

نموذج وصف المقرر

Review the performance of the higher education institution (review of the academic program)

وصف المقرر

This course description provides a summary of the most important characteristics of the course and the learning outcomes expected of the student to achieve, proving whether he has made the most of the available learning opportunities and must be linked to the program description.

1. Educational Institution	Al-Zahrawi University College - Ministry of Higher Education and Scientific Research
2. University Department / Center	Department of Medical Devices Engineering Techniques
3. Course Name / Code	Fundamentals of Electrical Engineering / MIET1101
4. Programs in which it is included	Electrical Engineering, Medical Devices Techniques
5. Available Forms of Attendance	Lectures, Labs, Workshops
6. Semester / Year	First Semester, Academic Year 2024/2025
7. Total Number of Study Hours	Credits, 210 Study Hours
8. Date of preparing this description	12/06/2025
Course Objectives: • Develop problem-solving skills and understanding of electrical circuit theory. • Understand voltage, current, and power in electrical circuits. • Apply basic laws such as Kirchhoff's laws. • Perform network analysis using methods such as nodal and mesh analysis.	
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1. Learning Outcomes, Teaching and Learning Methods, and Evaluation	

A. Knowledge and Understanding

- Understanding how electricity works in electrical circuits.
- A list of different terms related to electrical circuits.
- Explanation of Ohm's Law.
- Identifying the basic components of a circuit and their uses

B. Subject-Specific Skills

This course aims to develop students' skills in understanding electrical circuit theory through the application of various analytical techniques. This includes understanding how electricity works in circuits, comprehending Kirchhoff's laws, and analyzing networks using methods such as nodal and mesh analysis. It also focuses on the ability to solve electrical problems using fundamental laws such as Ohm's Law, in addition to analyzing alternating current (AC) and direct current (DC) circuits, and understanding the properties of basic components such as resistors, capacitors, and inductors.

Teaching and Learning Methods

- Student participation in exercises
- Interactive sessions and experimental lessons
- Supplementary activities including practical experiments and examples

C. Evaluation Methods

- Quizzes
- Assignments
- Projects and reports
- Midterm exam
- Final exam

D. Thinking Skills

Thinking skills focus on enhancing students' cognitive and analytical abilities by encouraging critical and creative thinking. This includes developing the ability to logically analyze problems, understand relationships between various elements, and make informed decisions based on data and evidence. It also includes encouraging independent thinking that allows students to leverage their personal skills in solving complex problems and providing innovative solutions. Through interactive activities and analytical exercises, students are motivated to expand their thinking and increase their ability to adapt to various challenges

Teaching and Learning Methods

- Developing critical thinking skills through exercises and interactive activities
- Using complex problem-solving to encourage analytical thinking
- Encouraging interaction among students to exchange ideas
- Stimulating creative thinking using real-life examples

Evaluation Methods

- Formative assessment: through quizzes and projects
- Summative assessment: based on the final exam to assess students' overall understanding of the subject

e. General and Transferable Skills

• General Skills:

- Effective communication: enhancing verbal and written communication skills
- Teamwork: developing collaboration skills with peers while working on projects
- Time management: improving students' ability to organize their time effectively
- Problem-solving: developing critical thinking skills, analyzing problems, and solving them innovatively

• Transferable Skills:

- Adaptability: adjusting to changes in different work environments
- Self-learning: enhancing students' ability to continuously learn and develop
- Innovation: encouraging students to think outside the box to provide new solutions
- Leadership skills: enabling students to lead and manage teams effectively

Course Structure

Unit Name	Course or Topic	Learning Outcomes	Evaluation Methods	Teaching Methods	Hours	Week
Fundamentals of Electrical Engineering	Basic Electrical Circuits	- Understand how electricity works in electrical circuits.-	- Quizzes- Assignments- Projects and	- Theoretical Lectures- Practical	7 hours	1-16 (Weekly)

		Knowledge of basic electrical terms.- Familiarity with Kirchhoff's laws and circuit analysis.	Reports- Midterm Exam- Final Exam	Labs- Interactive Exercises		
Part A – DC Circuit Theory I	DC Circuit Theory	- Ability to use Kirchhoff's laws to analyze electrical networks.- Knowledge of converting delta resistances to wye and vice versa.	- Midterm Exam- Quizzes- Projects	- Interactive Exercises- Theoretical Lectures	20 hours	1-3
Part B – DC Circuit Theory II	DC Circuit Theory II	- Familiarity with parallel power sources.- Use of analysis methods such as mesh analysis and nodal analysis.	- Projects- Final Exam	- Interactive Exercises- Practical Labs	20 hours	4-7
AC Circuits I & II	AC Electrical Circuits	- Understand how alternating current (AC) is generated and analyze its values.- Understand voltage and current values in AC circuits.	- Quizzes- Projects	- Theoretical Lectures- Practical Exercises	25 hours	8-12
Magnetism & Magnetic Circuits	Magnetism and Magnetic Circuits	- Understanding magnetism and magnetic circuits.	- Reports- Final Exam	- Practical Labs- Interactive Exercises	20 hours	13
3-Phase System	Three-Phase System	- Understand how a three-phase system works.- Knowledge of Wye and Delta connections.	- Quizzes- Projects	- Theoretical Lectures- Practical Labs	15 hours	14
Revision of Basic Electrical Theorems	Review of Basic Electrical Theorems	- Review of Kirchhoff's laws and their effect on circuit analysis.	- Quizzes- Reports	- Review Lectures- Exercises	8 hours	15
Introduction to Electrical Elements	Introduction to Electrical Elements	- Understanding basic electrical elements such as resistors, capacitors, and inductors.	- Assignments- Projects	- Practical Labs	10 hours	1
Power Sources in Parallel	Parallel Power Sources	- Understanding how parallel power sources work.	- Quizzes- Reports	- Theoretical Lectures- Practical Labs	15 hours	4
Impedance in RL Circuits	Impedance in RL Circuits	- Ability to calculate impedance in RL circuits and determine current.	- Projects- Quizzes	- Interactive Lectures- Practical Labs	12 hours	9
Superposition and Thevenin's Theorem	Superposition and Thevenin's Theorem	- Use of Superposition Theorem and Thevenin's Theorem to analyze circuits.	- Quizzes- Projects	- Theoretical Lectures- Interactive Exercises	10 hours	6
Norton and Maximum	Norton and Maximum	- Understanding the applications of Norton's	- Projects- Quizzes	- Theoretical Lectures-	12 hours	7

Power Transfer Theorems	Power Transfer Theorems	Theorem and Maximum Power Transfer Theorem in circuits.		Practical Exercises		
AC Power and Complex Impedance	AC Power and Complex Impedance	- Calculating power in AC circuits using complex impedance.	- Projects- Quizzes	- Lectures- Practical Labs	15 hours	10
Vector Diagrams and Power Factor	Vector Diagrams and Power Factor	- Understanding vector diagrams and calculating power factor in AC circuits.	- Projects- Quizzes	- Interactive Lectures- Practical Exercises	10 hours	11

11. Infrastructure	
Required Readings:	References: • "Fundamentals of Electric Circuits" من C.K. Alexander و M.N.O Sadiku. • "Basic Electrical Engineering Fourth Edition".
Special Requirements (Workshops, Journals, Software, Websites):	Electronic Websites:
Social Services (Guest Lectures, Professional Training, Field Studies, Others)	Organizing workshops and courses for graduates: • Guest Lectures: Lectures are organized by industry experts to expand knowledge horizons. • Professional Training: Opportunities for internships in companies and industrial institutions. • Field Studies: Field visits to factories or power generation plants. • Others: Scientific seminars and workshops to develop academic skills

12.	
Prerequisites	
Minimum Number of Students	15
Maximum Number of Students	200

Name of the Instructor: Ayad AL-sobhani