:**Dr. Tahani Hamodi Al-Mhana** Email: **eng.tahany.hamodi@uobabylon.edu.iq**
8. Course Objectives

Course Objectives	• To give a broad understanding of Synchronous machines and their applications. • To study the principle of operation for Synchronous generators and motors. • To develop skills in analyzing the performance of Synchronous machines. • To analyze problems related to operation and control of Synchronous motors and generators. • To understand the effect of load variations on synchronous motor and generators.

9. Teaching and Learning Strategies

Strategy	In this module "Electrical machines IV", Various teaching and learning approaches will be adopted to enhance students' understanding and engagement. Some common strategies are listed below: 1. Learning Technologies on Campus using Whiteboard and TV monitor. On campus Lectures are the main teaching method in this module. It can include visual aids such as slides and diagrams to facilitate in-depth subject understanding. Instructors may also provide real-life examples and applications to make the content more relatable. 2. Multimedia and Interactive Tools: Multimedia resources, such as video lectures on YouTube channel and google classroom can be used to enhance understanding and engage students. 3. Practical Examples and Problem-Solving: Instructors can use practical examples and problem-solving exercises to help students apply theoretical concepts to real-world situations. By presenting and solving problems related to electrical circuits, students can develop critical thinking and analytical skills. 4. Group Discussions and Collaborative Learning: Students can work together to solve problems, analyze case studies, or discuss challenging concepts. This promotes peer learning, critical thinking, and communication skills. 5. Inquiry-Based Teaching: Encouraging students to ask a lot of questions is an effective teaching strategy that does not only motivate students to think more practically but also helps them to become independent learners. 6. Tutorials: Tutorials offer opportunities for students to seek additional help and clarification on specific topics. 7. Assessments and Feedback: Regular assessments, such as quizzes, assignments, and exams, can be used to evaluate students' understanding and progress. Constructive feedback helps students identify areas for improvement and reinforces their learning. 8. Online Resources and Platforms: Online resources, such as e-learning platforms, online forums, and educational websites, can support student learning outside the classroom. These resources can provide additional readings, practice exercises, and interactive modules to supplement classroom teaching. 9. Self-directed Learning: Encouraging students to take ownership of their learning through self-directed study.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method

Week 1	3		Welcome to this course, syllabus, and expectations. Textbook. Introduction to Synchronous Machines. Basic principle of operation.	Lectures and tutorials	Quizes, Midterm exam, final exam
Week 2	3		Construction of Synchronous generators/ Alternators. Salient and non-Salient pole types. Armature reaction phasor diagram for non-salient pole generators.		
Week 3			Generated EMF, effect of distribution and chording of winding.		
Week4			Armature reaction, synchronous reactance, leakage reactance. Equivalent circuit of an alternator.		
Week5			Phasor diagram of a loaded non-salient type alternator for various types of loads.		
Week6			Voltage regulation and methods of estimation of voltage regulation using EMF, MMF, ZPF & ASA method. Short circuit ratio and its importance.		
Week7			Operating characteristics, power angle characteristics of non-Salient pole alternator.		

Week8			Operation for fixed input and variable excitation, power flow equations. Losses and efficiency.		
Week9			Synchronizing to infinite bus bars, parallel operation of alternators.		
Week10			Two reaction theory and torque-angle characteristic of a salient-pole alternator.		
Week11			**Mid-term Exam** + Power-angle characteristics of Salient-pole Machines.		
Week 12			Determination of Xd and Xq, Synchronous motor, voltage equation and equivalent circuit.		
Week 13			Phasor diagram of Synchronous motor, operation at constant load with variable excitation, power equations. Torque and torque angle.		
Week 14			V-curves, synchronous motor starting, Applications. Synchronous condensers. Hunting and damping.		

Week 15			Permanent magnet machines.		

11. Course Evaluation

10% quizzes and homework, 30% Midterm exams, and 60% end semester exam.

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	
Main references (sources)	Electric Machinery Fundamental, fifth edition, Stephen J. Chapman.
Recommended books and references (scientific journals, reports…)	Electrical Machines, Drives, and Power System, 5th edition, Theodore
Electronic References, Websites	

Course Description Form

1. Course Name: Electrical Power II
2. Course Code:
3. Semester / Year: Second semester/2024
4. Description Preparation Date:
30/1/2025
5. Available Attendance Forms:
6. Number of Credit Hours (Total) / Number of Units (Total): 45/3
7. Course administrator's name (mention all, if more than one name)
Name: Dr.Sarmad Khaleel Ibrahim Email: Sarmad.ibrahim@uobabylon.edu.iq
8. Course Objectives

Course Objectives	- Gain knowledge about the fundamental principles, parameters, and characteristics of transmission lines. - Develop skills in analyzing the performance of transmission lines, including voltage drop, power losses, line impedance, and power transfer capability. - Learn about the parameters used to characterize transmission lines, including resistance, inductance, capacitance, and shunt admittance. Study transmission line models, such as the distributed parameter model, the pi-model, and the T-model, to analyze line behavior and perform simulations. - Learn about DC distribution systems and their applications, including radial and Ring configurations - Study AC distribution systems and their applications, including radial configurations Learn about Variable Load on Power Stations and their Effects of Variable.

9. Teaching and Learning Strategies

Strategy	1. Learning Technologies on Campus using Whiteboard and TV monitor. 2. Hand out lecture notes. 3. Video lectures on YouTube and Google Classroom.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	3	Understanding overall transmission line performance.	Transmission Lines	Whiteboard and TV monitor	Homework assignment and Quiz
2	3	Understanding Classification of Overhead Transmission Lines.	Transmission Lines	Whiteboard and TV monitor	Homework assignment and Quiz
3	3	Understanding Classification of Overhead Transmission Lines	Transmission Lines	Whiteboard and TV monitor	Homework assignment and Quiz
4	3	Understanding Generalized Constants for Short, Medium and Long Transmission Lines	Transmission Lines	Whiteboard and TV monitor	Homework assignment and Quiz
5	3	Understanding Complex Power Flow Through Transmission Lines	Transmission Lines	Whiteboard and TV monitor	Homework assignment and Quiz
6	3	Understanding Complex Power Flow Through Transmission Lines using ABCD Parameters of Transmission Line	Transmission Lines	Whiteboard and TV monitor	Homework assignment and Quiz
7	3	Understanding the types of D.C. and A.C Distributors	Distribution Systems	Whiteboard and TV monitor	Homework assignment and Quiz
8	2	**Mid-term Exam**			
9	3	Understanding D.C Distributor Fed at One End and Both Ends - Concentrated Loading with Equal and Unequal voltages	Distribution Systems	Whiteboard and TV monitor	Homework assignment and Quiz

10	3	Understanding D.C Distributor Fed at One End and Both Ends - Uniformly Loading with Equal and Unequal voltages	Distribution Systems	Whiteboard and TV monitor	Homework assignment and Quiz
11	3	Understanding D.C Distributor with Both Concentrated and Uniform Loading and Ring Main Distributor with and without Interconnector	Distribution Systems	Whiteboard and TV monitor	Homework assignment and Quiz
12	3	Understanding A.C. Distribution System and Methods of Solving A.C. Distribution Problems	Distribution Systems	Whiteboard and TV monitor	Homework assignment and Quiz
13	3	Understanding A.C. Distribution System and Methods of Solving A.C. Distribution Problems	Distribution Systems	Whiteboard and TV monitor	Homework assignment and Quiz
14	3	Understanding Variable Load on Power Stations and Main Effects of variable load on Power Station Performance	Load Systems	Whiteboard and TV monitor	Homework assignment and Quiz
15	3	Understanding Variable Load on Power Stations and Main Effects of variable load on Power Station Performance	Load Systems	Whiteboard and TV monitor	Homework assignment and Quiz
16	3	**The preparatory week before the Final Exam**			

11. Course Evaluation

Homework assignments = 15%, Quizzes=15%, Mid-term Exams=50%, Report =5%, Participate =10%, Attendance=5%.

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	
Main references (sources)	Principles of Power System, V.K. Mehta, Rohit Mehta
Recommended books and references (scientific journals, reports…)	
Electronic References, Websites	https://www.coursera.org

Course Description Form

1. Course Name: Communications II

2. Course Code: EnElCoII 3 33 09

3. Semester / Year: Third

4. Description Preparation Date:

30/1/2025

5. Available Attendance Forms: Attendance in a Class

6. Number of Credit Hours (Total) / Number of Units (Total): 108/7

7. Course administrator's name (mention all, if more than one name)

Name: Dr. Samir Jasim Mohammed
Email: Dr.samiralmuraab@uobabylon.edu.iq

8. Course Objectives

Course Objectives	1- Provide a comprehensive understanding of transmission line theory and its importance in communication systems. 2- Introduce key components of transmission lines, including standing wave ratio (SWR), characteristic impedance (Zo), and reflection coefficient. 3- Teach students how to calculate and analyze transmission line parameters using Smith Chart simulation. 4- Explore digital communication systems and their advantages and disadvantages. 5- Discuss pulse modulation and sampling theory in digital communication. 6- Cover various modulation techniques, including pulse amplitude modulation (PAM), pulse width modulation (PWM), pulse density modulation (PDM), pulse code modulation (PCM), delta modulation (DM), and digital carrier modulation techniques like amplitude shift keying (ASK), frequency shift keying (FSK), and phase shift keying (PSK). 7- Cover the study of time division multiplexing (TDM) and its role in transmitting multiple information signals over a common channel.

9. Teaching and Learning Strategies

Strategy	1.Learning Technologies on Campus using Whiteboard and TV monitor. 2.Hand out lecture notes. 3.Video lectures on YouTube and google classroom.

10. Course Structure

Week	Hours Per week	Requir Outcom	Unit or subject name	Learning method	Evaluation method
Week 1 Week 2 Week 3 Week 4 Week 5 Week 6 Week 7 Week 8 Week 9 Week 10 Week 11 Week 12 Week 13 Week 14 Week 15 Week 16	4		Transmission Line: Introduction to two-line conductors Transmission Line Equations: Distributive Parameters Transmission Line Examples Propagation Constant, Reflection coefficients, and SWR Transmission Line Examples + Quiz Introduction to Digital Communication (Pulse Modulation) Sampling Theory PAM, PWM, PPM Generation Pulse Code Modulation (PCM) Delta Modulation (DM) + Quiz Mid-term Exam Signaling Format Digital Carrier Modulation Multiplexing Techniques Time Division Multiplexing (TDM) + Quiz Final Exam	Lectures	Midterm Exam + Quizzes+ Final Exam

11. Course Evaluation

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	
Main references (sources)	
Recommended books and references (scientific journals, reports…)	
Electronic References, Websites	

Learning and Teaching Resources

	Text	Available in the Library?
Required Texts	1-Introduction to Communication Systems (Ferrel G. Stremler) 2-Communication Systems (A. Bruce Carlson)	Yes
Recommended Texts	Introduction to Communication Systems (Ferrel G. Stremler)	No
Websites		

Course Description Form

1. Course Name: Engineering Analysis II

2. Course Code: EnElEaII 3 31 07

3. Semester / Year: Third

4. Description Preparation Date:

30/1/2025

5. Available Attendance Forms: Attendance in a Class

6. Number of Credit Hours (Total) / Number of Units (Total): 125/5

7. Course administrator's name (mention all, if more than one name)

Name: Dr. Ahmed Hussein Shatti
Email: eng.ahmed.hussein@uobabylon.edu.iq

8. Course Objectives

Course Objectives	This course aim to provide a comprehensive understanding of numerical methods, linear algebra, statistics, and probability, equipping students with the necessary skills to apply these concepts in various scientific and engineering contexts, as follows: 1. **Principles of Numerical Analysis:** o Understand the fundamentals of numerical analysis. o Learn methods for finding roots of non-linear equations, including Fixed-Point, Newton-Raphson, Secant, and Bisection methods. o Apply numerical integration methods such as the Trapezoidal Rule and Simpson's Rule. 2. **Linear Algebra:** o Grasp the basic concepts of matrices and vectors. o Perform matrix operations including addition, multiplication, and transposition. o Identify and utilize special matrices like symmetric, skew-symmetric, triangular, diagonal, scalar, and identity matrices. 3. **Linear System of Equations Solution Methods:** o Solve linear systems using Gauss Elimination and Back Substitution. o Understand the concepts of linearly dependent and independent vectors and functions. o Determine the rank of a matrix and solve systems using Cramer's Rule. o Learn to find the inverse of matrices using Gauss-Jordan Elimination and Determinant Method. 4. **Matrix Eigenvalues Problems:** o Calculate eigenvalues and eigenvectors. o Understand the properties of orthogonal matrices.

	5. **Principles of Statistics:** o Comprehend basic statistical definitions and construct histograms and frequency polygons. o Calculate measures of central tendency (Arithmetic Mean, Median, Mode) and dispersion (Standard Deviation and Variance). 6. **Probability and Combinatorics:** o Introduce the concept of probability and combinatorial analysis. o Learn to count using permutations and combinations. o Understand the axioms of probability, sample space, events, and Venn diagrams. o Apply the Laws of Total Probability and Bayes Theorem. 7. **Random Variables and Distributions:** o Define and work with random variables and their distribution functions. o Calculate expected value and standard deviation. o Explore specific discrete random variables like Bernoulli, Binomial, and Poisson.

9. Teaching and Learning Strategies

Strategy	1.Learning Technologies on Campus using Whiteboard and TV monitor. 2.Hand out lecture notes. 3.Video lectures on YouTube and google classroom.

10. Course Structure

Week	Hours	Require	Unit or subject name	Learning method	Evaluation method
	Per week	Outcom			
Week 1	4		Principle of numerical analysis: Introduction, Finding roots of non-linear equation, Fixed-Point for solving equation f(x)=0, Newton-Raphson for solving equation f(x)=0.	Lectures	Midterm Exam + Quizzes+ Final Exam
Week 2			Secant method for solving equation f(x)=0, Bisection method for solving equation f(x)=0.		
Week 3			Numerical Integration methods: Trapezoidal Rule, and Simpson's Rule.		
Week 4			Linear Algebra: Introduction, Matrices and Vectors, Matrix Addition, Matrix Multiplication, Transposition, Special Matrices (symmetric and skew symmetric, triangular, diagonal, scalar and identity matrix).		
Week 5			Linear System of Equations Solution Methods: Gauss Elimination and Back Substitution Method, Linearly dependent and Independent vectors, Linearly dependent and Independent functions, Rank of Matrix.		
Week 6			Cramer's Rule Method for solving Linear System of Equations, Invers Matrix using Gauss-Jordan Elimination, Inverse of Matrix using Determinant Method.		
Week 7			Matrix Eigenvalues Problems: Eigenvalues and Eigenvectors, Orthogonal matrix.		

Week 8			Principle of Statistics: Basic Definitions, Histogram and Frequency Polygons, Cumulative Frequency Distribution.		
Week 9			Arithmetic Mean, Median, Mode, and central Tendency, Measures of dispersion (Standard Deviation and Variance)		
Week 10			Introduction to Probability concept, Theory of Counting and Combinatory Analysis, Permutation, and Combination.		
Week 11			Axioms of Probability: Sample Space (sets), Events (subsets), Venn Diagram, Mutually Exclusive Events, Equally Likely Events, Conditional Probability and Independent Events, Laws of Total Probability, Bayes Theorem.		
Week 12			Introduction to Random Variables, Distribution functions, Discrete Random variables.		
Week 13			Expected Value, Standard Deviation, Bernoulli Random Variable, Binomial Random Variable, Poisson Random Variable.		
Week 14					
Week 15					

11. Course Evaluation

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	
Main references (sources)	
Recommended books and references (scientific journals, reports…)	
Electronic References, Websites	

Learning and Teaching Resources

	Text	Available in the Library?
Required Texts	1. Advance Engineering Mathematics – WILEY-2000	Yes
Recommended Texts	1. "Probability: For the Enthusiastic Beginner" by David J. Morin (2020)	Yes

	2. "Probability: Theory and Examples" by Rick Durrett (2019) 3. "Introduction to Probability" by Joseph K. Blitzstein and Jessica Hwang (2019)	
Websites		

Course Description Form

1. Course Name: Communications IV

2. Course Code: EnElCoIV 4 43 07

3. Semester / Year: Semester

4. Description Preparation Date:

30/1/2025

5. Available Attendance Forms:

6. Number of Credit Hours (Total) / Number of Units (Total): 60(hrs)/ 4(units)

7. Course administrator's name (mention all, if more than one name)

Name: Prof. Ahmed Abdulkadhim Hamad
Email: eng.ahmed.ak@uobabylon.edu.iq

8. Course Objectives

Course Objectives	To equip students with various issues related to DIGITAL SIGNAL PROCESSING, DIGITAL FILTER DESIGN, SATELLITE COMMUNICATION SYSTEMS, and SPREAD SPECTRUM SYSTEMS. 1. This course provides an in-depth analysis of the fundamental principles of Digital signal processing and spread spectrum and satellite communication. 2. The exposition of these principles is fully reinforced by many practical problems that illustrate the concepts discussed. 3. The course will introduce the mathematical representation and properties of discrete-time signals; like periodicity, Symmetricity, time-shifting, time-reversal, and time-scaling Learning. 4. The course provides a description and properties of Discrete-Time Systems; system linearity, shift-invariant, causality, and stability. 5. It gives some fundamentals about Discrete Fourier Transform (DFT), Fast Fourier Transform (FFT), convolution, and de-convolution. 6. Understand the principle of IIR digital filter design based on analog filter design. 7. Understand the principle of FIR digital filter design using the windows technique. 8. Study the realization of different digital filter types in the direct form I and II. The course gives some topics on advanced communication systems like spread

	spectrum (direct sequence and frequency hopping), and satellite communications.

9. Teaching and Learning Strategies

Strategy	1. Learning Technologies on Campus using Whiteboard and TV monitor. 2. Hand out lecture notes. 3. Video lectures on YouTube and google classroom. 4. Assign students to projects that simulate real systems in the form of groups. Work in the Lab: Lab sessions provide students with practical experience while reinforcing theoretical ideas. Utilizing different lab tools and components, students may conduct experiments and measurements. They apply their theoretical knowledge, develop their practical abilities, and comprehend how electrical systems behave in a controlled environment.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
Week 1	4	General DSP System, Drawback of analog signal processing (ASP), Advantages of DSP, Discrete-Time Signals, Complex Sequences, Some Fundamental Sequences, Periodic and aperiodic Sequences	INTRODUCTION TO DIGITAL SIGNAL PROCESSING (DSP)	Learning Technologies on Campus using Whiteboard and TV monitor. Hand out lecture notes.	daily preparation, daily oral, Homework. Reports Small projects Quizzes.
Week 2	4	Symmetric Sequences, Transformations of the Independent Variable, Addition, Multiplication, and Scaling, Signal Decomposition	INTRODUCTION TO DIGITAL SIGNAL PROCESSING (DSP)	Learning Technologies on Campus using Whiteboard and TV monitor. Hand out lecture notes.	daily preparation, daily oral, Homework. Reports Small projects Quizzes.
Week 3	4	Discrete-Time Systems, System Properties (Memoryless System, Additivity, Homogeneity, Linear Systems, Shift-Invariance, Linear Shift-Invariant Systems, Causality, Stability).	INTRODUCTION TO DIGITAL SIGNAL PROCESSING (DSP)	Learning Technologies on Campus using Whiteboard and TV monitor. Hand out lecture notes.	daily preparation, daily oral, Homework. Reports Small projects Quizzes.
Week 4	4	Input/output relation in Z-domain, The Discrete Fourier Transform (DFT), DFT Properties (Linearity, Symmetry, Circular Shift).	INTRODUCTION TO DIGITAL SIGNAL PROCESSING (DSP)	Learning Technologies on Campus using Whiteboard and TV monitor. Hand out lecture notes.	daily preparation, daily oral, Homework. Reports Small projects Quizzes.

Week 5	4	Radix-2 Fast Fourier Transform (FFT), Decimation-in-Time FFT.	INTRODUCTION TO DIGITAL SIGNAL PROCESSING (DSP)	Learning Technologies on Campus using Whiteboard and TV monitor. Hand out lecture notes.	daily preparation, daily oral, Homework. Reports Small projects Quizzes.
Week 6	4	Complexity of FFT, Inverse Fast Fourier-Transform (IFFT).	INTRODUCTION TO DIGITAL SIGNAL PROCESSING (DSP)	Learning Technologies on Campus using Whiteboard and TV monitor. Hand out lecture notes.	daily preparation, daily oral, Homework. Reports Small projects Quizzes.
Week 7	4	Convolution, Convolution Properties, Performing Convolution, Direct Evaluation.	INTRODUCTION TO DIGITAL SIGNAL PROCESSING (DSP)	Learning Technologies on Campus using Whiteboard and TV monitor. Hand out lecture notes.	daily preparation, daily oral, Homework. Reports Small projects Quizzes.
Week 8	4	Addition Method, Graphical Approach, Tabular method	INTRODUCTION TO DIGITAL SIGNAL PROCESSING (DSP)	Learning Technologies on Campus using Whiteboard and TV monitor. Hand out lecture notes.	daily preparation, daily oral, Homework. Reports Small projects Quizzes.
Week 9	4	Linear Convolution Using The DFT, Overlap- Add Method, z-transform method, Deconvolution, Iterative method, z-transform method.	INTRODUCTION TO DIGITAL SIGNAL PROCESSING (DSP)	Learning Technologies on Campus using Whiteboard and TV monitor. Hand out lecture notes.	daily preparation, daily oral, Homework. Reports Small projects Quizzes.
Week 10	4	DIGITAL FILTER DESIGN, Structures for IIR Systems (Direct Form I, Direct Form II).	DIGITAL FILTER DESIGN	Learning Technologies on Campus using Whiteboard and TV monitor. Hand out lecture notes.	daily preparation, daily oral, Homework. Reports Small projects Quizzes.
Week 11	4	Cascade Structure, Parallel Structure, Structures for FIR Systems, IIR FILTER DESIGN, Butterworth Filters, The Order of a Butterworth Filter, Analog-to-Analog Transformations, Design	DIGITAL FILTER DESIGN	Learning Technologies on Campus using Whiteboard and TV monitor. Hand out lecture notes.	daily preparation, daily oral, Homework. Reports Small projects Quizzes.

		of Bandpass Butterworth Filters			
Week 12	4	Chebyshev Filters, The Bilinear Transformation, Design of FIR filters using windows.	DIGITAL FILTER DESIGN	Learning Technologies on Campus using Whiteboard and TV monitor. Hand out lecture notes.	daily preparation, daily oral, Homework. Reports Small projects Quizzes.
Week 13	4	Spread Spectrum Systems, Pseudo-Noise Sequences, Properties of Maximal-Length Sequences, Direct-Sequence Spread Spectrum (DS-SS), Interference rejection capability, Frequency-Hop Spread Spectrum (fast and slow).	Spread Spectrum Systems	Learning Technologies on Campus using Whiteboard and TV monitor. Hand out lecture notes.	daily preparation, daily oral, Homework. Reports Small projects Quizzes.
Week 14	4	Configuration of a Satellite Communications System, Types of Orbits, Frequencies for Microwave Satellite Communications, Link Budget.	Satellite Communications System	Learning Technologies on Campus using Whiteboard and TV monitor. Hand out lecture notes.	daily preparation, daily oral, Homework. Reports Small projects Quizzes.
Week 15	4	System Noise Temperature, Antenna Noise Temperature, Antenna-to-Receiver Connecting Cable, Receiver Noise, System Temperature, C/N Ratio at Receiver Output.	Satellite Communications System	Learning Technologies on Campus using Whiteboard and TV monitor. Hand out lecture notes.	daily preparation, daily oral, Homework. Reports Small projects Quizzes.

11. Course Evaluation

Quizzes: 5, Assignments:5, Projects:5, homework:5, Attendance:5, Mid.term.Exam:15, final Exam:60

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	
Main references (sources)	
Recommended books and references (scientific journals, reports…)	
Electronic References, Websites	

Learning and teaching resources	
Required textbooks	• Monsons Hays, Schaums Outline of Digital Signal processing, 2nd edition ,McGraw-Hill Companies, 2012. • Simon Haykin, "Communication Systems", 4thed, 2001. • G_erard Maral, Michel Bousquet, "SATELLITE COMMUNICATIONS SYSTEMS Systems, Techniques and Technology", John Wiley & Sons Ltd, 2009. • Bernard Sklar, "Digital Communication Fundamentals and Applications", Prentice Hall PTR, Upper Saddle River, New Jersey, 2007.
Main references	• J.G. Proakis and D.G. Manolakis, Digital Signal Processing, 4rd edition, Prentice-Hall , 2006. • R.G Lyons, Understanding Digital Signal processing, 3rd edition, Prentice-Hall, (Amazon's top-selling for five straight year) ,2011.
Websites	• https://www.youtube.com/watch?v=-1mqq7mM2Tw&list=PL8kIY140F69An5xlA30ZKXLMcU7L6M0eJ

Course Description Form

1. Course Name: Electrical Power system Analysis II
2. Course Code: **EnElPsII45710 (3,1,0)**
3. Semester / Year: Second semester/2024
4. Description Preparation Date:
30/1/2025
5. Available Attendance Forms:
6. Number of Credit Hours (Total) / Number of Units (Total): 60/4
7. Course administrator's name (mention all, if more than one name)
Name: Dr. Ahmed Samawi Alkhafaji Email: eng.ahmed.samawi@uobabylon.edu.iq
8. Course Objectives

Course Objectives	1- Provide students how to analyze the flow of electrical power in power systems by using Gauss-Seidel and Newton Raphson Methods. 2- Provide students how to analyze power system Stability under transient conditions (change load, switching, faults, and failure generating 3- Provide students how to design the protection systems.

9. Teaching and Learning Strategies

Strategy	1. Learning Technologies on Campus using Whiteboard and TV monitor. 2. Hand out lecture notes. 3. Video lectures on YouTube and Google Classroom.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	Understanding overall load flow study.	Load flow studies	Whiteboard and TV monitor	Homework assignment and Quiz
2	4	Understanding the three types of bus-bar and how to use the numerical analysis methods.	Load flow studies	Whiteboard and TV monitor	Homework assignment and Quiz
3	4	Understanding the Gauss-Seidel method for calculation	Load flow studies	Whiteboard and TV monitor	Homework assignment and Quiz
4	4	Understanding Method of Voltage Control	Load flow studies		
5	4	Understanding Newton-Raphson Method	Load flow studies	Whiteboard and TV monitor	Homework assignment and Quiz
6	4	Understanding the power system losses calculation and draw the power direction schematics	Load flow studies	Whiteboard and TV monitor	Homework assignment and Quiz
7	4	Understanding the overall meaning of power system Stability	Power System Stability	Whiteboard and TV monitor	Homework assignment and Quiz
8	4	Understanding Rotor Dynamics and the Swing equation	Power System Stability	Whiteboard and TV monitor	Homework assignment and Quiz
9	4	Understanding The Power Angle Equation and Synchronizing Power Coefficients	Power System Stability	Whiteboard and TV monitor	Homework assignment and Quiz
10	4	Understanding Equal-Area Criterion of Stability	Power System Stability	Whiteboard and TV monitor	Homework assignment and Quiz
11	4	Understanding Application of the Equal Area Criterion	Power System Stability		

12	2	**Mid-Term Exam**			
12	2	Understanding the Power System Protection introduction	Protection	Whiteboard and TV monitor	Homework assignment and Quiz
13	2	Understanding Protection System Components	Protection	Whiteboard and TV monitor	Homework assignment and Quiz
13	2	Understanding the Relays Performance and types	Protection	Whiteboard and TV monitor	Homework assignment and Quiz
14	4	Understanding the Radial System Protection and Relays connection on power system network	Protection	Whiteboard and TV monitor	Homework assignment and Quiz
15	4	The preparatory week before the Final Exam			

11. Course Evaluation

Homework assignments = 15%, Quizzes=15%, Mid-term Exams=50%, Report =5%, Participate =10%, Attendance=5%.

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	
Main references (sources)	Power System Analysis and Design, Fifth Edition, Si, J.
Recommended books and references (scientific journals, reports…)	
Electronic References, Websites	https://www.coursera.org

Course Description Form

1. Course Name:
Power Electronics I
2. Course Code:
EnElPeI 4 39 03
3. Semester / Year:
First/Forth
4. Description Preparation Date:
30/1/2025
5. Available Attendance Forms:
Attendance in a Class
6. Number of Credit Hours (Total) / Number of Units (Total):
150/6
7. Course administrator's name (mention all, if more than one name)
Name: Prof. Dr Kasim Karam Abdalla Email: eng.kassim.kerem@uobabylon.edu.iq
8. Course Objectives

Course Objectives	This course introduces the basic concepts of power electronics switches including construction, operation and characteristics. The course also presents the details of the most important converter (AC/DC converter) including the circuit, operation and analysis of all types of single phase and three phase rectifier circuits in both uncontrolled and controlled mode of operation. In addition to the presentation of the design of electronic circuits that control the converter switches of the converter. The educational aims of this course are: 1- To Introduce power electronic concept, Scope and Application as well as Classification of Power Converters. 2- To understand basic power electronic devices such as Diode, Thyristors (SCR), Transistor, MOSFET, IGBT, MCT, Diac, Triac and GTO, including construction, operation and characteristics 3- To presents the details of the most important switch SCR include methods of triggering, commutation, protection and cooling.

	4- To design relaxation oscillator by using Unijunction transistor (UJT) and Programmable Unijunction transistor (PUT). 5- To present principles on converter (AC/DC converter) including the circuit, operation and analysis of single phase and three phase rectifier circuits.

9. Teaching and Learning Strategies

Strategy	1.Learning Technologies on Campus using Whiteboard and TV monitor. 2.Hand out lecture notes. 3.Video lectures on YouTube and google classroom.

10. Course Structure

Week	Hours	Require	Unit or subject name	Learning method	Evaluation method
	Per week	Outcom			
Week 1	٣		Power Electronics introduction, classification and application	Lectures	Midterm Exam + Quizzes+ Final Exam
Week 2			Power Electronics devices		
Week 3			Power Diode characteristics (statics and dynamic), operation and reading and calculating its parameter from the data sheet		
Week 4			Power diode types (Standard or general-purpose diodes, Fast-recovery diodes, Schottky diodes), and comparison.		
Week 5			Thyristor characteristics (statics and dynamic), operation and reading and calculating its parameters from the data sheet.		
Week 6			Turn on thyristor methods		
Week 7			**Mid-term Exam** + Gate turn on SCR		
Week 8			UJT construction, operation and characteristics. Relaxation oscillator design using UJT		
Week 9			PUT construction, operation and characteristics. Relaxation oscillator design using PUT		
Week 10			Turn off thyristor methods.		
Week 11			Thyristor protection.		
Week 12			Design of the snubber circuit		
Week 13			Cooling of the thyristor		
Week 14			Rating of the thyristor		
Week 15			Rectification circuits		
Week 16			Preparatory week before the final Exam		

11. Course Evaluation	
12. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	Power Electronics by C.W. Lander
Main references (sources)	Power Electronics Devices, Circuits and Industrial Applications by V. R. MOORTHI
Recommended books and references (scientific journals, reports ….)	Power electronics Devices, Circuits, and Applications by Mohammed Rashid.
Electronic References, Websites	

Course Description Form

1. Course Name:	
Power Electronics II	
2. Course Code:	
EnElPeII 4 45 09	
3. Semester / Year:	
Second/Forth	
4. Description Preparation Date:	
30/1/2025	
5. Available Attendance Forms:	
Attendance in a Class	
6. Number of Credit Hours (Total) / Number of Units (Total):	
75/3	
7. Course administrator's name (mention all, if more than one name)	
Name: Prof. Dr Kasim Karam Abdalla Email: eng.kassim.kerem@uobabylon.edu.iq	
8. Course Objectives	
Course Objectives	The educational aims of this course are: 1- To understand the performance parameters of the converters. 2- To derive, calculate and understand performance parameters of alternating (single and three phase) voltage (controlled and uncontrolled) rectification circuits with different loads and the effect of using Freewheeling diode (FWD). 3- To understand single and three phase dual convertor and their types 4- To understand Phenomenon of commutation or overlap and derive, calculate angle and voltage reduction of this effect 5- To understand the half and full wave Six-Phase (Hexa-Phase) Uncontrolled Rectifier. 6- To design DC-DC converters, Buck, Boost, Buck-Boost, Cuk and SEPIC converters 7- To understand DC-AC inverters: Introduction, Classification, single phase half and full bridge VSI also AC Voltage Controllers and Cycloconverters Principals

	8- To take examples of Application of Power Electronics: D.C. Motor Speed control, A.C. Drives: variable frequency drives. AC Voltage Regulators.

9. Teaching and Learning Strategies

Strategy	1.Learning Technologies on Campus using Whiteboard and TV monitor. 2.Hand out lecture notes. 3.Video lectures on YouTube and google classroom.

10. Course Structure

Week	Hours Per week	Require Outcom	Unit or subject name	Learning method	Evaluation method
Week 1	/week		Introduction and definition of the performance parameters for rectifiers	Lectures	Midterm Exam + Quizzes+ Final Exam
Week 2			Single phase half and full wave uncontrolled rectifiers with R and RL loads and with and without Free wheeling diode.		
Week 3			Single phase half wave controlled rectifier circuits with R and RL loads with and without Free wheeling diode.		
Week 4			Single phase full wave semi-controlled and controlled rectifier circuits with R and RL loads with and without Free wheeling diode.		
Week 5			Three phase half uncontrolled rectifier circuits with R and RL loads and Free wheeling diode with and without Free wheeling diode.		
Week 6			Three phase full wave uncontrolled rectifier circuits with R and RL loads and Free wheeling diode with and without Free wheeling diode.		
Week 7			Mid-term Exam + Rectification mode and Inverting mode by changing firing angle in bridge rectifier		
Week 8			Three phase half wave controlled rectifier circuits with R and RL loads with and without Free wheeling diode.		

Week 9			Three phase full wave semi-controlled and controlled rectifier circuits with R and RL loads with and without Free wheeling diode.		
Week 10			Single and three phase fall-wave controlled Dual Converter.		
Week 11			Phenomenon of commutation or overlap.		
Week 12			Half and full wave Six-Phase Uncontrolled Rectifier.		
Week 13			DC-DC converters, Buck, Boost, Buck-Boost, Cuk and SEPIC converters.		
Week 14			DC-AC inverters		
Week 15			Application of Power Electronics: D.C. Motor Speed control, A.C. Drives: variable frequency drives. AC Voltage Regulators.		
Week 16			Preparatory week before the final Exam		

11. Course Evaluation

12. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	Power Electronics by C.W. Lander
Main references (sources)	Power Electronics Devices, Circuits and Industrial Applications by V. R. MOORTHI
Recommended books and references (scientific journals, reports .)	Power electronics Devices, Circuits, and Applications by Mohammed Rashid.
Electronic References, Websites	

Course Description Form

1. Course Name:
Control-1
2. Course Code:
EnElCeI45104 (3,1,0)
3. Semester / Year:
2nd/ 2024
4. Description Preparation Date:
30/1/2025
5. Available Attendance Forms:
Internal
6. Number of Credit Hours (Total) / Number of Units (Total)
56 / 3
7. Course administrator's name (mention all, if more than one name)
Name: HAIDER Al-MUMEN Email: eng.almumenh@uobabylon.edu.iq

8. Course Objectives

Course Objectives	Students should be able to learn: 1- The type of system, dynamics of physical systems, classification of control system, analysis and design objectives. 2 - How to represent system by transfer function and block diagram reduction method and Mason's rule. 3- Time response analysis and demonstrate their knowledge to frequency response. 4- Stability analysis of system using Root locus, and bode plot. The course will enable the students to gain preliminary knowledge in: 1- Identifying the open and closed loop control system. 2- Formulating mathematical model for physical systems. 3- Simplifying representation of complex systems using reduction techniques. 4- Use standard test signals to identify performance characteristics of first and second-order systems. 5- Applying root locus technique for stability analysis. 6- Analyzing performance characteristics of system using Frequency response methods.

9. Teaching and Learning Strategies

Strategy	ξ Lectures. ξ Dialogue and discussion. ξ Brainstorming. ξ Tutorials (Problem solving). ξ Quizzes

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	٤	Explain the basic concepts of antennas And its spread in different mediations	Introduction to control systems Laplace transform	. Lectures and Tutorials	• Exam
٢	٤	=	Modeling of electrical systems	. Lectures and Tutorials	• Exam
3	4	=	Modeling of mechanical systems	. Lectures and Tutorials	• Exam
4	4	=	Modeling of electro-mecanical systems	. Lectures and Tutorials	• Exam
5	4	=	Block diagram	. Lectures and Tutorials	• Exam
6	4	=	Time response of first order system	. Lectures and Tutorials	• Exam
7	4	=	Time response of second order system	. Lectures and Tutorials	• Exam
8	4	=	Routh stability criterion	. Lectures and Tutorials	• Exam
9	4	=	Root locus	. Lectures and Tutorials	• Exam
10	4	=	Frequency response	. Lectures and	• Exam

			Bode plote	Tutorials	
12	4	=	Stability analysis using bode plot	. Lectures and Tutorials	• Exam
13	4	=	Polar plot	. Lectures and Tutorials	• Exam
14	4	=	Nyquist stability analysis	. Lectures and Tutorials	• Exam
15	4	=		.	• Exam
16	4	=			• Exam

11. Course Evaluation

Quizzes 10% (10), Assignments 10% (10), Report10% (10), Midterm Exam10% (10), Final Exam 60% (60)

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	
Main references (sources)	
Recommended books and references (scientific journals, reports…)	
Electronic References, Websites	

Course Description Form

1. Course Name:
Digital electronic
2. Course Code:
EnElDe44907 (4,1,0)
3. Semester / Year:
Semester
4. Description Preparation Date:
30/1/2025
5. Available Attendance Forms:
Weekly, Core, On campus
6. Number of Credit Hours (Total) / Number of Units (Total) :
75 hours Th.
7. Course administrator's name (mention all, if more than one name)
Name: Hussein Ali Lafta Email: hussein.ali556@uobabylon.edu.iq
8. Course Objectives

Course Objectives	• This course provides an in-depth analysis on the fundamental principles of digital electronic. • The exposition of these principles is fully reinforced by many practical problems that illustrate the concepts discussed. • Beginning with a precise and quantitative detailing of the flip flop. Then moves on to explain digital counter, shift register. • The other chapters focus on Synchronous Sequential Networks, ADC and DAC circuit Timer Circuits, DTL, TTL, RTL and Emitter coupled logic Circuit. Each subject has an important related application of the digital electronic. • Many examples are drawn from industrial research experience and from insights contributed by practicing engineers and industrial partners.

9. Teaching and Learning Strategies

Strategy	1. Learning Technologies on Campus using Whiteboard and TV monitor. 2. Hand out lecture notes. 3. Video lectures on YouTube and google classroom.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	5		Flip-Flops	White Board, computer and TV Screen	Homework Quizzes
2	5		digital counter	White Board, computer and TV Screen	Homework Quizzes
3	5		Asynchronous Counters	White Board, computer and TV Screen	Homework Quizzes
4	5		Synchronous Counters	White Board, computer and TV Screen	Homework Quizzes
5	5		Integrated circuit counters	White Board, computer and TV Screen	Homework Quizzes
6	5		cascaded counters	White Board, computer and TV Screen	Homework Quizzes
7	5		Shift Register Shift Register counter	White Board, computer and TV Screen	Homework Quizzes
8	5		Shift Register counter	White Board, computer and TV Screen	Exam

9	5		Synchronous Sequential Networks	White Board, computer and TV Screen	Homework Quizzes
10	5		State Reduction	White Board, computer and TV Screen	Homework Quizzes
11	5		Digital and Analog Representation	White Board, computer and TV Screen	Homework Quizzes
12	5		Timer Circuits	White Board, computer and TV Screen	Homework Quizzes
13	5		DTL and TTL Circuit	White Board, computer and TV Screen	Homework Quizzes
14	5		RTL AND Emitter coupled logic Circuit	White Board, computer and TV Screen	Homework Quizzes
15	3		Final Exam		Exam

11. Course Evaluation	
Quizzes and Homework: (20%), midterm: (20%), Final Exam: (60%)	
12. Learning and Teaching Resources	
Required textbookk(curricular book, if any)	
Main references (sources)	1. Digital Principles and applications, 7th edition, by Albert Paul Malvino 2. Digital Fundamentals, 9th edition, by Floyd R P Jain Modern Digital Electronics
Recommended books and references (scientific journal, reportes…)	
Electronic references, websites)	

Course Description Form

1. Course Name: English Language VIII
2. Course Code:
3. Semester / Year: Second Semester/2023-2024
4. Description Preparation Date:
30/1/2025
5. Available Attendance Forms:
Room Lectures
6. Number of Credit Hours (Total) / Number of Units (Total) 1
30 hours.
7. Course administrator's name (mention all, if more than one name)
Name: Dr. Tahani Hamodi AL-Mhana Email: eng.tahany.hamodi@uobabylon.edu.iq
8. Course Objectives

Course Objectives	• Preparing students to use English language appropriately. • Enhancement of all language skills (speaking, listening, reading and writing) needed as a graduate of Electrical Engineering. • Acquirement of relevant grammatical and verbal structures of English for Electrical Engineering at higher level suitable for after graduation. • Acquirement of skills on how to write CV and cover letter. • Enhancement of inferring skills through studying social and technological reading passages.

9. Teaching and Learning Strategies

Strategy	• Lectures. • Tutorial. • Class Discussion. • Examples. • Practical applications. • Thinking-based problems. • Group Discussions and Collaborative Learning.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2		Introduction to course, description and requirements. Unit 5, An eye to the future.	Lectures, Tutorial and discussions	Discussions
2	2		Unit 5, Future forms, will or going to	Lectures, Tutorial and discussions	Discussions
3	2		Unit 5, spoken English, Reading passage and exercise.	Lectures, Tutorial and discussions	Quiz
4	2		Unit 5, Future continuous, Future perfect.	Lectures, Tutorial and discussions	Discussions
5	2		Unit 5, listening, exercise, hot verbs (take ,put), phrasal verbs	Lectures, Tutorial and discussions	Discussions

6	2		Reading passage and exercise.	Lectures, Tutorial and discussions	Quiz
7	2		Unit 6, making it big, test your grammar.	Lectures, Tutorial and discussions	Discussions
8	2		Unit 6, expression of quantity, reading passage and exercise.	Lectures, Tutorial and discussions	Discussions
9	2		Unit 6, countable and uncountable nouns.	Lectures, Tutorial and discussions	Quiz
10	2		Unit 6, Listening and speaking, exercise.	Lectures, Tutorial and discussions	Discussions
11	2		Unit 6, business expressions and numbers	Lectures, Tutorial and discussions	Discussions
12	2		Unit 7, getting on together, modal verbs.	Lectures, Tutorial and discussions	Discussions

13	2		Unit 7, Listening and speaking, exercise.	Lectures, Tutorial and discussions	Quiz
14	2		Unit 7, Reading passage and exercise. Introduction to CV writing.	Lectures, Tutorial and discussions	Discussions
15	2		How to write a scientific CV and cover letter. Examples.	Lectures, Tutorial and discussions	Discussions

11. Course Evaluation

- Quizzes and homework. (10%)
- Mid-term test (30%, To be scheduled).
- Final exam (60%, To be scheduled by department).

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	
Main references (sources)	Liz and John Soars, New Headway Upper- Intermediate Student's Book, Oxford.
Recommended books and references (scientific journals, reports…)	
Electronic References, Websites	Any English Learning website is useful.

Course Description Form

1. Course Name:
Instrumentation Laboratory
2. Course Code:
ELC-107
3. Semester / Year:
First Semester / Fourth
4. Description Preparation Date:
30/1/2025
5. Available Attendance Forms:
Yes
6. Number of Credit Hours (Total) / Number of Units (Total)
45 hours / 2 units.
7. Course administrator's name (mention all, if more than one name)
Name: Assistant Lecturer: Qasim Mahdi Hamad Email: Kasimalhussai@uobabylon.edu.iq
8. Course Objectives
When teaching an instrumentation lab using Arduino, the aims typically revolve around introducing students to the principles of instrumentation and measurement using a hands-on approach with Arduino-based hardware and software. -Understanding Instrumentation: Concepts Introduce students to the basic principles of instrumentation such as sensors, actuators, signal conditioning, data acquisition, and measurement techniques. -Hands-on Experience: Provide students with practical experience in designing, building, and testing instrumentation systems using Arduino microcontrollers and related components. -Programming Skills Develop students' programming skills by teaching them how to write code in Arduino IDE to interface with sensors, process data, and control actuators. -Sensor Integration: Teach students how to integrate various types of sensors (e.g., temperature, humidity, light, motion) with Arduino and how to interpret sensor data. -Signal Processing: Introduce students to basic signal processing techniques such as filtering, amplification, and noise reduction, and demonstrate how these techniques can be implemented using Arduino. -Data Acquisition: Familiarize students with techniques for acquiring, storing, and analyzing data using Arduino and associated software tools. -Troubleshooting and Debugging: Develop students' problem-solving skills by challenging them to troubleshoot common issues encountered in instrumentation systems, such as sensor calibration errors or communication glitches. -Project-based Learning: Encourage students to work on hands-on projects that involve designing and building instrumentation systems for real-world applications, fostering creativity and innovation. -Interdisciplinary Learning: Showcase the interdisciplinary nature of instrumentation by incorporating concepts from various fields such as electrical engineering, computer science, physics, and mechanical engineering.

9. Teaching and Learning Strategies

Strategy	-Theoretical lectures with explanation of the required task. -Hands-on Activities: Provide students with hands-on activities where they can interact directly with Arduino boards, sensors, and actuators. Encourage them to build circuits, write code, and observe real-time results. -Project-Based Learning: Assign projects that require students to design and implement instrumentation systems to solve real-world problems. This approach fosters creativity, problem-solving skills, and practical application of theoretical concepts. -Peer Learning: Encourage collaboration among students by organizing group activities or projects where they can work together to solve challenges, share ideas, and learn from each other's experiences.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	3	Teaching the student about Arduino	Introduction to Arduino	PowerPoint presentation+ using Arduino kit	NA
2	3	Teaching the student basic Arduino architecture.	Arduino Architecture.	PowerPoint presentation+ using Arduino kit	Quiz
3	3	Teaching the student Arduino coding language.	Arduino IDE	PowerPoint presentation+ using Arduino kit	Quiz
4	3	Teaching the student Arduino coding (digital input)	Digital Inputs	PowerPoint presentation+ using Arduino kit	Assessments based on student implementation of the required task.
5	3	Teaching the student Arduino coding (digital output)	Digital Outputs	PowerPoint presentation+ using Arduino kit	Quiz
6	3	Teaching the student Arduino coding (Analog input)	Analog Inputs	PowerPoint presentation+ using Arduino kit	Quiz
7	3	Teaching the student Arduino coding (Analog output/PWM)	Pulse Width Modulation	PowerPoint presentation+ using Arduino kit	Assessments based on student implementation of the required task.
8		Mid-Term Exam			
9	3	Implementation Of sensor and Actuator with Arduino	Sensors and Actuator	PowerPoint presentation	Quiz
10	3	The student will be taught about sensors, both digital and analog sensors.	Temperature Sensors	PowerPoint presentation+ Arduino kit+ required Sensor	Quiz

11	**3**	The student will be taught about sensors, both digital and analog sensors.	Magnetic Sensors	PowerPoint presentation+ Arduino kit+ required Sensor	Assessments based on student implementation of the required task.
12	**3**	The student will be taught about sensors, both digital and analog sensors.	Photo, Flame and IR Sensors	PowerPoint presentation+ Arduino kit+ required Sensor	Quiz
13	**3**	The student will be taught about sensors, both digital and analog sensors.	Touch and Tilt sensors	PowerPoint presentation+ Arduino kit+ required Sensor	Quiz
14	**3**	The student will be taught about sensors, both digital and analog sensors.	Ultrasonic Sensor	PowerPoint presentation+ Arduino kit+ required Sensor	Quiz
15		Final Exam			

11. Course Evaluation
Total:50%, Mid-course exam: 20%, Final Exame:20%, quiz and practical assessment: 10%

12. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	
Main references (sources)	
Recommended books and references (scientific journals, reports…)	
Electronic References, Websites	

Learning and Teaching Resources		
	Text	**Available in the Library?**
Required Texts	Laboratory manuals	Yes
Recommended Texts	The presented Lecture	Yes
Websites		

Course Description Form

1. Course Name:
Control Systems Laboratory
2. Course Code:
ELC-108
3. Semester / Year:
Second Semester / 2023-2024
4. Description Preparation Date:
30/1/2025
5. Available Attendance Forms:
Yes
6. Number of Credit Hours (Total) / Number of Units (Total)
45 hours / 2 units.
7. Course administrator's name (mention all, if more than one name)
Name: Assistant Lecturer: Qasim Mahdi Hamad Email: Kasimalhussai@uobabylon.edu.iq
8. Course Objectives
This course aims to equip students with a comprehensive understanding of control system analysis, and modeling techniques. It covers a wide range of topics, from the basics of control systems design to the advanced controller design methods. Modelling of Control Systems using MATLAB/ SIMULINK. Time and frequency response analysis. Controller design using different methods.
9. Teaching and Learning Strategies

Strategy	-Theoretical lectures with intensive explanation of the required task. -The computer software is used to implement the required task by students, with lecture-based quiz - PowerPoint presentation on a TV in the lab is used for depth explanation of the required task. - Using the traditional white board to derive the necessary equations and block diagram connection.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	3	Teaching the student how to model systems using Simulink	Introduction to modeling of Control Systems	PowerPoint presentation	NA
2	3	Modelling of electrical systems using Simulink	Modeling of Electrical systems	PowerPoint presentation+ practical use of computer.	Quiz
3	3	System representation by differential equations	Mathematical modeling of RLC Circuit.	PowerPoint presentation+ practical use of computer.	Quiz
4	3	Using Simulink to model a mathematical equation	Modeling of ordinary Differential Equations	PowerPoint presentation+ practical use of computer.	Assessments based on student implementation of the required task.
5	3	Modeling in Simulink	DC Motor Shaft Position Control	PowerPoint presentation+ practical use of computer.	Quiz
6	3	Teaching the student how to ODs equations using Simulink	Modeling of DC Motor using Differential Equation Representation.	PowerPoint presentation+ practical use of computer.	Quiz
7	3	Student should be able build Simulink model.	Building Simulink model of the DC motor.	PowerPoint presentation+ practical use of computer.	Assessments based on student implementation of the required task.
8	3	Teaching the students the performance criterion associated with time response.	Time response analysis methods.	PowerPoint presentation+ practical use of computer.	Quiz
9	3	Student should be able to add the system parameters by Matlab code or using direct method.	Physical Parameters representation.	PowerPoint presentation+ practical use of computer.	Quiz

10	3	The student most be able to model a DC Motor speed control using Simulink.	DC Motor Rotor Speed control model	PowerPoint presentation+ practical use of computer.	Quiz
11	3	Using MATLAB, the student should be able to determine the locations of poles and zeros and how to manipulate them.	Root Locus design method.	PowerPoint presentation+ practical use of computer.	Assessments based on student implementation of the required task.
12	3	Frequency Response Analysis using Bode Plot Method.	Bode Plot Design Method.	PowerPoint presentation+ practical use of computer.	Quiz
13	3	Using nominal and disturbed system, the student should be able to design suitable PID controller.	Design of a PID Controller.	PowerPoint presentation+ practical use of computer.	Quiz
14	3	The student should be able to recognize the first order system features and the associated time delay.	First order systems analysis	PowerPoint presentation+ practical use of computer.	Quiz
15	3	The student should be able to recognize the second and higher order system features.	Second Order and Higher Order Systems analysis		

11. Course Evaluation
Total:50%, Mid-course exam: 20%, Final Exame:20%, quiz and practical assessment: 10%

12. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	
Main references (sources)	
Recommended books and references (scientific journals, reports…)	
Electronic References, Websites	

Learning and Teaching Resources		
	Text	**Available in the Library?**
Required Texts	Modern Control Engineering (Ogata)	Yes
Recommended Texts	Modern Control Engineering (Ogata)	Yes
Websites		

Course Description Form

1. Course Name:
Digital Communications Laboratory
2. Course Code:
ELC-108
3. Semester / Year:
First Semester / 2023-2024
4. Description Preparation Date:
30/1/2025
5. Available Attendance Forms:
Yes
6. Number of Credit Hours (Total) / Number of Units (Total)
45 hours / 2 units.
7. Course administrator's name (mention all, if more than one name)
Name: Dr. Raed S.H. AL-Musawi, and Dr. Ahmed N. Jabbar Email: Raed.ALmusawi@uobabylon.edu.iq
8. Course Objectives
In this course, students will learn the fundamental principles of digital communication systems. They will understand how data is encoded, modulated, transmitted, and received in digital communication systems. Through lectures, discussions, and hands-on laboratory sessions, students will gain proficiency in analyzing and designing various techniques used in digital communication, such as line coding, pulse code modulation, and error detection and correction. They will also explore advanced topics including digital modulation techniques, optical communication systems, spread spectrum techniques, and multiple access techniques. By the end of the course, students will have developed practical skills in designing and implementing digital communication systems, as well as the ability to analyze and optimize their performance. These skills will prepare them for careers in telecommunications, networking, and related fields, as well as further studies in the field of digital communication.
9. Teaching and Learning Strategies
Teaching Strategies: 1. Lectures: Engage students through structured lectures covering theoretical concepts and principles of digital communication systems, supplemented with visual aids and examples to enhance understanding. 2. Hands-on Laboratory Sessions: Provide students with practical experience by conducting laboratory sessions where they can design, simulate, and implement digital communication systems using industry-standard software and hardware tools.

3. Group Discussions: Facilitate interactive group discussions to encourage peer learning, critical thinking, and collaborative problem-solving on topics covered in lectures and laboratory sessions.

4. Case Studies: Present real-world case studies of digital communication systems, including telecommunications networks, satellite communications, and wireless technologies, to illustrate theoretical concepts in practical contexts and stimulate discussion.

5. Project-Based Learning: Assign projects that require students to apply their knowledge and skills in designing and implementing digital communication systems to solve real-world problems or explore advanced topics of interest.

Learning Outcomes:

1. Conceptual Understanding: Develop a comprehensive understanding of the theoretical concepts and principles underlying digital communication systems, including encoding, modulation, transmission, reception, and signal processing.

2. Analytical Skills: Acquire analytical skills to analyze the performance of digital communication systems, evaluate design choices, and optimize system parameters for efficient and reliable data transmission.

3. Practical Competence: Gain practical competence in designing, simulating, and implementing digital communication systems through laboratory experiments, projects, and hands-on activities using industry-standard tools and techniques.

4. Critical Thinking: Develop critical thinking skills to evaluate the strengths and limitations of different digital communication techniques, technologies, and standards, and make informed decisions in system design and optimization.

5. Communication Proficiency: Improve communication proficiency through participation in group discussions, presentations, and written reports, effectively conveying technical concepts, analysis results, and design solutions to peers and instructors.

10. Course Structure

Week #	Hours	Expected Learning Outcomes	Experiment Title	Learning Method	Evaluation Method

1	**3**	Understand principles of line coding and its applications in digital communication systems.	Line Coding Techniques	Lectures, Hands-on Laboratory Sessions	Laboratory reports, quizzes
2	**3**	Learn the principles of Pulse Code Modulation (PCM) and its application in digital communication systems.	Pulse Code Modulation (PCM)	Lectures, Hands-on Laboratory Sessions	Laboratory reports, quizzes
3	**3**	Gain proficiency in baseband digital transmission techniques and their role in digital communication systems.	Baseband Digital Transmission	Lectures, Hands-on Laboratory Sessions	Laboratory reports, quizzes
4	**3**	Understand principles of Amplitude Shift Keying (ASK) modulation and its applications in digital communication.	Digital Modulation Techniques: Amplitude Shift Keying (ASK)	Lectures, Hands-on Laboratory Sessions	Laboratory reports, quizzes
5	**3**	Explore principles of Frequency Shift Keying (FSK) modulation and its applications in digital communication.	Digital Modulation Techniques: Frequency Shift Keying (FSK)	Lectures, Hands-on Laboratory Sessions	Laboratory reports, quizzes
6	**3**	Learn principles of Phase Shift Keying (PSK) modulation and its applications in digital communication.	Digital Modulation Techniques: Phase Shift Keying (PSK)	Lectures, Hands-on Laboratory Sessions	Laboratory reports, quizzes
7	**3**	Gain understanding of error detection and correction codes and their importance in ensuring reliable data transmission.	Error Detection and Correction Codes	Lectures, Hands-on Laboratory Sessions	Laboratory reports, quizzes
8	**3**	Mid-term Exam	Mid-term Exam	Written Exam	Written Exam
9	**3**	Further understanding of error detection and correction codes and their applications in digital communication systems.	Error Detection and Correction Codes	Lectures, Hands-on Laboratory Sessions	Laboratory reports, quizzes
10	3	Explore principles of optical communication systems and their applications in digital communication.	Optical Communications Systems	Lectures, Hands-on Laboratory Sessions	Laboratory reports, quizzes

11	**3**	Learn about spread spectrum techniques and their role in secure and robust communication systems.	Spread Spectrum Techniques	Lectures, Hands-on Laboratory Sessions	Laboratory reports, quizzes
12	**3**	Gain understanding of multiple access techniques and their applications in enabling multiple users to share the communication channel.	Multiple Access Techniques	Lectures, Hands-on Laboratory Sessions	Laboratory reports, quizzes
13	**3**	Learn about Multiple Input Multiple Output (MIMO) systems and their advantages in wireless communication.	MIMO Systems	Lectures, Hands-on Laboratory Sessions	Laboratory reports, quizzes
14	**3**	Explore principles of Orthogonal Frequency Division Multiplexing (OFDM) and its applications in high-speed data transmission.	OFDM (Orthogonal Frequency Division Multiplexing)	Lectures, Hands-on Laboratory Sessions	Laboratory reports, quizzes
15	**3**	Understand Software-Defined Radio (SDR) systems and their flexibility in adapting to different communication standards.	Software-Defined Radio (SDR)	Lectures, Hands-on Laboratory Sessions	Laboratory reports, quizzes

11. Course Evaluation
Grading breakdown: Total (50%), Mid-term exam (20%), Final exam (20%), Quizzes and practical assessments (10%).

12. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	
Main references (sources)	
Recommended books and references (scientific journals, reports…)	
Electronic References, Websites	

Learning and Teaching Resources		
	Text	**Available in the Library?**
Required Texts	"Digital Communications" by John G. Proakis and Masoud Salehi	Yes
Recommended Texts	"Principles of Digital Communication" by Robert G. Gallager "Digital Communications: Fundamentals and Applications" by Bernard Sklar "Optical Fiber Communications" by Gerd Keiser "Wireless Communications: Principles and Practice" by Theodore S. Rappaport	Yes
Websites		