وزارة التعليم العالي والبحث العلمي
جهاز الإشراف والتقويم العلمي
دائرة ضمان الجودة والاعتماد الأكاديمي
قسم الاعتماد

كلية الهدى الجامعة

وصف المقرر الدراسي

قسم تقنيات الهندسة الكهربائية

2026 - 2025

نموذج وصف المقرر

1. أسم المقرر الدراسي:
DC Electrical Circuits
2. رمز المقرر:
EET1101
3. الفصل / السنة:
الفصل الأول 2024-2025/ مسار بولونيا
4. تاريخ اعداد هذا الوصف:
2025/7/15
5. حضوري / عبر الانترنت:
حضوري
6. عدد الساعات الدراسية (الكلي)/ عدد الوحدات/ (الكلي):
200ساعة/ 8 وحدة اوربية
7. أسم مسؤول المقرر الدراسي (اذا كان هناك اكثر من اسم يذكر ايضا):
م. عبدالسلام محمد عبود
8. أهداف المقرر

1. To develop a thorough understanding of the scientific principles that govern DC electrical circuits, including voltage, current, resistance, and power relationships.
2. To apply scientific laws, such as Ohm's law and Kirchhoff's laws, to accurately analyze and solve electrical circuits.
3. To explore the scientific properties and behavior of circuit components, including resistors and understand their impact on circuit performance.
4. To enhance problem-solving skills by scientifically analyzing complex circuit configurations and proposing appropriate solutions.
5. To investigate the scientific principles underlying circuit design and evaluation, including the selection of components based on scientific criteria and the assessment of circuit performance using scientific measurements.
6. To study the scientific aspects of transient and steady-state behavior in circuits, including the analysis of DC and AC circuits, and interpret scientific data represented by voltage and current waveforms.
7. To utilize scientific simulation tools and modeling techniques for scientific exploration, experimentation, and validation of circuit behavior.
8. To emphasize the importance of adhering to scientific safety protocols when working with electrical circuits, ensuring compliance with scientific guidelines and standards.
9. To establish connections between scientific principles and practical scenarios, highlighting the scientific relevance of electrical circuits in real-world scientific applications and technological advancements.
10. To foster scientific critical thinking skills in evaluating circuit configurations, proposing scientifically-based design improvements, and scientifically assessing limitations and potential risks associated with circuit operation.

9. استراتيجيات التعليم والتعلم

Two main strategies will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering type of simple experiments involving some sampling activities that are interesting to the students.

1. Theory-Based Lectures: Traditional classroom lectures are used to present theoretical concepts, principles, and theories related to electrical engineering. Professors or instructors explain complex ideas, provide examples, and engage students in discussions to foster understanding.
2. Laboratory Experiments: Laboratory sessions are an integral part of electrical engineering education. Students engage in hands-on experiments, using equipment, instruments, and software tools to apply theoretical knowledge, analyze data, and gain practical skills. This helps them understand the practical aspects of electrical engineering and reinforces theoretical concepts.

10. بنية المقرر الدراسي

الاسبوع	الساعات	مخرجات المتعلم المطلوبة	اسم الوحدات او الموضوع	طريقة التعلم	طريقة التقييم
Week 1	6	Understand fundamental concepts in electrical circuits (voltage, current, resistance, power, energy) and their relationships.	Introduction to DC circuits and circuit elements. Voltage, current, and resistance (Ohm's Law).	حضوري	اختبارات يومي
Week 2	6	Apply circuit analysis techniques (Ohm's law, Kirchhoff's laws, network theorems) to analyze and solve circuits.	Kirchhoff's Laws. Series and parallel circuits. Circuit analysis techniques: Node voltage method.	حضوري	تقارير
Week 3	6	Identify and describe characteristics of circuit components (resistors, capacitors, inductors, operational amplifiers).	Circuit analysis techniques: Mesh current method. Superposition theorem.	حضوري	واجبات
Week 4	6	Identify and describe characteristics of circuit components (resistors, capacitors, inductors, operational amplifiers).	Thevenin's theorem. Norton's theorem.	حضوري	اختبارات يومي
Week 5	6	Analyze series and parallel circuits, calculate equivalent resistances, and understand voltage/current division. Apply circuit theorems	Maximum power transfer theorem. Capacitors in DC circuits: Charging and discharging.	حضوري	تقارير

			and techniques (superposition, nodal analysis, mesh analysis, source transformation) for circuit simplification and analysis.		
واجبات	حضوري	Inductors in DC circuits: Transients and time constants. RL circuits.	Apply circuit theorems and techniques (superposition, nodal analysis, mesh analysis, source transformation) for circuit simplification and analysis.	6	Week 6
اختبارات يومي	حضوري	Transients in RC circuits Capacitive and inductive reactance	Analyze transient and steady-state responses of circuits under DC and AC conditions.	6	Week 7
تقارير	حضوري	Transients in RL circuits Natural response and forced response	Analyze DC circuits using phasor notation, impedance, and understand reactance and complex power.	6	Week 8
واجبات	حضوري	Transients in LC circuits Resonance in series and parallel circuits	Utilize circuit simulation software for modeling, simulating, and analyzing circuits.	6	Week 9
اختبارات يومي	حضوري	Mesh analysis with dependent sources	Utilize circuit simulation software for modeling, simulating, and analyzing circuits.	6	Week 10
تقارير	حضوري	Network theorems: Millman's theorem, reciprocity theorem	Understand electrical safety practices and ethical considerations in working with circuits.	6	Week 11
واجبات	حضوري	Introduction to three-phase circuits	Understand electrical safety practices and ethical considerations in	6	Week 12

			working with circuits.		
اختبارات يومي	حضوري	Delta-star transformation	Apply critical thinking and problem-solving skills to analyze and solve circuit problems.	6	Week 13
تقارير	حضوري	Three-phase circuits: Delta and star connections	Apply critical thinking and problem-solving skills to analyze and solve circuit problems.	6	Week 14
واجبات	حضوري	Review and revision	Understand electrical safety practices and ethical considerations in working with circuits. Apply critical thinking and problem-solving skills to analyze and solve circuit problems.	6	Week 15

11. تقييم المقرر

As		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5, 10	LO #1, 2, 8 and 9
	Assignments	3	10% (10)	2, 8, 12	LO # 3, 4, 6 and 7
	Projects / Lab.	14	10% (10)	Continuous	All
	Report	14	10% (10)	14	LO # 1-14
Summative assessment	Midterm Exam	2 hours	10% (10)	7	LO # 1-7
	Final Exam	4 hours	50% (50)	16	All
Total assessment			100% (100 Marks)		

12. مصادر التعلم والتدريس

Fundamentals of Electric Circuits, C.K. Alexander and M.N.O Sadiku, McGraw-Hill Education

DC Electrical Circuit Analysis: A Practical Approach Copyright Year: 2020, dissidents.

https://www.coursera.org/browse/physical-science-and-engineering/electrical-engineering

نموذج وصف المقرر

1. أسم المقرر الدراسي:
Differential Mathematics
2. رمز المقرر:
EET1104
3. الفصل / السنة:
الفصل الأول 2024-2025/ مسار بولونيا
4. تاريخ اعداد هذا الوصف:
2025/7/15
5. حضوري / عبر الانترنت:
حضوري
6. عدد الساعات الدراسية (الكلي)/ عدد الوحدات/ (الكلي):
150 ساعة / 6 وحدة اوربية
7. أسم مسؤول المقرر الدراسي (اذا كان هناك اكثر من اسم يذكر ايضا):
م.م. محمدالامين عبدالستار حميد
8. أهداف المقرر
1. To develop a solid understanding of fundamental digital principles: The aim is to grasp the basic concepts of digital logic, number systems, Boolean algebra, and logic gates, providing a strong foundation for further studies in digital circuits and systems. 2. To acquire practical skills in circuit design and implementation: The aim is to develop practical skills in designing, implementing, and testing digital circuits using laboratory equipment, integrated circuits, and various logic gates. 3. To enhance problem-solving and analytical thinking abilities: The aim is to cultivate problem-solving skills by analyzing and simplifying complex digital circuits using Boolean algebra, truth tables, and logic simplification techniques. 4. To foster teamwork and collaboration: The aim is to encourage collaboration through group projects, lab exercises, and discussions, fostering teamwork skills and the ability to work effectively in a digital design environment. To promote critical thinking and application of knowledge: The aim is to encourage critical thinking by applying theoretical knowledge to real-world scenarios, such as designing circuits to perform specific functions or solving digital logic problems using different logic gates and techniques.
9. استراتيجيات التعليم والتعلم
Two main strategies will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering type of simple experiments involving some sampling activities that are interesting to the students.

- Theory-Based Lectures: Traditional classroom lectures are used to present theoretical concepts, principles, and theories related to electrical engineering. Professors or instructors explain complex ideas, provide examples, and engage students in discussions to foster understanding.

Laboratory Experiments: Laboratory sessions are an integral part of electrical engineering education. Students engage in hands-on experiments, using equipment, instruments, and software tools to apply theoretical knowledge, analyze data, and gain practical skills. This helps them understand the practical aspects of electrical engineering and reinforces theoretical concepts.

10. بنية المقرر الدراسي

الاسبوع	الساعات	مخرجات المتعلم المطلوبة	اسم الوحدات او الموضوع	طريقة التعلم	طريقة التقييم
Week 1	6	• Introduction to Laboratory Equipment and their Usage. Deriving Truth Tables for NOT, AND, and OR Gates using Switches.	Numerical Systems: Decimal, Binary, Octal, Hexadecimal.	حضوري	اختبارات يومي
Week 2	6	• Deriving Truth Tables for NOT, AND, and OR Gates using Diodes and Transistors. Implementing NOR and NAND Gates using Diodes and Transistors.	• Conversion between Decimal and Binary. Conversion between Decimal and Octal.	حضوري	تقارير
Week 3	6	• Implementing and Verifying Exclusive OR (EXOR) and Exclusive NOR (EXNOR) Gates. Implementing De Morgan's First and Second Laws.	• Conversion between Decimal and Hexadecimal. Conversion between Octal and Binary.	حضوري	واجبات
Week 4	6	• Constructing Basic Gates using NAND Gate IC7400. Constructing Basic Gates using NOR Gate IC7402.	• Conversion between Hexadecimal and Binary. Binary Arithmetic: Addition and Subtraction.	حضوري	اختبارات يومي
Week 5	6	• Constructing EXOR Gate using NAND Gate and again using NOR Gate. Half-Adder Circuit using Different Gates and NAND Gate again.	• Binary Arithmetic: Using Complements for Subtraction. Introduction to Logic Gates: AND, OR, NOT.	حضوري	تقارير
Week 6	6	• Half-Subtractor Circuit using Different Gates and NAND Gate again. Full-Adder Circuit using	• Implementing Logic Gates with Switches. Implementing AND and	حضوري	واجبات

		OR Gates with Diodes and Resistors.	Different Gates and NAND Gate again.		
اختبارات يومي	حضوري	• Implementing AND, OR, and NOT Gates with Transistors. Introduction to XOR and XNOR Gates.	• Full-Subtractor Circuit using Different Gates and NAND Gate again. Implementing Full-Adder and Full-Subtractor Circuits.	6	Week 7
تقارير	حضوري	• Boolean Algebra: De Morgan's Theorems. Boolean Algebraic Relationships.	Implementing Half-Adder and Half-Subtractor Circuits.	6	Week 8
واجبات	حضوري	• Implementing Different Gates using NAND Gate. Implementing Different Gates using NOR Gate.	• Implementing Full-Adder and Full-Subtractor Circuits using ICs. Using Integrated Circuits for Addition and Subtraction.	6	Week 9
اختبارات يومي	حضوري	• Circuits with Different Gates: Truth Table and Logic Equation. Simplification of Logic Circuits with Boolean Algebra.	• Introduction to Integrated Circuits (ICs). Implementing 4-bit Binary Addition using ICs.	6	Week 10
تقارير	حضوري	• Introduction to Karnaugh Map: 2-variable and 3-variable Maps. Transferring Truth Table to Karnaugh Map.	• Implementing 4-bit Binary Subtraction using ICs. Implementing Arithmetic Circuits using ICs.	6	Week 11
واجبات	حضوري	• Karnaugh Map: 4-variable Map. Examples of Digital Circuits with Karnaugh Map.	Practice Exam and Preparation for Assessment.	6	Week 12
اختبارات يومي	حضوري	• Simplification of Logic Circuits with Karnaugh Map: Don't Care Conditions. Logic Circuits with the Property of Folding and Interlocking.	• Implementing Half-Carry and Full-Carry Lookahead Adders. Introduction to Carry Lookahead Adder Circuits.	6	Week 13
تقارير	حضوري	• Arithmetic Circuits: Half-Adder and Full-Adder. Arithmetic Circuits:	Implementing Multiplexers and Demultiplexers.	6	Week 14

			Half-Subtractor and Full-Subtractor.		
Week 15	6	• Design, Implementation, and Testing of a Complex Digital Circuit. Course review and feedback.	• Review and Revision. Practice Exam and Preparation for Final Assessment.	حضوري	واجبات

11. تقييم المقرر

As		Time/ Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5, 10	LO #1, 2, 8 and 9
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	14	LO # 1-14
Summative assessment	Midterm Exam	2 hours	10% (10)	7	LO # 1-7
	Final Exam	3 hours	50% (50)	16	All
Total assessment			100% (100 Marks)		

12. مصادر التعلم والتدريس

J. F. Wakerly, "Digital Design: Principles and Practices," 4th ed. Pearson Education, 2005.

T. L. Floyd and R. Fletcher, "Digital Fundamentals," 11th ed. Pearson, 2014.

نموذج وصف المقرر

1. أسم المقرر الدراسي:

Differential Mathematics

2. رمز المقرر:

EET1104

3. الفصل / السنة:

الفصل الأول 2024-2025/ مسار بولونيا

4. تاريخ اعداد هذا الوصف:

2025/7/15

5. حضوري / عبر الانترنت:

حضوري

6. عدد الساعات الدراسية (الكلي)/ عدد الوحدات/ (الكلي):

150 ساعة / 6 وحدة اوربية

7. أسم مسؤول المقرر الدراسي (اذا كان هناك اكثر من اسم يذكر ايضا):

م.عبدالسلام محمد عبود

8. أهداف المقرر

The module aims for the Differential Mathematics course are as follows:

1. To develop a solid understanding of the fundamental concepts and techniques of differential calculus and their relevance in engineering contexts.
2. To apply differentiation techniques effectively in solving engineering problems, including optimization, motion analysis, and cost and revenue optimization.
3. To demonstrate proficiency in working with transcendental functions, such as exponential, logarithmic, and inverse trigonometric functions, and their application in engineering.
4. To introduce the basics of differential equations and their importance in modeling and analyzing engineering systems, including growth and decay phenomena and electrical circuits.

To enhance problem-solving skills by applying differential calculus concepts to real-world engineering scenarios, fostering critical thinking and analytical abilities.

9. استراتيجيات التعليم والتعلم

The module on Differential Mathematics with a focus on engineering applications implements a range of effective learning and teaching strategies to foster student understanding and engagement.

- Lectures introduce key concepts and problem-solving techniques, while interactive discussions facilitate student participation and real-world examples. Problem-solving sessions encourage active learning and collaboration, allowing students to apply differential calculus to engineering problems.
- Practical applications are emphasized through case studies and simulations, highlighting the relevance of differential mathematics in an engineering context. Computer-based tools, tutorials, and workshops provide additional support, while assessments and independent study promote feedback and deeper exploration.
- Guest speakers and practical projects bridge theory and practice, inspiring students and developing critical thinking skills.

By integrating these strategies, the module cultivates a comprehensive understanding of differential mathematics in engineering and equips students with the skills needed for success in their engineering careers.

10. بنية المقرر الدراسي

الاسبوع	الساعات	مخرجات المتعلم المطلوبة	اسم الوحدات او الموضوع	طريقة التعلم	طريقة التقييم
Week 1	6	Introduction to Differential Calculus. Limits and Continuity. Differentiation Rules: Power Rule, Product Rule, Quotient Rule, Chain Rule.	Introduction to Differential Calculus. Limits and Continuity. Differentiation Rules: Power Rule, Product Rule, Quotient Rule, Chain Rule.	حضوري	اختبارات يومي
Week 2	6	Derivatives of Trigonometric and Exponential Functions Derivatives of Logarithmic and Inverse Trigonometric Functions Implicit Differentiation	Derivatives of Trigonometric and Exponential Functions Derivatives of Logarithmic and Inverse Trigonometric Functions Implicit Differentiation	حضوري	تقارير

واجبات	حضوري	Related Rates Optimization Problems in Engineering Curve Sketching: Critical Points, Inflection Points, Concavity	Related Rates Optimization Problems in Engineering Curve Sketching: Critical Points, Inflection Points, Concavity	6	Week 3
اختبارات يومي	حضوري	L'Hôpital's Rule and Indeterminate Forms Linear Approximation and Differentials	L'Hôpital's Rule and Indeterminate Forms Linear Approximation and Differentials	6	Week 4
تقارير	حضوري	Applications of Differentiation in Engineering: Rates of Change, Velocity, Acceleration Motion Problems: Position, Velocity, and Acceleration Functions	Applications of Differentiation in Engineering: Rates of Change, Velocity, Acceleration Motion Problems: Position, Velocity, and Acceleration Functions	6	Week 5
واجبات	حضوري	Optimization of Engineering Systems: Maximum and Minimum Problems Optimization with Constraints	Optimization of Engineering Systems: Maximum and Minimum Problems Optimization with Constraints	6	Week 6
اختبارات يومي	حضوري	Applications of Differentiation in Engineering: Marginal Analysis, Cost and Revenue Optimization Linearization and Error Analysis	Applications of Differentiation in Engineering: Marginal Analysis, Cost and Revenue Optimization Linearization and Error Analysis	6	Week 7
تقارير	حضوري	Implicit Differentiation and Higher Derivatives Related Rates with Engineering Applications	Implicit Differentiation and Higher Derivatives Related Rates with Engineering Applications	6	Week 8
واجبات	حضوري	Transcendental Functions: Derivatives of Exponential and Logarithmic Functions Applications of Transcendental Functions in Engineering	Transcendental Functions: Derivatives of Exponential and Logarithmic Functions Applications of Transcendental Functions in Engineering	6	Week 9
اختبارات يومي	حضوري	Review of Differentiation Techniques Higher Derivatives and Acceleration in Engineering	Review of Differentiation Techniques Higher Derivatives	6	Week 10

			and Acceleration in Engineering		
تقارير	حضوري	Taylor Series Expansion and Applications Linear Approximation and Estimation in Engineering	Taylor Series Expansion and Applications Linear Approximation and Estimation in Engineering	6	Week 11
واجبات	حضوري	Introduction to Differential Equations First-Order Differential Equations: Separable Equations, Linear Equations	Introduction to Differential Equations First-Order Differential Equations: Separable Equations, Linear Equations	6	Week 12
اختبارات يومي	حضوري	Applications of Differential Equations in Engineering: Growth and Decay, RC Circuits	Applications of Differential Equations in Engineering: Growth and Decay, RC Circuits	6	Week 13
تقارير	حضوري	Higher-Order Differential Equations and Engineering Applications Spring-Mass Systems: Modeling and Analysis	Higher-Order Differential Equations and Engineering Applications Spring-Mass Systems: Modeling and Analysis	6	Week 14
واجبات	حضوري	Systems of Differential Equations in Engineering: Electrical Circuits, Control Systems Phase Plane Analysis: Stability and Classification Review and Exam Preparation	Systems of Differential Equations in Engineering: Electrical Circuits, Control Systems Phase Plane Analysis: Stability and Classification Review and Exam Preparation	6	Week 15

11. تقييم المقرر

As		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5, 10	LO #1, 2, 8 and 9
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Projects / Lab.				
	Report	1	10% (10)	14	LO # 1-14
Summative assessment	Midterm Exam	2 hours	20% (10)	7	LO # 1-7
	Final Exam	3 hours	50% (50)	16	All
Total assessment			100% (100 Marks)		

12. مصادر التعلم والتدريس

K.A. Stroud and Dexter J. Booth, "Engineering Mathematics," 7th edition, Palgrave Macmillan, 2013.

E. Kreyszig, "Advanced Engineering Mathematics," 10th edition, Wiley, 2011.
https://www.coursera.org/browse/physical-science-and-engineering

نموذج وصف المقرر

1. أسم المقرر الدراسي:
Engineering Workshops
2. رمز المقرر:
EETC101
3. الفصل / السنة:
الفصل الأول 2024-2025/ مسار بولونيا
4. تاريخ اعداد هذا الوصف:
2025/7/15
5. حضوري / عبر الانترنت:
حضوري
6. عدد الساعات الدراسية (الكلي)/ عدد الوحدات/ (الكلي):
6 ساعات / 150 وحدة اوربية
7. أسم مسؤول المقرر الدراسي (اذا كان هناك اكثر من اسم يذكر ايضا):
أ.د. فائق حماد عنتر
8. أهداف المقرر
The module aims of the Electrical and Mechanical Workshop module are as follows: 1. To provide students with a comprehensive understanding of the principles and practices involved in electrical and mechanical workshops. 2. To familiarize students with the safety measures and precautions required in electrical and mechanical workshop environments. 3. To develop students' practical skills in using tools and equipment commonly used in electrical and mechanical workshops. 4. To introduce students to various electrical and mechanical processes, such as turning, filing, drilling, welding, and assembly. 5. To enhance students' knowledge of different types of machines, instruments, and materials used in electrical and mechanical workshops. 6. To provide hands-on experience and practical training in performing tasks related to electrical and mechanical workshop operations. 7. To develop students' problem-solving skills and critical thinking abilities through practical applications and troubleshooting scenarios. 8. To foster teamwork and effective communication skills by engaging students in group projects and collaborative workshop activities. 9. To instill an understanding of professional ethics and responsibility in the context of electrical and mechanical workshop practices. To prepare students for future academic and professional pursuits in the fields of electrical engineering, mechanical engineering, and related disciplines.

9. استراتيجيات التعليم والتعلم

The learning and teaching strategies for the Electrical and Mechanical Workshop module may include:

1. Lectures: The module may include lectures delivered by the instructor to introduce and explain the theoretical concepts, principles, and procedures related to electrical and mechanical workshop practices. Lectures can provide an overview of the topics, highlight key points, and provide examples and case studies.
2. Practical Demonstrations: Hands-on practical demonstrations can be conducted by the instructor to show students the proper usage of tools and equipment, safety precautions, and step-by-step procedures for various workshop tasks. This allows students to observe and understand the practical aspects of the subject.
3. Laboratory Sessions: Laboratory sessions provide students with the opportunity to apply their theoretical knowledge and practice their skills in a controlled workshop environment. Students can work on assigned tasks, conduct experiments, perform measurements, and troubleshoot electrical and mechanical systems under the guidance of the instructor.
4. Group Discussions: Group discussions can be facilitated to encourage active participation and collaboration among students. Students can discuss and analyze case studies, share their experiences, and exchange ideas and perspectives on workshop-related topics. This promotes critical thinking, problem-solving, and peer learning.
5. Workshops and Work-Based Learning: Organizing workshops and incorporating work-based learning experiences can enhance the practical skills of students. This may involve site visits to real-world electrical and mechanical workshops, where students can observe professional practices, interact with industry experts, and gain hands-on experience in a professional setting.
6. Assignments and Projects: Assignments and projects can be assigned to students to further deepen their understanding of the subject matter. This may include tasks such as designing electrical installations, troubleshooting circuits, creating wiring diagrams, or conducting research on specific workshop-related topics. These assignments promote independent learning, research skills, and practical application of knowledge.
3. Assessments: Various forms of assessments can be used to evaluate students' understanding and progress. These may include written exams, practical assessments, laboratory reports, project presentations, and quizzes. Assessments provide feedback to students and allow them to demonstrate their knowledge, skills, and problem-solving abilities.

10. بنية المقرر الدراسي

الاسبوع	الساعات	مخرجات المتعلم المطلوبة	اسم الوحدات او الموضوع	طريقة التعلم	طريقة التقييم
Week 1	6	Principles of Industrial Safety in Electrical Workshops. Electrical shock protection and safety measures. Familiarization with tools used in electrical workshops. Power sources and their characteristics. Training on the use of a multimeter for measuring wire sizes.	Principles of Industrial Safety in Electrical Workshops. Electrical shock protection and safety measures. Familiarization with tools used in electrical workshops. Power sources and their characteristics. Training on the use of a multimeter for measuring wire sizes.	حضوري	اختبارات يومي

تقارير	حضوري	Different Types of Welding Irons (with different capacities) and Spot Welding Proper usage techniques for different types of welding irons, including spot welding. Introduction to electric transformers and their types. Magnetic circuits in transformers.	Different Types of Welding Irons (with different capacities) and Spot Welding Proper usage techniques for different types of welding irons, including spot welding. Introduction to electric transformers and their types. Magnetic circuits in transformers.	6	Week 2
واجبات	حضوري	Electric Circuits and Transformer Operation. Opening transformers and gathering information from the old transformer for primary and secondary windings. Measurement of wire diameters for the transformer. Types of electric motors (single-phase and three-phase), example of shaded pole motor (small water pump motor).	Electric Circuits and Transformer Operation. Opening transformers and gathering information from the old transformer for primary and secondary windings. Measurement of wire diameters for the transformer. Types of electric motors (single-phase and three-phase), example of shaded pole motor (small water pump motor).	6	Week 3
اختبارات يومي	حضوري	Electrical Installations and Types of Wiring (Surface and Concealed) Types of electrical installations (surface and concealed). Concealed wiring within pipes. Siemens wiring installation. Drawing a lighting installation circuit with control circuit. Practical exercise on wiring installation.	Electrical Installations and Types of Wiring (Surface and Concealed) Types of electrical installations (surface and concealed). Concealed wiring within pipes. Siemens wiring installation. Drawing a lighting installation circuit with control circuit. Practical exercise on wiring installation.	6	Week 4
تقارير	حضوري	Parallel Wiring of Two Lamps with a Switch and Socket Drawing a circuit diagram for two lamps wired in parallel with a switch and socket. Practical application of the circuit. Drawing the internal	Parallel Wiring of Two Lamps with a Switch and Socket Drawing a circuit diagram for two lamps wired in parallel with a switch and socket. Practical application of the circuit. Drawing the internal	6	Week 5

		connection for a fluorescent lamp circuit. Replacing one lamp with a fluorescent lamp.	connection for a fluorescent lamp circuit. Replacing one lamp with a fluorescent lamp.		
واجبات	حضوري	Drawing a Staircase Lamp (Two-Way Switch) Circuit Drawing a circuit diagram for a staircase lamp with two-way switches. Practical application of the circuit.	Drawing a Staircase Lamp (Two-Way Switch) Circuit Drawing a circuit diagram for a staircase lamp with two-way switches. Practical application of the circuit.	6	Week 6
اختبارات يومي	حضوري	Introduction to Electrical Relays, Types, Uses, Thermal Overload Relays, Time Delay Relays Understanding electrical relays and their types. Applications and uses of relays. Thermal overload relays and time delay relays.	Introduction to Electrical Relays, Types, Uses, Thermal Overload Relays, Time Delay Relays Understanding electrical relays and their types. Applications and uses of relays. Thermal overload relays and time delay relays.	6	Week 7
تقارير	حضوري	Operation of Single-Face Motor with an Air Pick-Up and Push Button Operating a single-face motor using an air pick-up and push button. Operating the motor and changing its direction of rotation using relays and a time delay.	Operation of Single-Face Motor with an Air Pick-Up and Push Button Operating a single-face motor using an air pick-up and push button. Operating the motor and changing its direction of rotation using relays and a time delay.	6	Week 8
واجبات	حضوري	Introduction to Workshop Safety Discuss the importance of safety in workshop environments. Cover safety rules, personal protective equipment (PPE), emergency procedures, and hazardous material handling.	Introduction to Workshop Safety Discuss the importance of safety in workshop environments. Cover safety rules, personal protective equipment (PPE), emergency procedures, and hazardous material handling.	6	Week 9
اختبارات يومي	حضوري	Turning Process and Instrumentation Measures Explain the basics of the turning process, including lathe machine components and operations. Discuss instrumentation measures used in turning, such as calipers,	Turning Process and Instrumentation Measures Explain the basics of the turning process, including lathe machine components and operations. Discuss instrumentation	6	Week 10

		micrometers, and dial indicators.	measures used in turning, such as calipers, micrometers, and dial indicators.		
تقارير	حضوري	Cutting Tools in Turning Introduce different types of cutting tools used in turning, including lathe tools, inserts, and tool holders. Explain tool geometry, selection criteria, and tool life considerations.	Cutting Tools in Turning Introduce different types of cutting tools used in turning, including lathe tools, inserts, and tool holders. Explain tool geometry, selection criteria, and tool life considerations.	6	Week 11
واجبات	حضوري	Practical Exercise - Horizontal Turning Demonstrate horizontal turning on a lathe machine. Guide students in practicing turning operations, such as facing, turning, and grooving, using appropriate cutting tools.	Practical Exercise - Horizontal Turning Demonstrate horizontal turning on a lathe machine. Guide students in practicing turning operations, such as facing, turning, and grooving, using appropriate cutting tools.	6	Week 12
اختبارات يومي	حضوري	Turning Different Shapes Teach students how to turn different shapes, such as tapers, chamfers, and threads, on the lathe machine. Cover techniques for creating internal and external threads and other complex shapes.	Turning Different Shapes Teach students how to turn different shapes, such as tapers, chamfers, and threads, on the lathe machine. Cover techniques for creating internal and external threads and other complex shapes.	6	Week 13
تقارير	حضوري	Introduction to Filing Process Introduce the filing process and its applications in workshop activities. Explain different types of files and their uses, including hand files, needle files, and rasp files.	Introduction to Filing Process Introduce the filing process and its applications in workshop activities. Explain different types of files and their uses, including hand files, needle files, and rasp files.	6	Week 14
واجبات	حضوري	Practical Exercise - Filing Process Guide students in practicing filing techniques on various materials. Demonstrate the correct filing motions, angles, and finishing methods for different surfaces and edges.	Practical Exercise - Filing Process Guide students in practicing filing techniques on various materials. Demonstrate the correct filing motions, angles, and finishing methods for	6	Week 15

			different surfaces and edges.		

11. تقييم المقرر

As		Time/ Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	6, 14	LO #1, 2, 8 and 9
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	14	LO # 1-14
Summative assessment	Midterm Exam	2 hours	10% (10)	7	LO # 1-7
	Final Exam	3 hours	50% (50)	16	All
Total assessment			100% (100 Marks)		

12. مصادر التعلم والتدريس

J. Smith and E. Johnson, "Electrical Engineering Workshop: Theory and Practice," .

D. Wilson and S. Thompson, "Mechanical Engineering Workshop: Principles and Applications," .

نموذج وصف المقرر

1. أسم المقرر الدراسي:

Arabic Language

2. رمز المقرر:

MTU1001

3. الفصل / السنة:

الفصل الأول 2024-2025/ مسار بولونيا

4. تاريخ اعداد هذا الوصف:

2025/7/15

5. حضوري / عبر الانترنت:

حضوري

6. عدد الساعات الدراسية (الكلي)/ عدد الوحدات/ (الكلي):

50 ساعة / 2 وحدة اوربية

7. أسم مسؤول المقرر الدراسي (اذا كان هناك اكثر من اسم يذكر ايضا):

م. د. باسم عبد حمد

8. أهداف المقرر

أهداف المادة الدراسية هي اني يكون الطالب قادراً على أن :

1. يتعرف على أنواع الأخطاء اللغوية المشتركة وتوضيح أسبابها وكيفية تجنبها.
2. يتعلم القواعد المتعلقة بالتاء المربوطة والطويلة والتاء المفتوحة وكيفية كتابتها بشكل صحيح.

3. يتعلم قواعد كتابة الألف الممدودة والمقصورة واستخدام الحروف الشمسية والقمرية بشكل صحيح.
4. التعرف على الضاد والظاء ومعرفة كيفية التمييز بينهما في الكتابة.
5. يتعلم طرق كتابة الهمزة بشكل صحيح وفقًا للقواعد اللغوية.
6. التعرف على علامات الترقيم واستخدامها بشكل صحيح في النصوص.
7. يفهم الفروق بين الاسم والفعل والتمييز بينهما في الجمل.
8. يفهم المفاعيل و كيفية استخدامها بشكل صحيح في النصوص.
9. يتعلم الأرقام والعدد واستخدامها في التعبير عن الكميات.
10. يتجنب الأخطاء اللغوية الشائعة في سياقات عملية لتعزيز فهم القواعد وتحسين المهارات اللغوية.
11. يدرس النون والتنوين وفهم معاني حروف الجر واستخدامها بشكل صحيح في الجمل.
12. يركز على الجوانب الشكلية للخطاب الإداري وكيفية كتابته بأسلوب صحيح ومناسب.
13. التعرف على لغة الخطاب الإداري وفهم استخدامها في التواصل الإداري.
14. يفهم نماذج من المراسلات الإدارية لتطبيق المفاهيم والمهارات المكتسبة في الخطاب الإداري.

9. استراتيجيات التعليم والتعلم

استراتيجيات التعلم والتعليم المستخدمة في مادة اللغة تشمل مجموعة متنوعة من النهج والتقنيات التي تعزز عملية التعلم للطلاب. من بين هذه الاستراتيجيات:

1. التفاعل النشط: يتم تشجيع الطلاب على المشاركة والمشاركة الفعالة في الدروس من خلال المناقشات الجماعية والأنشطة التفاعلية.
2. التعلم التعاوني: يشجع التعاون والتعاون بين الطلاب من خلال العمل الجماعي والمشاريع الجماعية، حيث يتعاون الطلاب مع بعضهم البعض لتحقيق أهداف التعلم المحددة.
3. التطبيق العملي: يتم توفير فرص للطلاب لتطبيق المفاهيم والمهارات المكتسبة في سياقات عملية وواقعية، مما يعزز التفاعل الفعال مع المادة.
4. استخدام التقنيات الحديثة: يستفيد الطلاب من استخدام التكنولوجيا في عملية التعلم، مثل استخدام الحواسيب والإنترنت للبحث والتعلم الذاتي.
5. توفير ردود فعل فورية: يتم توفير ردود فعل فورية وتقييم مستمر للطلاب، سواء عن طريق التقييمات الشفهية أو الكتابية، مما يساعدهم على تحسين أدائهم وتطوير مهاراتهم.
6. التنويع في وسائل التواصل: يتم استخدام مجموعة متنوعة من وسائل التواصل والتعليم، مثل المحاضرات التوضيحية، والمناقشات الجماعية، والأنشطة العملية، والعروض التقديمية، لتلبية احتياجات وأساليب التعلم المختلفة للطلاب.
7. باستخدام هذه الاستراتيجيات، يتم تعزيز التفاعل والتعلم الفعال للطلاب، و تحفيزهم على المشاركة واكتساب المعرفة والمهارات بشكل شامل وشيق.

10. بنية المقرر الدراسي

الاسبوع	الساعات	مخرجات المتعلم المطلوبة	اسم الوحدات او الموضوع	طريقة التعلم	طريقة التقييم
Week 1	2	مقدمة عن الأخطاء اللغوية –التاء المربوطة والطويلة والتاء المفتوحة	مقدمة عن الأخطاء اللغوية –التاء المربوطة والطويلة والتاء المفتوحة	حضوري	اختبارات يومي
Week 2	2	قواعد كتابة الالف الممدودة والمقصورة – الحروف الشمسية والقمرية	قواعد كتابة الالف الممدودة والمقصورة – الحروف الشمسية والقمرية	حضوري	تقارير
Week 3	2	الضاد والظاء	الضاد والظاء	حضوري	واجبات
Week 4	2	كتابة الهمزة	كتابة الهمزة	حضوري	اختبارات يومي

Week 5	2	علامات الترقيم	علامات الترقيم	حضوري	تقارير
Week 6	2	الاسم والفعل والتفريق بينهما	الاسم والفعل والتفريق بينهما	حضوري	واجبات
Week 7	2	المفاعيل	المفاعيل	حضوري	اختبارات يومي
Week 8	2	العـــدد	العـــدد	حضوري	تقارير
Week 9	2	تطبيقات الأخطاء اللغوية الشائعة	تطبيقات الأخطاء اللغوية الشائعة	حضوري	واجبات
Week 10	2	تطبيقات الأخطاء اللغوية الشائعة	تطبيقات الأخطاء اللغوية الشائعة	حضوري	اختبارات يومي
Week 11	2	النون والتنوين ـ معاني حروف الجر	النون والتنوين ـ معاني حروف الجر	حضوري	تقارير
Week 12	2	الجوانب الشكلية للخطاب الإداري	الجوانب الشكلية للخطاب الإداري	حضوري	واجبات
Week 13	2	لغة الخطاب الإداري	لغة الخطاب الإداري	حضوري	اختبارات يومي
Week 14	2	نماذج من المراسلات الإدارية	نماذج من المراسلات الإدارية	حضوري	تقارير
Week 15	2	الاستعداد للأمتحان النهائي	الاستعداد للأمتحان النهائي	حضوري	واجبات

11. تقييم المقرر

As		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5, 10	LO #1, 2, 8 and 9
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Projects / Lab.				
	Report	1	10% (10)	14	LO # 1-14
Summative	Midterm Exam	2 hours	20% (10)	7	LO # 1-7

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

12. مصادر التعلم والتدريس

ملزمة اللغة العربية (المعممة من وزارة التعليم العالي والبحث العلمي)

نموذج وصف المقرر

1. أسم المقرر الدراسي:
Human Rights and Democracy
2. رمز المقرر:
MTU1006
3. الفصل / السنة:
الفصل الأول 2024-2025/ مسار بولونيا
4. تاريخ اعداد هذا الوصف:
2025/7/15
5. حضوري / عبر الانترنت:
حضوري
6. عدد الساعات الدراسية (الكلي)/ عدد الوحدات/ (الكلي):
50 ساعة / 2 وحدة اوربية
7. أسم مسؤول المقرر الدراسي (اذا كان هناك اكثر من اسم يذكر ايضا):
م.د. باسم عبد حمد
8. أهداف المقرر
The module aims to: 1. To provide students with a comprehensive understanding of the historical development of human rights and their significance in contemporary society. 2. To familiarize students with the concept and characteristics of human rights, enabling them to analyze and evaluate various human rights issues and challenges. 3. To explore the different generations of human rights, their evolution over time, and the implications for individuals and communities. 4. To examine the role of human rights in ancient civilizations and Abrahamic religions, highlighting the contributions and influences of these historical contexts. To investigate the international and regional recognition of human rights through the study of key charters, conventions, and declarations, enabling students to comprehend the global framework for human rights protection and promotion.
9. استراتيجيات التعليم والتعلم
The module will employ various learning and teaching strategies to enhance students' understanding and engagement. These strategies will include: 1. Lectures: Traditional lectures will be delivered by the instructor to provide foundational knowledge and concepts related to human rights. Lectures will offer comprehensive explanations, historical context, and theoretical frameworks. 2. Discussions and Debates: Interactive discussions and debates will be conducted to encourage critical thinking and active participation. Students will have the opportunity to express their opinions, engage in thoughtful debates, and analyze different perspectives on human rights issues.

3. Case Studies: Real-life case studies will be examined to illustrate the application of human rights principles in different contexts. Students will analyze and discuss these cases to develop problem-solving skills and gain a deeper understanding of the practical implications of human rights.
4. Group Projects: Collaborative group projects will be assigned to promote teamwork and research skills. Students will work together on specific human rights topics, conduct research, and present their findings to the class. This approach fosters teamwork, communication, and research abilities.
5. Guest Speakers: Inviting guest speakers, such as human rights activists, legal experts, or representatives from relevant organizations, will provide students with firsthand insights into the practical aspects of human rights work. Guest speakers can share their experiences, expertise, and engage in interactive discussions with students.
6. Multimedia Resources: Utilizing multimedia resources such as videos, documentaries, and online platforms will enhance students' understanding and engagement with human rights topics. These resources can present real-life examples, testimonies, and visual representations to complement the theoretical aspects of the module.
7. Critical Analysis and Reflection: Assignments and assessments will encourage students to critically analyze human rights issues, reflect on their personal perspectives, and evaluate the impact of human rights violations and advancements. This will develop their analytical skills and foster a deeper understanding of the complex nature of human rights.
8. Independent Study: Students will be encouraged to engage in independent study, including reading relevant textbooks, scholarly articles, and reports. This will enable them to deepen their understanding of specific human rights topics, broaden their knowledge base, and develop self-directed learning skills.

Overall, these learning and teaching strategies aim to create an interactive and engaging learning environment, fostering critical thinking, active participation, and a deeper understanding of human rights principles and their practical application.

10. بنية المقرر الدراسي

الاسبوع	الساعات	مخرجات المتعلم المطلوبة	اسم الوحدات او الموضوع	طريقة التعلم	طريقة التقييم
Week 1	2	Introduction to Human Rights (1 week). Historical Development of Human Rights. Concept and Characteristics of Human Rights. Importance and Relevance of Human Rights.	Introduction to Human Rights (1 week). Historical Development of Human Rights. Concept and Characteristics of Human Rights. Importance and Relevance of Human Rights.	حضوري	اختبارات يومي
Week 2	2	Human Rights in Ancient Civilizations (1 week). Examination of Human Rights in Ancient Societies. Contributions of Ancient Civilizations to Human Rights Principles.	Human Rights in Ancient Civilizations (1 week). Examination of Human Rights in Ancient Societies. Contributions of Ancient Civilizations to Human Rights Principles.	حضوري	تقارير

واجبات	حضوري	Human Rights in Abrahamic Religions (1 week). Exploration of Human Rights in Judaism, Christianity, and Islam. Emphasis on the Personality of Prophet Muhammad (PBUH) and his Contribution to Human Rights.	Human Rights in Abrahamic Religions (1 week). Exploration of Human Rights in Judaism, Christianity, and Islam. Emphasis on the Personality of Prophet Muhammad (PBUH) and his Contribution to Human Rights.	2	Week 3
اختبارات يومي	حضوري	Human Rights in the Medieval and Modern Ages (1 week). Evolution of Human Rights during the Middle Ages and Modern Era. Impact of Enlightenment and Renaissance on Human Rights.	Human Rights in the Medieval and Modern Ages (1 week). Evolution of Human Rights during the Middle Ages and Modern Era. Impact of Enlightenment and Renaissance on Human Rights.	2	Week 4
تقارير	حضوري	Contemporary International Recognition of Human Rights (1 week). Analysis of International Human Rights Instruments and Treaties. Focus on the Universal Declaration of Human Rights (1948).	Contemporary International Recognition of Human Rights (1 week). Analysis of International Human Rights Instruments and Treaties. Focus on the Universal Declaration of Human Rights (1948).	2	Week 5
واجبات	حضوري	Regional Recognition of Human Rights (1 week). Examination of Regional Human Rights Systems and Mechanisms. Exploration of Non-Governmental Organizations' Role in Promoting Human Rights.	Regional Recognition of Human Rights (1 week). Examination of Regional Human Rights Systems and Mechanisms. Exploration of Non-Governmental Organizations' Role in Promoting Human Rights.	2	Week 6
اختبارات يومي	حضوري	Human Rights in International Charters (1 week). Study of Key International Charters and Conventions. In-depth Analysis of the Universal Declaration of Human Rights (1948).	Human Rights in International Charters (1 week). Study of Key International Charters and Conventions. In-depth Analysis of the Universal Declaration of Human Rights (1948).	2	Week 7

تقارير	حضوري	Human Rights in National Constitutions (Iraqi Constitutions) (1 week). Examination of Human Rights Provisions in Iraqi Constitutions. Comparative Analysis of Constitutional Safeguards for Human Rights.	Human Rights in National Constitutions (Iraqi Constitutions) (1 week). Examination of Human Rights Provisions in Iraqi Constitutions. Comparative Analysis of Constitutional Safeguards for Human Rights.	2	Week 8
واجبات	حضوري	Human Rights in Iraq after 2003 (Iraqi Constitution 2005) (1 week). Overview of Human Rights Developments in Iraq post-2003. Analysis of the Iraqi Constitution of 2005 and its Impact on Human Rights.	Human Rights in Iraq after 2003 (Iraqi Constitution 2005) (1 week). Overview of Human Rights Developments in Iraq post-2003. Analysis of the Iraqi Constitution of 2005 and its Impact on Human Rights.	2	Week 9
اختبارات يومي	حضوري	Safeguards of Human Rights at Various Levels (1 week). Exploration of International, Regional, and National Mechanisms for Protecting Human Rights. Focus on Genocide as a Violation of Human Rights.	Safeguards of Human Rights at Various Levels (1 week). Exploration of International, Regional, and National Mechanisms for Protecting Human Rights. Focus on Genocide as a Violation of Human Rights.	2	Week 10
تقارير	حضوري	Financial and Administrative Corruption (1 week). Understanding the Phenomenon of Financial and Administrative Corruption. Causes and Consequences of Corruption and Efforts to Combat it.	Financial and Administrative Corruption (1 week). Understanding the Phenomenon of Financial and Administrative Corruption. Causes and Consequences of Corruption and Efforts to Combat it.	2	Week 11
واجبات	حضوري	Week 12: Right to Water and Sustainable Management (1 week). Importance of the Right to Water as a Human Right. Strategies for Sustainable Water Management and Ensuring Access to Clean Water.	Week 12: Right to Water and Sustainable Management (1 week). Importance of the Right to Water as a Human Right. Strategies for Sustainable Water Management and Ensuring Access to Clean Water.	2	Week 12
اختبارات يومي	حضوري	Week 13: Terrorism and its Impact on State and Society (1 week).	Week 13: Terrorism and its Impact on State and Society (1 week).	2	Week 13

		Examination of Terrorism and its Threat to Human Rights. Analysis of Counter-Terrorism Measures and Balancing Human Rights Considerations.	Examination of Terrorism and its Threat to Human Rights. Analysis of Counter-Terrorism Measures and Balancing Human Rights Considerations.		
تقارير	حضوري	Human Rights in Contemporary Issues (1 week). Exploration of Current Human Rights Challenges and Debates. Discussion on Emerging Human Rights Issues in the Modern World.	Human Rights in Contemporary Issues (1 week). Exploration of Current Human Rights Challenges and Debates. Discussion on Emerging Human Rights Issues in the Modern World.	2	Week 14
واجبات	حضوري	Review and Conclusion (1 week). Recap of Key Concepts and Themes Covered in the Module. Discussion on the Importance of Upholding and Promoting Human Rights in Today's Society.	Review and Conclusion (1 week). Recap of Key Concepts and Themes Covered in the Module. Discussion on the Importance of Upholding and Promoting Human Rights in Today's Society.	2	Week 15

11. تقييم المقرر

As		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5, 10	LO #1, 2, 8 and 9
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Projects / Lab.				
	Report	1	10% (10)	14	LO # 1-14
Summative assessment	Midterm Exam	2 hours	20% (10)	7	LO # 1-7
	Final Exam	3 hours	50% (50)	16	All
Total assessment			100% (100 Marks)		

12. مصادر التعلم والتدريس

حقوق الإنسان في العالم العربي: القضايا والتحديات"، تأليف: علي حجازي وجمال شعت. الطبعة: الطبعة الثانية، العام: 2017.

مبادئ حقوق الإنسان: المفاهيم والقضايا الحديثة"، تأليف: أحمد المجالي وغسان حمدان. الطبعة: الطبعة الأولى، العام: 2019.

نموذج وصف المقرر

1. أسم المقرر الدراسي:
Engineering Mechanics
2. رمز المقرر:
EET1201
3. الفصل / السنة:
الفصل الأول 2024-2025/ مسار بولونيا
4. تاريخ اعداد هذا الوصف:
2025/7/15
5. حضوري / عبر الانترنت:
حضوري
6. عدد الساعات الدراسية (الكلي)/ عدد الوحدات/ (الكلي):
6 ساعات / 150 وحدة اوربية
7. أسم مسؤول المقرر الدراسي (اذا كان هناك اكثر من اسم يذكر ايضا):
أ.د. فائق حماد عنتر
8. أهداف المقرر
The module aims to: 1. To introduce students to the fundamental concepts and principles of Mechanics Engineering. 2. To develop students' ability to analyze and solve engineering problems related to statics, dynamics, and equilibrium of forces. 3. To enhance students' critical thinking and problem-solving skills in the context of mechanical systems and components. 4. To foster practical knowledge and hands-on experience through laboratory experiments and application of theoretical concepts. To prepare students for further studies or professional careers in engineering by providing a solid foundation in Mechanics Engineering principles and methodologies.
9. استراتيجيات التعليم والتعلم
The module will employ the following learning and teaching strategies: 1. Lectures: Traditional lectures delivered by the instructor to present key concepts, theories, and principles of Mechanics Engineering. Lectures may include visual aids, demonstrations, and examples to enhance understanding and facilitate knowledge transfer. 2. Laboratory Sessions: Practical hands-on laboratory sessions where students can apply theoretical concepts to real-world situations. Students may perform experiments, measurements, and data analysis, gaining practical skills and reinforcing their understanding of Mechanics Engineering principles. 3. Problem-Solving Sessions: Interactive problem-solving sessions where students work individually or in groups to solve engineering problems related to mechanics. This strategy allows students to practice critical thinking, analytical skills, and the application of theoretical knowledge to practical scenarios. 4. Tutorials: Small-group or one-on-one tutorials where students can seek clarification on difficult concepts, discuss challenging problems, and receive personalized guidance from the instructor. Tutorials provide

opportunities for active engagement, individualized support, and deeper comprehension of the subject matter.

Group Projects: Collaborative group projects that require students to apply their knowledge of Mechanics Engineering to solve complex problems or design projects. This strategy encourages teamwork, communication skills, and the integration of multiple concepts and skills acquired throughout the module.

10. بنية المقرر الدراسي

الاسبوع	الساعات	مخرجات المتعلم المطلوبة	اسم الوحدات او الموضوع	طريقة التعلم	طريقة التقييم
Week 1	4	Introduction to the Laboratory: Familiarization with the lab environment, safety guidelines, and equipment. Measurement Techniques: Practice using measurement tools such as rulers, calipers, and micrometers.	Introduction to Engineering Mechanics Statics and Dynamics Basic Concepts and Definitions	حضوري	اختبارات يومي
Week 2	4	Force Measurement: Conduct experiments to measure forces using load cells and force sensors. Resultant Forces: Calculate and analyze resultant forces in various systems.	Forces: Types, Characteristics, and Properties Force Vectors and Components Resultant and Equilibrium of Forces	حضوري	تقارير
Week 3	4	Equilibrium of Forces: Perform experiments to study the equilibrium of forces and verify the principles of static equilibrium. Moment of a Force: Measure and analyze the moment of a force using torque sensors.	Moments and Couples Moment of a Force - Moments and Equilibrium	حضوري	واجبات
Week 4	4	Free-Body Diagrams: Practice creating free-body diagrams for different mechanical systems. Two-Dimensional Force Systems: Analyze two-dimensional force systems and calculate resultant forces and moments.	Free-Body Diagrams Equilibrium of Planar Forces Two-Dimensional Force Systems	حضوري	اختبارات يومي
Week 5	4	Centroids and Centers of Gravity: Conduct experiments to determine centroids and centers of gravity for various objects and structures. Stability Analysis: Study the stability of objects in equilibrium and investigate the effects of	Distributed Forces: Centroids and Centers of Gravity Centroid of Plane Areas Centroid of Composite Bodies	حضوري	تقارير

			shifting centroids.		
واجبات	حضوري	Moment of Inertia Moments of Inertia for Plane Areas Parallel-Axis Theorem	Moment of Inertia: Measure the moment of inertia of objects using moment of inertia apparatus. Parallel-Axis Theorem: Verify the parallel-axis theorem experimentally and calculate moments of inertia for composite bodies.	4	Week 6
اختبارات يومي	حضوري	Principles of Virtual Work Equilibrium of Rigid Bodies Trusses and Frames	Truss Analysis: Analyze and test truss structures to determine internal forces and equilibrium conditions. Virtual Work Applications: Perform experiments to understand the principles of virtual work and its applications in engineering mechanics.	4	Week 7
تقارير	حضوري	Friction: Types and Laws Frictional Forces and Equilibrium Applications of Friction	Friction: Study different types of friction and measure coefficients of friction using friction apparatus. Equilibrium with Friction: Analyze systems involving frictional forces and determine equilibrium conditions.	4	Week 8
واجبات	حضوري	Kinetics: Forces and Motion Newton's Laws of Motion Linear and Angular Momentum	Kinematics: Perform experiments to study motion and displacement of objects, including rectilinear and angular motion. Velocity and Acceleration Analysis: Measure and analyze velocity and acceleration using motion sensors.	4	Week 9
اختبارات يومي	حضوري	Kinetics: Forces and Motion Newton's Laws of Motion Linear and Angular Momentum	Kinetics: Study the relationship between forces and motion through experiments based on Newton's laws of motion. Impulse and Momentum: Measure impulse and momentum of objects in different scenarios and analyze the results.	4	Week 10
تقارير	حضوري	Work and Energy Principle of Work and Energy Conservation of Mechanical Energy	Work and Energy: Conduct experiments to explore work, energy, and power relationships in mechanical systems. Conservation of Mechanical Energy: Verify the conservation	4	Week 11

			of mechanical energy through experimental measurements.		
واجبات	حضوري	Power and Efficiency Impulse and Momentum Impact and Collision	Power and Efficiency: Calculate and analyze power and efficiency in mechanical systems using experimental data. Impact and Collision: Study the principles of impact and collision through experiments and observe the effects of different parameters.	4	Week 12
اختبارات يومي	حضوري	Rotational Dynamics Moment of Inertia for Rigid Bodies Angular Momentum and Torque	Rotational Dynamics: Perform experiments to study rotational dynamics, including moment of inertia and angular momentum. Torque Measurement: Measure torque in different systems using torque sensors and analyze the relationship between torque and angular acceleration.	4	Week 13
تقارير	حضوري	Vibrations and Oscillations Free Vibrations and Harmonic Motion Damping and Resonance	Vibrations and Oscillations: Study free vibrations and harmonic motion through experiments with oscillating systems. Damping Analysis: Investigate damping effects and resonance phenomena in mechanical systems and analyze their implications.	4	Week 14
واجبات	حضوري	Review and Recapitulation Problem-Solving Techniques	Review and Recapitulation: Review the practical concepts covered throughout the course. Problem-Solving Techniques: Apply problem-solving strategies to solve practical engineering mechanics problems and scenarios.	4	Week 15

11. تقييم المقرر

As		Time/ Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	10% (10)	5, 10	LO #1, 2, 8 and 9
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	14	LO # 1-14
Summative assessment	**Midterm Exam**	2 hours	10% (10)	7	LO # 1-7
	Final Exam	3 hours	50% (50)	16	All
Total assessment			100% (100 Marks)		

12. مصادر التعلم والتدريس
Bedford and W. Fowler, "Engineering Mechanics: Statics," 5th ed. Upper Saddle River, NJ: Pearson, 2008.
R. C. Hibbeler, "Engineering Mechanics: Dynamics," 14th ed. Boston, MA: Pearson, 2015.

نموذج وصف المقرر

1. أسم المقرر الدراسي:
AC Electrical Circuits
2. رمز المقرر:
EET1204
3. الفصل / السنة:
الفصل الأول 2024-2025/ مسار بولونيا
4. تاريخ اعداد هذا الوصف:
2025/7/15
5. حضوري / عبر الانترنت:
حضوري
6. عدد الساعات الدراسية (الكلي)/ عدد الوحدات/ (الكلي):
5 ساعات / 125 وحدة اوربية
7. أسم مسؤول المقرر الدراسي (اذا كان هناك اكثر من اسم يذكر ايضا):
م. عبدالسلام محمد عبود
8. أهداف المقرر
The module aims to: 1. To provide a comprehensive understanding of alternating current (AC), including its principles, characteristics, and waveform representation, as well as the significance of RMS value and average value in AC circuits. 2. To develop proficiency in working with phasor quantities, including their definition, representation in polar and rectangular forms, and the ability to perform arithmetic operations such as multiplication, division, addition, and subtraction. 3. To analyze resonance circuits, both in series and parallel configurations, in order to determine conditions for resonance, calculate key parameters such as current, voltage, impedance, phase angle, and frequency at resonance, and evaluate bandwidth and quality factor. 4. To investigate the impact of AC on different circuit configurations, ranging from resistance-only circuits to circuits with pure inductance or capacitance, as well as combinations of resistance, inductance, and capacitance. This includes determining phase angles between current and voltage for each circuit type. To explore the concept of power in AC circuits, encompassing the calculation of power in circuits with various components (resistance, inductance, capacitance) in series and parallel. Additionally, to comprehend active and reactive power, power factor, and techniques to improve power factor. The course will also cover the application of theories such as Norton's theorem, Thevenin's theorem, and impedance matching in AC circuits.
9. استراتيجيات التعليم والتعلم
The learning and teaching strategies for the AC Circuits module can vary depending on the specific educational institution and instructor. However, here are some common strategies that can be effective for teaching this module: • Lectures: Conducting lectures to introduce and explain fundamental concepts, principles, and theories related to AC circuits. This can include providing clear explanations, using visual aids such as slides or demonstrations, and engaging students through interactive discussions.

- Practical Demonstrations: Organizing practical demonstrations or laboratory sessions where students can observe and interact with real AC circuits. This hands-on experience allows them to apply theoretical knowledge, perform measurements, and analyze circuit behavior.
- Problem-Solving Sessions: Facilitating problem-solving sessions to enhance students' understanding of AC circuit analysis and calculation techniques. This involves presenting practice problems of increasing complexity and guiding students in step-by-step problem-solving strategies.
- Simulations and Virtual Labs: Utilizing computer simulations and virtual laboratory environments to provide interactive and immersive experiences. This allows students to simulate and analyze AC circuits, observe waveforms, and manipulate circuit parameters, reinforcing their understanding of concepts and principles.
- Group Discussions and Collaborative Learning: Encouraging group discussions and collaborative learning activities where students can actively engage with their peers. This can involve solving problems as a group, analyzing case studies, or engaging in debates and discussions to deepen their understanding of AC circuit concepts.
- Multimedia Resources: Incorporating multimedia resources such as online videos, interactive animations, and virtual tools to supplement lectures and provide additional visual representations of AC circuit phenomena.
- Assessments and Feedback: Implementing formative and summative assessments to evaluate students' understanding and progress. This can include quizzes, assignments, laboratory reports, and examinations. Providing timely feedback on assessments helps students identify areas of improvement and reinforces their learning.
- Self-Study Materials: Recommending textbooks, reference materials, and online resources for students to further explore AC circuit concepts independently. This promotes self-directed learning and allows students to deepen their understanding at their own pace.

By employing a combination of these strategies, instructors can create an engaging and effective learning environment for students studying AC circuits.

10. بنية المقرر الدراسي

الاسبوع	الساعات	مخرجات المتعلم المطلوبة	اسم الوحدات او الموضوع	طريقة التعلم	طريقة التقييم
Week 1	6	Introduction to laboratory equipment and safety guidelines The Oscilloscope: Comparison between peak and average values practically, calculating the form factor and crest factor (multiple exercises). Series and parallel connections of RC and RL circuits.	AC Quantities: Definition and characteristics of alternating current Generation and waveform representation of AC Relationships and definitions of RMS value, average value, and their significance Finding the form factor and crest factor for irregular waveforms with practical examples	حضوري	اختبارات يومي
Week 2	6	Phase angle measurement in series RLC circuits (multiple exercises). Phase angle measurement in parallel RLC circuits (multiple exercises).	Phasor Quantities: Definition of phasor quantities Representation of phasors in polar and rectangular forms Calculation of phase angle Operations on phasor quantities including multiplication, division, addition, and subtraction with practical examples	حضوري	تقارير

واجبات	حضوري	Resonance Circuits: Series and parallel resonance circuits Definition and conditions for resonance Calculation of current, voltage, impedance, phase angle, and frequency at resonance Determining bandwidth and quality factor Graphical representation of the relationship between inductive and capacitive reactance with frequency Example problems for both series and parallel resonance cases	Series resonance - Parallel resonance. Verification of Norton and Thevenin theories in AC current.	6	Week 3
اختبارات يومي	حضوري	Effect of Alternating Current on Circuits: Circuit with resistance only Circuit with pure inductance only Circuit with pure capacitance only Determining the phase angle between current and voltage for each circuit with examples.	Comparison between analog voltmeter and electronic voltmeter in measuring DC and AC voltage (multiple exercises). Achieving maximum power transfer in AC current - verifying the theory with its three possibilities.	6	Week 4
تقارير	حضوري	Effect of Alternating Current on Circuits: Circuit with resistance and inductance in series Circuit with resistance and capacitance in series Circuit with resistance, inductance, and capacitance in series Finding the relationship between current and voltage in the three cases, including phase angle and total circuit impedance, with practical examples.	Power measurement using three voltmeters and ammeters (multiple exercises).	6	Week 5
واجبات	حضوري	Effect of Alternating Current on Circuits: Circuit with resistance and inductance in parallel Circuit with resistance and capacitance in parallel Circuit with resistance, inductance, and capacitance in parallel Finding the relationship between voltage and current in the three cases, including phase angle and total circuit impedance, with practical examples.	Power and power factor measurement using a wattmeter (multiple exercises).	6	Week 6

اختبارات يومي	حضوري	Using the J-operator or the composite operator for finding total impedance, total admittance, current, voltage, and phase angle for resistors connected in series and parallel circuits, with example problem-solving.	Improving power factor (multiple exercises).	6	Week 7
تقارير	حضوري	Application of theories such as Norton's theorem, Thevenin's theorem, and impedance matching in alternating current circuits, with example problem-solving.	Voltage and current in three-phase circuits (star and delta connections).	6	Week 8
واجبات	حضوري	Power in AC circuits, including calculating power in circuits containing (resistance only, inductance only, capacitance only, resistance, inductance, and capacitance in series and parallel). Definition of active and reactive power and how to calculate them. Total apparent power (definition), drawing the power triangle, power factor, its definition, and its effect on AC circuits. How to improve power factor with practical examples.	Resistance measurement using a Wheatstone bridge (multiple exercises).	6	Week 9
اختبارات يومي	حضوري	Maximum power transfer theory in AC circuits, deriving the corresponding relationship with practical examples. Analysis of electric networks using the nodal voltage method, introduction, nodal voltages, number of nodal voltage equations, nodal voltage equations by inspection, common tolerance, transition tolerance. Practical examples of electric network analysis using the nodal method.	Loaded voltage divider - Unloaded voltage divider.	6	Week 10
تقارير	حضوري	Three-phase AC circuits, definition, and generation of three-phase AC current (single phase, two phases, three phases) with drawing the connections in star and delta configurations in three-phase AC circuits and the special relationships for calculating line current, phase current, total power, and line power, phase power. Advantages of each connection when used with balanced and unbalanced loads, with example problem-solving. Solving practical examples	Resistance measurement using an ammeter and voltmeter (multiple exercises).	6	Week 11

		regarding three-phase AC current with delta and star connections for balanced and unbalanced loads.			
واجبات	حضوري	Methods of power measurement for three-phase loads: Wattmeter, how to connect it to the circuit to measure active power and calculate reactive power and apparent power, with an example problem. Power measurement using a wattmeter and voltage, how to find total power using this method in both star and delta connections, using two watt meters, and using three watt meters.	Using amplifiers to measure high-value resistances (insulators) - (multiple exercises).	6	Week 12
اختبارات يومي	حضوري	Transient cases in circuits: Transient cases in DC current, circuits in transient cases (RLC, RC, RL circuits). Transient AC currents: Transient AC currents in RLC, RC, RL circuits, transient currents.	Increasing the range of measurement for an ammeter - Calibration of the ammeter using another device.	6	Week 13
تقارير	حضوري	Self-inductance of a coil (electromagnetic induction): Definition, special relationships to find self-inductance of a coil, mutual inductance between two coils, relationships to find mutual inductance based on the type of coil connection, including: a. Series-aiding connection and b. Series-opposing connection. Transformers: Transformer construction, drawing the transformer, its characteristics, operating principle, and special relationships. Types of transformers and problem-solving.	Increasing the range of measurement for a voltmeter - Calibration of the voltmeter.	6	Week 14
واجبات	حضوري	Growth and decay curves of current in an inductive circuit: Explanation of this circuit and its effect on DC current, general relationships for growth and decay of current in the coil, drawing the current and calculating the time constant, problem-solving. Charging and discharging capacitors, including the use of capacitance in DC circuits, general relationship for charging and discharging capacitors, drawing the current, the effect of the time constant, and its calculation,	Studying the time constant for an inductive circuit (RL) - Studying the time constant for a capacitive circuit (RC).	6	Week 15

		problem-solving.			

11. تقييم المقرر

As		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5, 10	LO #1, 2, 8 and 9
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	14	LO # 1-14
Summative assessment	Midterm Exam	2 hours	10% (10)	7	LO # 1-7
	Final Exam	3 hours	50% (50)	16	All
Total assessment			100% (100 Marks)		

12. مصادر التعلم والتدريس

J. W. Nilsson and S. A. Riedel, "Electric Circuits," 11th ed. Boston, MA: Pearson, 2018.

E. M. Purcell, "Electricity and Magnetism," 3rd ed. Cambridge, MA: Cambridge University Press, 2013.

نموذج وصف المقرر

1. أسم المقرر الدراسي:
Integral Mathematics
2. رمز المقرر:
EET1205
3. الفصل / السنة:
الفصل الأول 2024-2025/ مسار بولونيا
4. تاريخ اعداد هذا الوصف:
2025/7/15
5. حضوري / عبر الانترنت:
حضوري
6. عدد الساعات الدراسية (الكلي)/ عدد الوحدات/ (الكلي):
6 ساعات / 150 وحدة اوربية
7. أسم مسؤول المقرر الدراسي (اذا كان هناك اكثر من اسم يذكر ايضا):
م. عبدالسلام محمد عبود
8. أهداف المقرر

The module aims to:

1. To provide students with a comprehensive understanding of integration principles and techniques, including both indefinite and definite integration.
2. To equip students with the necessary skills to integrate various types of functions, such as trigonometric, inverse trigonometric, logarithmic, exponential, and hyperbolic functions.
3. To enable students to apply integration methods to solve practical problems and real-world applications, including finding areas, lengths of curves, surface areas, and volumes of solids.
4. To foster critical thinking and analytical skills by challenging students with a variety of integration problems and encouraging them to develop efficient problem-solving strategies.

To prepare students for advanced mathematical studies and future disciplines that require a strong foundation in integration, such as physics, engineering, economics, and computer science.

9. استراتيجيات التعليم والتعلم

The module will employ the following learning and teaching strategies

1. Lectures and Demonstrations: In-class lectures and demonstrations provide a structured approach to presenting the theoretical concepts of integration. The instructor can explain key concepts, demonstrate integration techniques, and provide examples to illustrate their application.
2. Problem-Solving Sessions: Regular problem-solving sessions allow students to actively engage with integration problems. These sessions can involve individual or group work, where students can practice applying integration techniques to solve a variety of problems and receive immediate feedback from the instructor.
3. Interactive Discussions: Engaging students in interactive discussions fosters critical thinking and deeper understanding of integration concepts. The instructor can facilitate discussions on integration strategies, real-world applications, and the connection between integration and other mathematical topics.
4. Practical Application Exercises: Assigning practical application exercises specific to electrical engineering helps students see the relevance of integration in their field of study. These exercises may involve solving engineering problems related to circuit analysis, signal processing, or electromagnetic theory using integration techniques.

Technology-Assisted Learning: Utilizing technology tools, such as computer software or online resources, can enhance learning and visualization of integration concepts. Students can use mathematical software to perform numerical integrations, graph functions, and explore the graphical interpretations of integration results.

10. بنية المقرر الدراسي

الاسبوع	الساعات	مخرجات المتعلم المطلوبة	اسم الوحدات او الموضوع	طريقة التعلم	طريقة التقييم
Week 1	6	Indefinite Integration: Basic principles of integration, indefinite integrals, and integration rules for trigonometric functions.	Indefinite Integration: Basic principles of integration, indefinite integrals, and integration rules for trigonometric functions.	حضوري	اختبارات يومي
Week 2	6	Integration of Inverse Trigonometric Functions: Techniques for integrating inverse trigonometric functions.	Integration of Inverse Trigonometric Functions: Techniques for integrating inverse trigonometric functions.	حضوري	تقارير
Week 3	6	Integration of Logarithmic and Exponential Functions: Methods for integrating logarithmic and exponential functions.	Integration of Logarithmic and Exponential Functions: Methods for integrating logarithmic and exponential functions.	حضوري	واجبات

اختبارات يومي	حضوري	Integration of Hyperbolic Functions Techniques for integrating hyperbolic functions.	Integration of Hyperbolic Functions Techniques for integrating hyperbolic functions.	6	Week 4
تقارير	حضوري	Integration Methods Further integration methods, including integration by substitution and integration by parts.	Integration Methods Further integration methods, including integration by substitution and integration by parts.	6	Week 5
واجبات	حضوري	Definite Integration Introduction to definite integration, evaluating definite integrals, and applications in finding areas between curves.	Definite Integration Introduction to definite integration, evaluating definite integrals, and applications in finding areas between curves.	6	Week 6
اختبارات يومي	حضوري	Applications of Definite Integration Calculating the length of curves and determining surface areas using definite integration.	Applications of Definite Integration Calculating the length of curves and determining surface areas using definite integration.	6	Week 7
تقارير	حضوري	Volumes of Solids Using integration to find volumes of solids, including solids of revolution and cross-sectional areas.	Volumes of Solids Using integration to find volumes of solids, including solids of revolution and cross-sectional areas.	6	Week 8
واجبات	حضوري	Applications in Physics Applying definite integration to solve physics problems involving motion, work, and fluid forces.	Applications in Physics Applying definite integration to solve physics problems involving motion, work, and fluid forces.	6	Week 9
اختبارات يومي	حضوري	Techniques of Integration Review Reviewing and practicing integration techniques, including substitution, integration by parts, and trigonometric substitution.	Techniques of Integration Review Reviewing and practicing integration techniques, including substitution, integration by parts, and trigonometric substitution.	6	Week 10
تقارير	حضوري	Area Between Curves Exploring methods for finding the area between two curves and applying them to practical problems.	Area Between Curves Exploring methods for finding the area between two curves and applying them to practical problems.	6	Week 11
واجبات	حضوري	Length of Curves Calculating the length of curves using integration techniques.	Length of Curves Calculating the length of curves using integration techniques.	6	Week 12

اختبارات يومي	حضوري	Surface Area Determining the surface area of three-dimensional objects using integration methods.	Surface Area Determining the surface area of three-dimensional objects using integration methods.	6	Week 13
تقارير	حضوري	Review and Exam Preparation Comprehensive review of the topics covered throughout the module and preparation for final exams.	Review and Exam Preparation Comprehensive review of the topics covered throughout the module and preparation for final exams.	6	Week 14
واجبات	حضوري	Assessment covering the concepts and applications of integral mathematics.	Assessment covering the concepts and applications of integral mathematics.	6	Week 15

11. تقييم المقرر

As		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	10% (10)	5, 10	LO #1, 2, 8 and 9
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Projects / Lab.				
	Report	1	10% (10)	14	LO # 1-14
Summative assessment	**Midterm Exam**	2 hours	20% (10)	7	LO # 1-7
	Final Exam	3 hours	50% (50)	16	All
Total assessment			100% (100 Marks)		

12. مصادر التعلم والتدريس

"Calculus: Early Transcendentals" by James Stewart (8th Edition, Cengage Learning, 2015).

"Advanced Engineering Mathematics" by Erwin Kreyszig (10th Edition, Wiley, 2011).

نموذج وصف المقرر

1. أسم المقرر الدراسي:
Engineering Drawing
2. رمز المقرر:
EETC102
3. الفصل / السنة:
الفصل الأول 2024-2025/ مسار بولونيا
4. تاريخ اعداد هذا الوصف:

2025/7/15
5. حضوري / عبر الانترنت:
حضوري
6. عدد الساعات الدراسية (الكلي)/ عدد الوحدات/ (الكلي):
5 ساعات / 125 وحدة اوربية
7. أسم مسؤول المقرر الدراسي (اذا كان هناك اكثر من اسم يذكر ايضا):
د.عادل حاتم نوار
8. أهداف المقرر
The module aims for the Basics of Engineering Drawing course are as follows: 1. To demonstrate proficiency in creating and interpreting engineering drawings: Develop the skills to create accurate and detailed engineering drawings using both manual drafting techniques and computer-aided drafting (CAD) software. Additionally, gain the ability to interpret and understand engineering drawings, including orthographic projections, sections, and assembly drawings. 2. To apply industry standards and practices: Understand and apply the relevant industry standards and practices for engineering drawing, such as dimensioning, tolerancing, and geometric dimensioning and tolerancing (GD&T). Ensure that drawings are compliant with applicable standards to facilitate effective communication and manufacturing processes. 3. To develop spatial visualization skills: Enhance your ability to visualize and mentally manipulate objects in three-dimensional space based on two-dimensional drawings. Strengthen your spatial awareness and improve your understanding of complex engineering designs. 4. To demonstrate effective communication of technical information: Acquire the skills to communicate technical information clearly and accurately through annotations, notes, and drawing presentations. Enhance your ability to convey design intent, dimensions, and specifications to other stakeholders, such as engineers, manufacturers, and clients. To apply critical thinking and problem-solving skills in engineering drawing: Develop the ability to analyze and solve engineering drawing problems, such as identifying and resolving dimensional conflicts, addressing design issues, and ensuring proper fit and function of components. Apply critical thinking skills to evaluate and improve the quality and accuracy of engineering drawings.
9. استراتيجيات التعليم والتعلم
When it comes to learning and teaching engineering drawing using AutoCAD, there are several strategies that can be effective. Here are some recommendations: 1. Familiarize with the Software: Before diving into engineering drawing concepts, it's important to become familiar with the AutoCAD software. This includes understanding the user interface, basic tools, and commands. Start with introductory tutorials or online resources that cover the basics of AutoCAD. 2. Start with Fundamentals: Begin by teaching the fundamental concepts of engineering drawing, such as orthographic projection, isometric projection, dimensioning, and tolerancing. Explain the principles and techniques used in creating accurate and clear technical drawings. 3. Hands-on Practice: Engineering drawing is a practical skill, so provide ample opportunities for hands-on practice. Assign exercises and projects that require students to create different types of drawings using AutoCAD. Encourage them to explore and experiment with various tools and commands. 4. Step-by-Step Instructions: Break down complex drawing tasks into smaller, manageable steps. Provide step-by-step instructions and demonstrations using AutoCAD, showing students how to execute each step effectively. This approach helps students understand the workflow and build their confidence. 5. Visual Aids and Examples: Utilize visual aids, such as slides, diagrams, and examples, to reinforce

concepts. Show real-world engineering drawings and explain how they were created using AutoCAD. Visual representations can enhance understanding and make abstract concepts more tangible.
6. Group Activities and Collaboration: Promote collaboration among students by assigning group activities or projects. This allows them to work together, share knowledge, and learn from one another. Encourage students to discuss their approaches and problem-solving techniques related to engineering drawing in AutoCAD.
7. Provide Feedback: Regularly provide constructive feedback on students' drawings. Highlight areas for improvement, suggest alternative methods, and point out common mistakes. This feedback loop is crucial for students to refine their skills and develop a deeper understanding of engineering drawing principles.
8. Stay Updated with AutoCAD Features: AutoCAD is regularly updated with new features and enhancements. Stay up to date with these changes to ensure you're teaching the latest tools and workflows. Familiarize yourself with new capabilities that can improve efficiency and accuracy in engineering drawing.
9. Online Resources and Communities: Encourage students to explore online resources, tutorials, and communities dedicated to AutoCAD and engineering drawing. There are numerous websites, forums, and YouTube channels that offer valuable content and support for learning AutoCAD.
Project-Based Learning: Incorporate project-based learning into the curriculum, where students can apply their engineering drawing skills to real-world scenarios. Assign projects that simulate industry-related tasks, such as creating architectural plans, mechanical assemblies, or electrical schematics using AutoCAD.

10. بنية المقرر الدراسي

الاسبوع	الساعات	مخرجات المتعلم المطلوبة	اسم الوحدات او الموضوع	طريقة التعلم	طريقة التقييم
Week 1	6	Introduction to Engineering Drawing: Importance and applications of engineering drawing. Drawing instruments and materials. Drawing standards and conventions.	Introduction to Engineering Drawing: Importance and applications of engineering drawing. Drawing instruments and materials. Drawing standards and conventions.	حضوري	اختبارات يومي
Week 2	6	Lines and Lettering Types of lines used in engineering drawing. Line weights and line quality. Techniques for freehand lettering and title block.	Lines and Lettering Types of lines used in engineering drawing. Line weights and line quality. Techniques for freehand lettering and title block.	حضوري	تقارير
Week 3	6	Geometric Construction Basic geometric shapes and their construction methods.	Geometric Construction Basic geometric shapes and their construction methods.	حضوري	واجبات

		Construction of angles, triangles, and polygons. Division of lines and angles.	Construction of angles, triangles, and polygons. Division of lines and angles.		
اختبارات يومي	حضوري	Orthographic Projection Introduction to orthographic projection. Multiview projection and views of an object. Drawing orthographic views of simple objects.	Orthographic Projection Introduction to orthographic projection. Multiview projection and views of an object. Drawing orthographic views of simple objects.	6	Week 4
تقارير	حضوري	Sectional Views Introduction to sectional views. Types of sectional views (full, half, offset). Drawing sectional views of objects.	Sectional Views Introduction to sectional views. Types of sectional views (full, half, offset). Drawing sectional views of objects.	6	Week 5
واجبات	حضوري	Dimensioning and Tolerancing Introduction to dimensioning and tolerancing. Types of dimensions (linear, angular, radial). Geometric dimensioning and tolerancing (GD&T).	Dimensioning and Tolerancing Introduction to dimensioning and tolerancing. Types of dimensions (linear, angular, radial). Geometric dimensioning and tolerancing (GD&T).	6	Week 6
اختبارات يومي	حضوري	Auxiliary Views: Introduction to auxiliary views. Drawing auxiliary views to show true shape and size of inclined surfaces. Solving problems using auxiliary views.	Auxiliary Views: Introduction to auxiliary views. Drawing auxiliary views to show true shape and size of inclined surfaces. Solving problems using auxiliary views.	6	Week 7

تقارير	حضوري	Pictorial Drawings Introduction to pictorial drawings (isometric, oblique, perspective). Drawing isometric and oblique pictorial views. Creating exploded views.	Pictorial Drawings Introduction to pictorial drawings (isometric, oblique, perspective). Drawing isometric and oblique pictorial views. Creating exploded views.	6	Week 8
واجبات	حضوري	Screw Threads and Fasteners Introduction to screw threads. Types of screw threads and thread representation. Drawing standard fasteners (bolts, nuts, screws).	Screw Threads and Fasteners Introduction to screw threads. Types of screw threads and thread representation. Drawing standard fasteners (bolts, nuts, screws).	6	Week 9
اختبارات يومي	حضوري	Assembly Drawings Introduction to assembly drawings. Drawing exploded views and assembly details. Bill of materials (BOM) and part numbering.	Assembly Drawings Introduction to assembly drawings. Drawing exploded views and assembly details. Bill of materials (BOM) and part numbering.	6	Week 10
تقارير	حضوري	Introduction to CAD (Computer-Aided Design) Overview of CAD software and its benefits. Introduction to basic CAD tools and commands. Creating simple drawings using CAD software.	Introduction to CAD (Computer-Aided Design) Overview of CAD software and its benefits. Introduction to basic CAD tools and commands. Creating simple drawings using CAD software.	6	Week 11
واجبات	حضوري	Isometric Projection Introduction to isometric projection. Drawing isometric views of simple	Isometric Projection Introduction to isometric projection. Drawing isometric views of simple	6	Week 12

		objects. Solving problems using isometric projection.	objects. Solving problems using isometric projection.		
اختبارات يومي	حضوري	Electrical and Electronic Symbols Introduction to electrical and electronic symbols. Drawing basic electrical and electronic circuits. Wiring diagrams and schematic symbols.	Electrical and Electronic Symbols Introduction to electrical and electronic symbols. Drawing basic electrical and electronic circuits. Wiring diagrams and schematic symbols.	6	Week 13
تقارير	حضوري	Engineering Drawings for Manufacturing Introduction to manufacturing drawings. Drawing detailed views and dimensioning for manufacturing. Introduction to tolerances and fits.	Engineering Drawings for Manufacturing Introduction to manufacturing drawings. Drawing detailed views and dimensioning for manufacturing. Introduction to tolerances and fits.	6	Week 14
واجبات	حضوري	Review and Project Work Review of course topics and concepts. Project work involving the application of engineering drawing principles.	Review and Project Work Review of course topics and concepts. Project work involving the application of engineering drawing principles.	6	Week 15

11. تقييم المقرر

As		Time/ Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5, 10	LO #1, 2, 8 and 9
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Projects / Lab.	14	10% (10)	Continuous	All
	Report	14	10% (10)	14	All
Summative assessment	Midterm Exam	2 hours	10% (10)	7	LO # 1-7
	Final Exam	3 hours	50% (50)	16	All
Total assessment			100% (100 Marks)		

12. مصادر التعلم والتدريس
D. A. Madsen, D. P. Madsen, and J. E. Briesacher, Engineering Drawing and Design, 5th ed., Clifton Park, NY: Delmar Cengage Learning, 2011.
F. E. Giesecke, A. Mitchell, H. C. Spencer, I. L. Hill, and J. T. Dygdon, Technical Drawing with Engineering Graphics, 15th ed., Upper Saddle River, NJ: Pearson, 2016.
https://www.coursera.org/browse/physical-science-and-engineering

نموذج وصف المقرر

1. أسم المقرر الدراسي:
English Language (Beginner)
2. رمز المقرر:
MTU1002
3. الفصل / السنة:
الفصل الأول 2024-2025/ مسار بولونيا
4. تاريخ اعداد هذا الوصف:
2025/7/15
5. حضوري / عبر الانترنت:
حضوري
6. عدد الساعات الدراسية (الكلي)/ عدد الوحدات/ (الكلي):
2 ساعات / 50 وحدة اوربية
7. أسم مسؤول المقرر الدراسي (اذا كان هناك اكثر من اسم يذكر ايضا):
م. م. احمد خالد برع
8. أهداف المقرر
The module aims of English Language (Beginner) are designed to help learners at the beginner level develop their English language skills and achieve specific learning objectives. While I don't have access to the specific module aims of this coursebook, I can provide you with a general outline of the typical aims for a beginner-level English course: 1. To introduce beginner-level learners to the English language, focusing on building vocabulary and acquiring essential language structures. 2. To develop listening and speaking skills through interactive activities and engaging in basic conversational practice. 3. To enhance reading comprehension abilities by introducing simple texts and emphasizing vocabulary and sentence structures. 4. To provide foundational writing skills, including sentence formation, paragraph writing, and completing basic forms. To cultivate cultural awareness and equip learners with practical language skills for everyday situations, such as ordering food, shopping, and asking for directions.

9. استراتيجيات التعليم والتعلم

The learning and teaching strategies for the English Language (Beginner) module may include:

1. Interactive Language Practice: Engage learners in communicative activities that promote active participation and language practice. This can include pair work, group discussions, role-plays, and language games.
2. Authentic Materials: Incorporate authentic materials such as videos, audio recordings, and reading texts that reflect real-life language use. This helps learners develop their listening, speaking, reading, and writing skills in authentic contexts.
3. Task-Based Learning: Design tasks and projects that require learners to use the target language to accomplish specific goals or solve problems. This promotes meaningful language use and encourages critical thinking and problem-solving skills.
4. Visual Aids and Multimedia: Utilize visual aids, charts, diagrams, and multimedia resources to support language learning and comprehension. Visuals can enhance understanding, aid in vocabulary acquisition, and provide context for language use.

Error Correction and Feedback: Provide timely and constructive feedback on learners' language production to help them identify and correct errors. Encourage self-correction and peer correction to foster a supportive learning environment.

10. بنية المقرر الدراسي

الاسبوع	الساعات	مخرجات المتعلم المطلوبة	اسم الوحدات او الموضوع	طريقة التعلم	طريقة التقييم
Week 1	2	Hello!	Hello!	حضوري	اختبارات يومي
Week 2	2	Your world.	Your world.	حضوري	تقارير
Week 3	2	All about you.	All about you.	حضوري	واجبات
Week 4	2	Family and friends.	Family and friends.	حضوري	اختبارات يومي
Week 5	2	The way I live.	The way I live.	حضوري	تقارير
Week 6	2	Every day	Every day	حضوري	واجبات
Week 7	2	My favourites.	My favourites.	حضوري	اختبارات يومي
Week 8	2	Where I live. Times past.	Where I live. Times past.	حضوري	تقارير

واجبات	حضوري	We had a great time! I can do that!	We had a great time! I can do that!	2	Week 9
اختبارات يومي	حضوري	Please and thank you. Here and now.	Please and thank you. Here and now.	2	Week 10
تقارير	حضوري	It's time to go! Getting to know you.	It's time to go! Getting to know you.	2	Week 11
واجبات	حضوري	The way we live. It all went wrong.	The way we live. It all went wrong.	2	Week 12
اختبارات يومي	حضوري	Let's go shopping!	Let's go shopping!	2	Week 13
تقارير	حضوري	What do you want to do?	What do you want to do?	2	Week 14
واجبات	حضوري	Tell me! What's it like?	Tell me! What's it like?	2	Week 15

11. تقييم المقرر

As		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5, 10	LO #1, 2, 8 and 9
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Projects / Lab.				
	Report	1	10% (10)	14	LO # 1-14
Summative assessment	Midterm Exam	2 hours	20% (10)	7	LO # 1-7
	Final Exam	3 hours	50% (50)	16	All
Total assessment			100% (100 Marks)		

12. مصادر التعلم والتدريس

Soars, J., Soars, L. (2014). New Headway Plus: Beginner Student's Book. United Kingdom: Oxford University Press.

Soars, J., Soars, L. (2006). New Headway Plus: Pre-intermediate. United Kingdom: Oxford University Press.

نموذج وصف المقرر

1. أسم المقرر الدراسي:

Computer Principles
2. رمز المقرر:
MTU1004
3. الفصل / السنة:
الفصل الأول 2024-2025/ مسار بولونيا
4. تاريخ اعداد هذا الوصف:
2025/7/15
5. حضوري / عبر الانترنت:
حضوري
6. عدد الساعات الدراسية (الكلي)/ عدد الوحدات/ (الكلي):
3 ساعات / 75 وحدة اوربية
7. أسم مسؤول المقرر الدراسي (اذا كان هناك اكثر من اسم يذكر ايضا):
م. م. محمدالامين عبدالستار حميد
8. أهداف المقرر
The module aims to: 1. To introduce students to the fundamental concepts of computers, including their evolution, advantages, and classification based on purpose, size, and data type. 2. To familiarize students with the physical components of a computer and software entities, highlighting their roles in computer operations. 3. To promote awareness of computer security, ethics, and intellectual property rights, emphasizing the types of violations and measures for protection. 4. To provide an overview of operating systems, their functions, classifications, and examples, with a focus on the Windows 11 operating system and its desktop components. 5. To equip students with practical knowledge of computer usage and maintenance, covering file organization, software installation, common computer settings, and promoting responsible practices. These aims and indicative contents aim to achieve a comprehensive understanding of computer fundamentals, security, operating systems, and proper computer usage and maintenance.
9. استراتيجيات التعليم والتعلم
The learning and teaching strategies for the module on Computer Principles and operating systems can include: 1. Lectures and Presentations: The instructor can deliver lectures and presentations to introduce and explain key concepts, theories, and principles related to computer fundamentals and operating systems. This can help students develop a foundational understanding of the subject matter. 2. Practical Demonstrations: Hands-on practical demonstrations can be conducted to illustrate the usage of different computer components, software applications, and operating system functionalities. This can enhance students' understanding of the practical aspects of computer systems. 3. Group Discussions and Collaborative Learning: Engaging students in group discussions and collaborative learning activities can promote active participation and deeper understanding. Students can discuss and analyze case studies, real-life examples, and scenarios related to computer fundamentals and operating systems. 4. Laboratory Exercises: Practical laboratory exercises can provide students with opportunities to apply their knowledge and skills in a controlled environment. They can work on computer hardware, software installations, operating system configurations, and troubleshooting tasks, allowing them to gain practical experience.

Assignments and Projects: Assignments and projects can be assigned to students to encourage independent learning and critical thinking. They can involve research, analysis, problem-solving, and the application of concepts learned in the module. This can help students develop their skills and deepen their understanding.

10. بنية المقرر الدراسي

الاسبوع	الساعات	مخرجات المتعلم المطلوبة	اسم الوحدات او الموضوع	طريقة التعلم	طريقة التقييم
Week 1	3	Practical examples of browsing, opening, and closing windows and dialog boxes, and the proper way to interact with the keyboard, cursor, and other devices. Computer Fundamentals: Concept of a Computer, Stages of the Computer Life Cycle, Evolution of Computer Generations.	Introduction to Computer Fundamentals. Concept of a Computer.	حضوري	اختبارات يومي
Week 2	3	Practical examples of customization, working with icons, and changing screen resolution. Computer Advantages and Applications, Classification of Computers based on Purpose, Size, and Data Type.	Stages of the Computer Life Cycle. Evolution of Computer Generations.	حضوري	تقارير
Week 3	3	Training the student on creating a new user, maximizing windows, displaying the keyboard, and familiarizing with the physical components of the computer. Computer Components: Physical Components of a Computer, Software Entities.	Advantages of Computers and their Applications. Classification of Computers based on Purpose, Size, and Data Type.	حضوري	واجبات
Week 4	3	Training the student on dealing with computer software licenses, their types, and handling original software sources. Your Personal Computer: Concept of Computer Security and Software Licenses.	Computer Components: Physical Components of a Computer. Computer Components: Software Entities.	حضوري	اختبارات يومي
Week 5	3	Training the students in computer security. Computer Safety & Software Licenses,	Personal Computers. Concept of	حضوري	تقارير

		Computer Security and Software Licenses.	Computer Safety, and Security.		
واجبات	حضوري	Software Licenses: Types and Importance. Intellectual Property.	Training the student in computer privacy. Ethics in the Digital World, Types of Violations, Computer Security, Computer Privacy.	3	Week 6
اختبارات يومي	حضوري	Software Licenses: Types and Importance. Intellectual Property.	Training the student on electronic hacking and its types, types and characteristics of viruses, how to create a computer backup for protection. Software Licenses: Types and Importance, Intellectual Property, Cyber Intrusions and Malicious Software, Steps for Protecting Against Hacking, Harmful Effects of Computers on Health.	3	Week 7
تقارير	حضوري	Cyber Intrusions and Malicious Software. Steps for Protecting Against Hacking.	Training the student on operating systems, configuring, and partitioning the internal and external hard disk. Operating Systems: Definition, Functions, Objectives, Classification, Examples of Different Operating Systems.	3	Week 8
واجبات	حضوري	Health Effects of Computers. Introduction to Operating Systems.	Training the student in installing Windows 7. Operating Systems: Windows 11.	3	Week 9
اختبارات يومي	حضوري	Functions and Objectives of Operating Systems. Classification of Operating Systems.	Training the student on Start Menu commands, the taskbar, creating a file, and saving it with the student's name on the desktop. Interacting with windows, scrollbars, and using the function keys (F1, F2, ..., F12) on the keyboard. Desktop Components: Start Menu, Taskbar.	3	Week 10
تقارير	حضوري	Examples of Different Operating Systems. Windows 11 Operating System.	Creating a folder with a specific name and training on renaming, hiding, recovering, deleting, and viewing its path. Folders and Files, Icons.	3	Week 11

واجبات	حضوري	Desktop Components. Start Menu and Taskbar.	Training the student in performing operations on windows, desktop wallpaper. Performing Operations on Windows, Desktop Wallpapers.	3	Week 12
اختبارات يومي	حضوري	Folders and Files. Icons and Operations on Windows.	Training the student on using the Control Panel. Control Panel: Windows Control Panel, Categories.	3	Week 13
تقارير	حضوري	Desktop Wallpapers. Control Panel: Categories and Functions. File Organization and Maintenance.	Training the student on uninstalling and reinstalling a specific program. From Control Panel: Defragmenting Files Inside the Computer, Installing and Uninstalling Programs.	3	Week 14
واجبات	حضوري	Installing and Uninstalling Programs. Common Computer Settings: Printer Management, Time and Date Settings, Primary Disk Maintenance.	Training the student on common computer settings, installing the printer, managing time and date, and maintaining primary disks (Partitions C, D, E, F). Common Computer Settings: Printer Management, Time and Date Settings, Primary Disk Maintenance.	3	Week 15

11. تقييم المقرر

As		Time/ Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	10% (10)	5, 10	LO #1, 2, 8 and 9
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	14	LO # 1-14
Summative assessment	**Midterm Exam**	2 hours	10% (10)	7	LO # 1-7
	Final Exam	3 hours	50% (50)	16	All
Total assessment			100% (100 Marks)		

12. مصادر التعلم والتدريس

R. E. Bryant and D. R. O'Hallaron, "Computer Systems: A Programmer's Perspective," 2019.

G. Brookshear and D. Brylow, "Computer Science: An Overview," 2020.

نموذج وصف المقرر

1. أسم المقرر الدراسي:
DC Generators
2. رمز المقرر:
EET2101
3. الفصل / السنة:
الفصل الأول 2024-2025/ مسار بولونيا
4. تاريخ اعداد هذا الوصف:
2025/7/15
5. حضوري / عبر الانترنت:
حضوري
6. عدد الساعات الدراسية (الكلي)/ عدد الوحدات/ (الكلي):
6 ساعات / 150 وحدة اوربية
7. أسم مسؤول المقرر الدراسي (اذا كان هناك اكثر من اسم يذكر ايضا):
8. أهداف المقرر
The aims of the DC Generators module are: 1. To provide a comprehensive understanding of magnetic circuits and their role in DC generators. 2. To explain the principles of electromechanical energy conversion in DC machines. 3. To introduce the basic concepts and functions of DC machines. 4. To familiarize students with the terms and types of armature windings used in DC generators. 5. To explore the production of induced electromotive force (EMF) in DC generators and the factors influencing it. 6. To analyze the effects of armature reaction and methods to improve commutation in DC generators. 7. To examine the different types of DC generators, including self-excited, series-wound, shunt-wound, and compound-wound generators. 8. To study the characteristics of shunt, series, and compound-wound generators and understand their losses and efficiency. To explore the parallel operation of shunt generators, including load division and voltage division in series generator parallels.
9. استراتيجيات التعليم والتعلم
The DC Generators module can be effectively taught using a combination of learning and teaching strategies, including: 1. Lectures: Conducting lectures to deliver theoretical concepts and principles related to DC generators. This allows students to gain foundational knowledge and understanding of the subject matter. 2. Practical Demonstrations: Organizing practical demonstrations to illustrate the operation and components of DC generators. This hands-on approach helps students visualize and experience the concepts in a real-world setting. 3. Problem-Solving Exercises: Assigning problem-solving exercises and numerical problems to

enhance students' analytical skills. This enables them to apply the learned concepts and principles to solve practical problems related to DC generators.
4. Case Studies: Presenting case studies or real-life examples of DC generator applications in different industries. This helps students relate the theoretical concepts to practical scenarios and understand the relevance of DC generators in various contexts.
5. Group Discussions and Peer Learning: Facilitating group discussions and peer learning activities to encourage active engagement and collaboration among students. This allows for the exchange of ideas, perspectives, and problem-solving approaches, fostering a deeper understanding of the subject matter.
Laboratory Experiments: Conducting laboratory experiments where students can interact with DC generator setups, measure electrical parameters, and observe the generator's behavior. This hands-on experience enhances their practical skills and reinforces theoretical concepts.

10. بنية المقرر الدراسي

الاسبوع	الساعات	مخرجات المتعلم المطلوبة	اسم الوحدات او الموضوع	طريقة التعلم	طريقة التقييم
Week 1	6	Introduction to Laboratory Equipment and Safety Familiarization with the laboratory equipment used in DC generator experiments. Introduction to lab safety protocols and guidelines.	Introduction to DC Generators Overview of DC generators and their applications. Comparison between AC and DC generators. Basic components and construction of DC generators.	حضوري	اختبارات يومي
Week 2	6	Magnetic Circuits and Magnetic Field Analysis Measurement of magnetic field strength using a gauss meter. Construction and analysis of magnetic circuits using magnetic materials.	Magnetic Circuits and Magnetic Field Analysis Magnetic circuits and their characteristics. Magnetic field analysis in DC generators. Magneto motive force (MMF) and magnetic field strength.	حضوري	تقارير
Week 3	6	Characteristics of Permanent Magnets Measurement of magnetic field strength and flux density of permanent magnets. Investigation of the relationship between magnet strength and magnetic field properties.	Permeability, Reluctance, and BH Curve Permeability and reluctance in magnetic circuits. BH curve, hysteresis, and eddy currents. Practical applications of permanent magnets in DC generators.	حضوري	واجبات
Week 4	6	Construction and Testing of Armature Windings Hands-on construction of different types of armature windings. Measurement of armature winding resistance using a multimeter.	Electromechanical Energy Conversion Principles of electromechanical energy conversion in DC machines. Faraday's law of electromagnetic	حضوري	اختبارات يومي

		induction. Concept of armature winding and coil pitch.			
تقارير	حضوري	Armature Windings and Commutation Introduction to armature windings and their types. Single-layer and double-layer windings. Lap winding and wave winding configurations.	Commutation Analysis and Improvement Techniques Observation and analysis of commutation issues in a DC generator setup. Implementation of commutation improvement techniques, such as interpoles or compensating windings.	6	Week 5
واجبات	حضوري	Multiplex Winding and Commutation Methods Multiplex winding and equalizer rings. Dummy coils and armature winding resistance. Commutation process and methods for improving commutation.	DC Generator Voltage Build-Up Measurement of voltage build-up characteristics in a self-excited DC generator. Analysis of factors affecting voltage build-up and its impact on generator performance.	6	Week 6
اختبارات يومي	حضوري	Armature Reaction and Compensating Windings Armature reaction and its effects on DC generator operation. Demagnetizing and cross-magnetizing AT per pole. Compensating windings and interpoles.	Characteristics of Shunt Generators Measurement of key parameters and characteristics of a shunt generator Calculation of efficiency, losses, and conditions for maximum efficiency	6	Week 7
تقارير	حضوري	DC Generator Voltage Build-Up Voltage build-up in self-excited DC generators. Analysis of factors influencing voltage build-up.	Characteristics of Series Generators Measurement of key parameters and characteristics of a series generator. Calculation of efficiency, losses, and conditions for maximum efficiency.	6	Week 8
واجبات	حضوري	Types of DC Generators Self-excited, series, shunt, and compound-wound generators. Characteristics and applications of each type.	Characteristics of Compound Generators Measurement of key parameters and characteristics of a compound generator. Calculation of efficiency, losses, and conditions for maximum efficiency.	6	Week 9

اختبارات يومي	حضوري	Characteristics of Shunt Generators Analysis of shunt generator characteristics. Efficiency, losses, and conditions for maximum efficiency.	Parallel Operation of Shunt Generators Setup and analysis of parallel operation of shunt generators. Measurement and evaluation of load sharing and voltage control.	6	Week 10
تقارير	حضوري	Characteristics of Series Generators Analysis of series generator characteristics. Efficiency, losses, and conditions for maximum efficiency.	Series Generator in Parallel Operation Setup and analysis of series generator parallels. Measurement and evaluation of load sharing and voltage control.	6	Week 11
واجبات	حضوري	Characteristics of Compound Generators Analysis of compound generator characteristics. Efficiency, losses, and conditions for maximum efficiency.	Efficiency and Losses Analysis Measurement and calculation of losses in a DC generator. Evaluation of efficiency and identification of areas for improvement.	6	Week 12
اختبارات يومي	حضوري	Shunt Generator in Parallel Operation Division of load and voltage in parallel operation. Load sharing and voltage control in parallel operation.	Troubleshooting and Fault Analysis Identification and troubleshooting of common faults in DC generator systems. Analysis of the impact of faults on generator performance.	6	Week 13
تقارير	حضوري	Series Generator in Parallel Operation Division of load and voltage in series generator parallels. Analysis of series generator performance in parallel operation.	Project Work: Students work on a small project related to DC generators, applying their knowledge and skills acquired throughout the module.	6	Week 14
واجبات	حضوري	Review and Examination Preparation Review of key concepts and topics covered in the module. Examination preparation and revision.	Lab Report Writing and Review: Preparation and submission of lab reports for experiments conducted throughout the module. Review of key concepts and hands-on experiences in preparation for the final assessment.	6	Week 15

11. تقييم المقرر

As	Time/ Number	Weight (Marks)	Week Due	Relevant Learning Outcome

Formative assessment	**Quizzes**	2	10% (10)	5, 10	LO #1, 2, 8 and 9
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	14	LO # 1-14
Summative assessment	**Midterm Exam**	2 hours	10% (10)	7	LO # 1-7
	Final Exam	3 hours	50% (50)	16	All
Total assessment			100% (100 Marks)		

12. مصادر التعلم والتدريس

S. J. Chapman, Electric Machinery Fundamentals. 5th ed. New York, NY: McGraw-Hill, 2012.

S. Filizadeh and M. A. S. Masoum, Electric Machines and Drives: Principles, Control, Modeling, and Simulation. Boca Raton, FL: CRC Press, 2017.

نموذج وصف المقرر

1. أسم المقرر الدراسي:
Electronic Essentials
2. رمز المقرر:
EET2102
3. الفصل / السنة:
الفصل الأول 2024-2025/ مسار بولونيا
4. تاريخ اعداد هذا الوصف:
2025/7/15
5. حضوري / عبر الانترنت:
حضوري
6. عدد الساعات الدراسية (الكلي)/ عدد الوحدات/ (الكلي):
5 ساعات / 125 وحدة اوربية
7. أسم مسؤول المقرر الدراسي (اذا كان هناك اكثر من اسم يذكر ايضا):
8. أهداف المقرر
The module aims to: 1. To provide a comprehensive understanding of semiconductor diodes, including their construction, characteristics, and applications. 2. To explore diode biasing techniques and analyze the behavior of diodes under forward and reverse bias conditions. 3. To introduce special diodes, such as Zener diodes, and their specific applications in voltage regulation. 4. To examine rectifier circuits using diodes, including half-wave and full-wave rectifiers, and calculate the relevant parameters such as RMS and DC values. To introduce the fundamentals of transistors, specifically Bipolar Junction Transistors (BJTs), their configurations, biasing techniques, and small-signal analysis, and explore their applications in amplifiers.
9. استراتيجيات التعليم والتعلم
The learning and teaching strategies for the module on Computer Principles and operating systems can include: 1. Lectures and Presentations: The instructor can deliver lectures and presentations to introduce and explain key concepts, theories, and principles related to computer fundamentals and operating systems. This can help students develop a foundational understanding of the subject matter. 2. Practical Demonstrations: Hands-on practical demonstrations can be conducted to illustrate the usage of different computer components, software applications, and operating system functionalities. This can enhance students' understanding of the practical aspects of computer systems. 3. Group Discussions and Collaborative Learning: Engaging students in group discussions and collaborative learning activities can promote active participation and deeper understanding. Students can discuss and analyze case studies, real-life examples, and scenarios related to computer fundamentals and operating systems. 4. Laboratory Exercises: Practical laboratory exercises can provide students with opportunities to apply their knowledge and skills in a controlled environment. They can work on computer hardware, software installations,

operating system configurations, and troubleshooting tasks, allowing them to gain practical experience.

Assignments and Projects: Assignments and projects can be assigned to students to encourage independent learning and critical thinking. They can involve research, analysis, problem-solving, and the application of concepts learned in the module. This can help students develop their skills and deepen their understanding.

10. بنية المقرر الدراسي

الاسبوع	الساعات	مخرجات المتعلم المطلوبة	اسم الوحدات او الموضوع	طريقة التعلم	طريقة التقييم
Week 1	5	Familiarization with the use of lab equipment.	Semiconductor Diodes: Introduction to semiconductor diodes, Diode construction and formation of barrier voltage, Characteristics of semiconductor diodes.	حضوري	اختبارات يومي
Week 2	5	Characteristics of a diode in forward and reverse bias and plotting characteristic curves.	Diode Biasing: Forward biasing and reverse biasing, Characteristics curves in forward and reverse bias.	حضوري	تقارير
Week 3	5	Half-wave rectifier.	Diode Applications and Special Diodes: Comparison between silicon and germanium diodes, Total resistance of diodes, Breakdown voltage and reverse bias currents, Thermal effects on diodes, and Zener diodes and their applications.	حضوري	واجبات
Week 4	5	Full-wave bridge rectifier.	Diode Rectifiers: Diodes as current rectifiers, Half-wave rectifier operation, Calculation of RMS, and DC values of current and voltage.	حضوري	اختبارات يومي
Week 5	5	Full-wave rectifier using center-tapped transformer.	Full-Wave Rectifiers: Full-wave rectification using center-tapped transformers, Bridge rectifiers, Comparison between half-wave and full-wave rectifiers.	حضوري	تقارير
Week 6	5	Half-wave rectifier with RC filter.	Filter Circuits: Introduction to filters, RC filters and their calculations.	حضوري	واجبات
Week 7	5	Full-wave rectifier with RC filter.	LC Filters and Ripple Factor: LC filters and their calculations, Calculation of output voltage (ripple voltage and DC voltage), Ripple factor calculation.	حضوري	اختبارات يومي
Week 8	5	Parallel clipper circuits (positive and negative).	Capacitor-Input Filters: CRC filters, Calculation of output voltage (ripple voltage and DC voltage), Ripple factor	حضوري	تقارير

		calculation.			
واجبات	حضوري	Clipping and Clamping Circuits: Clipping circuits: positive and negative clippers, Diode clampers.	DC voltage multiplier circuit for half-wave rectifier.	5	Week 9
اختبارات يومي	حضوري	Voltage Multipliers: Voltage multipliers for rectifiers, Voltage doubler and voltage tripler configurations.	DC voltage multiplier circuit for full-wave rectifier.	5	Week 10
تقارير	حضوري	Zener Diodes: Zener diode introduction, Zener breakdown voltage and breakdown region, Zener diode voltage regulation.	Zener diode - forward and reverse characteristics.	5	Week 11
واجبات	حضوري	Introduction to Transistors: Transistor basics: Bipolar Junction Transistor (BJT) introduction, BJT structure, symbol, and characteristics.	Utilizing Zener diode for DC voltage regulation with a fixed resistor load.	5	Week 12
اختبارات يومي	حضوري	BJT Configurations and Biasing: BJT regions of operation, Definition of βdc and αdc, BJT connections and external characteristics, Biasing techniques: base bias, self-bias, voltage-divider bias.	Utilizing Zener diode for DC voltage regulation with a variable resistor load.	5	Week 13
تقارير	حضوري	Small-Signal Analysis and Stability: Small-signal current gain and temperature effects, Analysis of operating point stability.	Achieving current gain (dcβ) in a transistor.	5	Week 14
واجبات	حضوري	Transistor Applications: Transistor applications and amplifiers, Review and application examples.	Characteristics of a transistor in common base configuration (internal and external).	5	Week 15

11. تقييم المقرر

As		Time/ Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	10% (10)	5, 10	LO #1, 2, 8 and 9
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	14	LO # 1-14
Summative assessment	**Midterm Exam**	2 hours	10% (10)	7	LO # 1-7
	Final Exam	3 hours	50% (50)	16	All
Total assessment			100% (100 Marks)		

12. مصادر التعلم والتدريس

R. L. Boylestad and L. Nashelsky, "Electronic Devices and Circuit Theory," 11th ed. Upper Saddle River, NJ: Pearson, 2012.

A. Malvino and D. J. Bates, "Electronic Principles," 8th ed. New York, NY: McGraw-Hill, 2014.

نموذج وصف المقرر

1. أسم المقرر الدراسي:
Electrical Circuit Analysis
2. رمز المقرر:
EET2103
3. الفصل / السنة:
الفصل الأول 2024-2025/ مسار بولونيا
4. تاريخ اعداد هذا الوصف:
2025/7/15
5. حضوري / عبر الانترنت:
حضوري
6. عدد الساعات الدراسية (الكلي)/ عدد الوحدات/ (الكلي):
5 ساعات / 125 وحدة اوربية
7. أسم مسؤول المقرر الدراسي (اذا كان هناك اكثر من اسم يذكر ايضا):
8. أهداف المقرر
The module aims to: 1. To provide a comprehensive understanding of semiconductor diodes, To introduce fundamental concepts: The module aims to provide a solid understanding of the fundamental concepts and principles of electrical circuits. This includes definitions and units of electrical quantities, as well as the behavior of circuit elements in AC circuits. 2. To develop analysis techniques: The module aims to develop students' skills in analyzing AC circuits using various techniques. This includes sinusoidal steady-state analysis using Kirchhoff's laws, mesh analysis, nodal analysis, superposition's theorem, Thevenin's theorem, Norton's theorem, and source transformations. 3. To understand impedance and admittance: Students will gain a comprehensive understanding of impedance and admittance and their applications in AC circuits. This involves analyzing impedance combinations, calculating equivalent impedance and admittance, and understanding their significance in circuit analysis. 4. To analyze sinusoidal steady-state response: The module aims to equip students with the ability to analyze the sinusoidal steady-state response of AC circuits. This includes understanding the behavior of series and parallel RLC circuits with external sources, as well as source-free circuits. Students will learn to determine circuit responses in the time domain and frequency domain. 5. To explore step response of RLC circuits: The module aims to cover the step response of RLC circuits, both in series and parallel configurations. Students will learn to analyze and interpret the behavior of circuits when subjected to step inputs, considering parameters such as settling time, rise time, and overshoot. To study general second-order circuits: Students will develop an understanding of general second-order circuits, which involve both series and parallel RLC circuits with external sources. The module aims to provide comprehensive knowledge of the analysis techniques and principles applicable to these circuits.
9. استراتيجيات التعليم والتعلم
The learning and teaching strategies for the module on Computer Principles and operating systems can include: 1. Lectures and Presentations: The instructor can deliver lectures and presentations to introduce and explain key concepts, theories, and principles related to computer fundamentals and operating systems. This can help students

develop a foundational understanding of the subject matter.
2. Practical Demonstrations: Hands-on practical demonstrations can be conducted to illustrate the usage of different computer components, software applications, and operating system functionalities. This can enhance students' understanding of the practical aspects of computer systems.
3. Group Discussions and Collaborative Learning: Engaging students in group discussions and collaborative learning activities can promote active participation and deeper understanding. Students can discuss and analyze case studies, real-life examples, and scenarios related to computer fundamentals and operating systems.
4. Laboratory Exercises: Practical laboratory exercises can provide students with opportunities to apply their knowledge and skills in a controlled environment. They can work on computer hardware, software installations, operating system configurations, and troubleshooting tasks, allowing them to gain practical experience.

Assignments and Projects: Assignments and projects can be assigned to students to encourage independent learning and critical thinking. They can involve research, analysis, problem-solving, and the application of concepts learned in the module. This can help students develop their skills and deepen their understanding.

10. بنية المقرر الدراسي

الاسبوع	الساعات	مخرجات المتعلم المطلوبة	اسم الوحدات او الموضوع	طريقة التعلم	طريقة التقييم
Week 1	5	Introduction to Laboratory Equipment and Safety Familiarize students with the lab equipment and safety protocols. Introduce the use of multimeters, function generators, oscilloscopes, and breadboards.	Definitions and units.	حضوري	اختبارات يومي
Week 2	5	DC Circuit Analysis: Perform experiments to reinforce DC circuit analysis techniques. Verify Ohm's law, Kirchhoff's laws, and voltage division in DC circuits.	Sinusoids, phasors for circuit elements.	حضوري	تقارير
Week 3	5	AC Circuit Fundamentals Introduce AC circuit concepts, including sinusoidal signals and phasors. Measure and analyze AC voltages and currents using oscilloscopes and multimeters.	Impedance, admittance, impedance combinations.	حضوري	واجبات
Week 4	5	Impedance and Admittance Measurements Measure and calculate impedance and admittance of various circuit elements. Verify impedance combinations in series and parallel configurations.	Sinusoidal steady-state analysis (Kirchhoff's laws).	حضوري	اختبارات يومي

تقارير	حضوري	Sinusoidal steady-state analysis (Mesh analysis).	Sinusoidal Steady-State Analysis Analyze AC circuits using Kirchhoff's laws and phasor techniques. Verify the calculations by comparing theoretical results with measured values.	5	Week 5
واجبات	حضوري	Sinusoidal steady-state analysis (Nodal analysis).	Mesh and Nodal Analysis Perform experiments to practice mesh and nodal analysis techniques. Analyze circuits using these methods and compare the results.	5	Week 6
اختبارات يومي	حضوري	Sinusoidal steady-state analysis (Superposition's theorem).	Superposition's Theorem Perform experiments to demonstrate the application of superposition's theorem. Calculate the response of circuits by considering individual sources separately.	5	Week 7
تقارير	حضوري	Sinusoidal steady-state analysis (Thevenin's theorem).	Thevenin and Norton Equivalent Circuits Determine Thevenin and Norton equivalent circuits of complex networks. Measure and validate the calculated values using practical circuits.	5	Week 8
واجبات	حضوري	Sinusoidal steady-state analysis (Norton's theorem).	Source Transformations Perform source transformations to convert between voltage and current sources. Analyze circuits before and after the transformations to compare the results.	5	Week 9
اختبارات يومي	حضوري	Sinusoidal steady-state analysis (Source transformations).	Series RLC Circuit Analysis Study the behavior of series RLC circuits in AC circuits. Measure and analyze the transient and steady-state responses of series RLC circuits.	5	Week 10
تقارير	حضوري	Source-free series RLC circuits.	Parallel RLC Circuit Analysis Study the behavior of parallel RLC circuits in AC circuits.	5	Week 11

			Measure and analyze the transient and steady-state responses of parallel RLC circuits.		
واجبات	حضوري	Source-free parallel RLC circuits.	Step Response of RLC Circuits Analyze the step response of series and parallel RLC circuits. Measure and compare the settling time, rise time, and overshoot with theoretical calculations.	5	Week 12
اختبارات يومي	حضوري	Step response of series RLC circuits.	Frequency Response of RLC Circuits Study the frequency response of RLC circuits using AC signals of varying frequencies. Measure and analyze the circuit's response at different frequencies.	5	Week 13
تقارير	حضوري	Step response of parallel RLC circuits.	General Second-Order Circuits Analyze general second-order circuits with series and parallel RLC components. Measure and analyze the natural response, transient response, and frequency response.	5	Week 14
واجبات	حضوري	General second-order circuits.	Project and Review Assign a comprehensive project where students apply circuit analysis techniques to a real-world problem. Review key concepts, techniques, and laboratory experiments to prepare for the final assessment.	5	Week 15

11. تقييم المقرر

As		Time/ Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	10% (10)	5, 10	LO #1, 2, 8 and 9
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Projects / Lab.	1	10% (10)	Continuous	All

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

12. مصادر التعلم والتدريس

Book Reference: J. W. Nilsson and S. A. Riedel, Electric Circuits. Boston, MA: Pearson, 2020.

Book Reference: W. H. Hayt Jr., J. E. Kemmerly, and S. M. Durbin, Engineering Circuit Analysis. New York, NY: McGraw-Hill, 2017.

نموذج وصف المقرر

1. أسم المقرر الدراسي:
Sensors
2. رمز المقرر:
EET2104
3. الفصل / السنة:
الفصل الأول 2024–2025/ مسار بولونيا
4. تاريخ اعداد هذا الوصف:
2025/7/15
5. حضوري / عبر الانترنت:
حضوري
6. عدد الساعات الدراسية (الكلي)/ عدد الوحدات/ (الكلي):
4 ساعات / 100 وحدة اوربية
7. أسم مسؤول المقرر الدراسي (اذا كان هناك اكثر من اسم يذكر ايضا):
8. أهداف المقرر
The module aims to: 1. To provide students with a comprehensive understanding of the principles and working mechanisms of various sensors used in electrical engineering. 2. To familiarize students with the different types and classifications of sensors and their applications in various fields. 3. To develop students' skills in selecting appropriate sensors for specific measurement requirements and understanding their characteristics and parameters. 4. To equip students with the knowledge and techniques for sensor calibration, signal conditioning, and

integration into electrical systems.
To enable students to apply their theoretical knowledge to practical scenarios through hands-on experiments and projects, fostering problem-solving and analytical skills in the field of sensor technology.

9. استراتيجيات التعليم والتعلم

The learning and teaching strategies for the module on Computer Principles and operating systems can include:
1. Lectures and Presentations: The instructor can deliver lectures and presentations to introduce and explain key concepts, theories, and principles related to computer fundamentals and operating systems. This can help students develop a foundational understanding of the subject matter.
2. Practical Demonstrations: Hands-on practical demonstrations can be conducted to illustrate the usage of different computer components, software applications, and operating system functionalities. This can enhance students' understanding of the practical aspects of computer systems.
3. Group Discussions and Collaborative Learning: Engaging students in group discussions and collaborative learning activities can promote active participation and deeper understanding. Students can discuss and analyze case studies, real-life examples, and scenarios related to computer fundamentals and operating systems.
4. Laboratory Exercises: Practical laboratory exercises can provide students with opportunities to apply their knowledge and skills in a controlled environment. They can work on computer hardware, software installations, operating system configurations, and troubleshooting tasks, allowing them to gain practical experience.

Assignments and Projects: Assignments and projects can be assigned to students to encourage independent learning and critical thinking. They can involve research, analysis, problem-solving, and the application of concepts learned in the module. This can help students develop their skills and deepen their understanding.

10. بنية المقرر الدراسي

الاسبوع	الساعات	مخرجات المتعلم المطلوبة	اسم الوحدات او الموضوع	طريقة التعلم	طريقة التقييم
Week 1	4	Lab Introduction: Overview of the laboratory and equipment used for sensor experiments. Safety Procedures: Introduction to lab safety rules and precautions when working with sensors. Familiarization with Measurement Tools: Proper use of multimeters, oscilloscopes, and data acquisition systems.	Introduction to Sensors in Electrical Engineering: Types, classification, and working principles. Sensor characteristics: Sensitivity, accuracy, resolution, and linearity.	حضوري	اختبارات يومي
Week 2	4	Temperature Sensor Experiments: Calibration and testing of thermocouples, resistance temperature detectors (RTDs), and thermistors Light Sensor Experiments: Characterization and testing of photodiodes, phototransistors, and light-dependent resistors (LDRs)	Temperature Sensors: Thermocouples, resistance temperature detectors (RTDs), and thermistors	حضوري	تقارير
Week 3	4	Strain Gauge and Load Cell Experiments: Measurement of strain using strain gauges and load sensing with load cells.	Light Sensors: Photodiodes, phototransistors, and	حضوري	واجبات

		light-dependent resistors (LDRs).	Pressure Sensor Experiments: Calibration and testing of piezoresistive and capacitive pressure sensors.		
اختبارات يومي	حضوري	Strain Gauges and Load Cells: Principles of strain measurement and load sensing.	Position and Displacement Sensor Experiments: Testing and characterization of potentiometers, encoders, and linear variable differential transformers (LVDTs). Magnetic Sensor Experiments: Study of Hall effect sensors and magnetoresistive sensors.	4	Week 4
تقارير	حضوري	Pressure Sensors: Piezoresistive pressure sensors, capacitive pressure sensors.	Accelerometer Experiments: Measurement of acceleration using MEMS-based accelerometers. Gyroscope Experiments: Characterization and testing of MEMS-based gyroscopes for angular rate sensing.	4	Week 5
واجبات	حضوري	Position and Displacement Sensors: Potentiometers, encoders, and linear variable differential transformers (LVDTs).	Proximity Sensor Experiments: Testing and calibration of inductive and capacitive proximity sensors. Current Sensor Experiments: Measurement of current using Hall effect sensors and current transformers.	4	Week 6
اختبارات يومي	حضوري	Magnetic Sensors: Hall effect sensors and magnetoresistive sensors.	Voltage and Power Sensor Experiments: Calibration and testing of voltage dividers, voltage transformers, and power sensors. Wireless Sensor Network Experiments: Introduction to wireless sensor networks and practical applications in electrical engineering.	4	Week 7
تقارير	حضوري	Accelerometers: Principles of acceleration sensing and MEMS-based accelerometers.	Sensor Calibration and Signal Conditioning: Techniques for sensor calibration and implementation of signal conditioning circuits. - Sensor Integration and Applications: Integration of sensors in electrical systems and hands-on application projects.	4	Week 8
واجبات	حضوري	Gyroscopes: Principles of angular rate sensing and MEMS-based gyroscopes.	Ultrasonic Sensor Experiments: Testing and characterization of ultrasonic distance sensors.	4	Week 9

			Gas Sensor Experiments: Calibration and testing of gas sensors for various gases.		
اختبارات يومي	حضوري	Proximity Sensors: Inductive and capacitive proximity sensors.	Humidity and Moisture Sensor Experiments: Measurement of humidity and moisture using capacitive and resistive sensors. pH Sensor Experiments: Testing and calibration of pH sensors for acidity and alkalinity measurements.	4	Week 10
تقارير	حضوري	Current Sensors: Hall effect current sensors and current transformers.	Force and Load Sensor Experiments: Characterization and testing of force and load sensors. Flow Sensor Experiments: Measurement of fluid flow using various flow sensors.	4	Week 11
واجبات	حضوري	Voltage and Power Sensors: Voltage dividers, voltage transformers, and power sensors.	Sound Sensor Experiments: Calibration and testing of sound sensors for audio measurements. Motion Sensor Experiments: Testing and characterization of motion sensors for detection and tracking.	4	Week 12
اختبارات يومي	حضوري	Wireless Sensor Networks: Introduction, protocols, and applications in electrical engineering.	Optical Sensor Experiments: Characterization and testing of optical sensors for detection and measurement applications. Vibration Sensor Experiments: Measurement of vibration using accelerometers and piezoelectric sensors.	4	Week 13
تقارير	حضوري	Sensor Calibration and Signal Conditioning: Calibration techniques and signal conditioning circuits specific to electrical engineering sensors.	Environmental Sensor Experiments: Testing and calibration of sensors for temperature, humidity, pressure, and air quality. Sensor Interfacing: Integration of sensors with microcontrollers or data acquisition systems for data acquisition and analysis.	4	Week 14
واجبات	حضوري	Sensor Integration and Applications: Integration of sensors in electrical systems and practical applications.	Final Project: Design and implementation of a sensor-based system or application, including data acquisition, processing, and control aspects. Project Presentation and Evaluation: Presentation of the final project and evaluation of	4	Week 15

			its performance and functionality.		

11. تقييم المقرر

As		Time/ Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5, 10	LO #1, 2, 8 and 9
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Projects / Lab.	14	10% (10)	Continuous	All
	Report	14	10% (10)	14	LO # 1-14
Summative assessment	Midterm Exam	2 hours	10% (10)	7	LO # 1-7
	Final Exam	3 hours	50% (50)	16	All
Total assessment			100% (100 Marks)		

12. مصادر التعلم والتدريس

R. Pallas-Areny and J. G. Webster, "Sensors and Signal Conditioning," 2nd ed. Hoboken, NJ, USA: John Wiley & Sons, 2001.

P. Scherz and S. Monk, "Practical Electronics for Inventors," 4th ed. New York, NY, USA: McGraw-Hill Education, 2016.

نموذج وصف المقرر

1. أسم المقرر الدراسي:

Applied Mathematics

2. رمز المقرر:

EET2105

3. الفصل / السنة:

الفصل الأول 2024-2025/ مسار بولونيا

4. تاريخ اعداد هذا الوصف:

2025/7/15

5. حضوري / عبر الانترنت:

حضوري

6. عدد الساعات الدراسية (الكلي)/ عدد الوحدات/ (الكلي):

5 ساعات / 125 وحدة اوربية

7. أسم مسؤول المقرر الدراسي (اذا كان هناك اكثر من اسم يذكر ايضا):

8. أهداف المقرر

The module aims to:

1. To develop a solid understanding of vector analysis, including vector operations, dot and cross products, lines and planes in space, and vector-valued functions.
2. To enable students to effectively sketch curves by understanding key aspects such as domain and range, symmetry, intercepts, asymptotes, concavity, and inflection points.
3. To familiarize students with the concepts of complex numbers, including the complex plane, polar form, De Moivre's theorem, and complex roots, and demonstrate their applications in solving mathematical problems.
4. To develop proficiency in working with multiple integrals, including summation in two directions, double and triple integrals, and change of variables, and understand their applications in physics and engineering.

To provide a strong foundation in ordinary differential equations (ODEs) and partial differential equations (PDEs), including solving techniques for first-order ODEs, separation of variables for PDEs, and applications in wave and heat equations.

9. استراتيجيات التعليم والتعلم

The learning and teaching strategies employed in the applied mathematics module are designed to facilitate active engagement, critical thinking, and practical application of mathematical concepts. The following strategies are commonly used:

1. Lectures: Lectures serve as the primary mode of content delivery, where instructors present key concepts, theories, and techniques. Lectures may include visual aids, examples, and demonstrations to enhance understanding and provide real-world context.
2. Interactive Discussions: Interactive discussions encourage student participation and facilitate deeper understanding of the material. Students are encouraged to ask questions, share their insights, and engage in discussions on specific topics or problem-solving strategies.
3. Problem-solving Sessions: Problem-solving sessions allow students to apply mathematical principles to solve a variety of problems. These sessions may be conducted in groups or individually, allowing students to collaborate, exchange ideas, and develop problem-solving skills.
4. Practical Exercises: Practical exercises involve hands-on application of mathematical concepts through computational tasks, modeling exercises, or simulations. These exercises reinforce theoretical knowledge and help students develop proficiency in using mathematical tools and software.
5. Case Studies and Real-world Applications: Case studies and real-world applications demonstrate the relevance of mathematics in various fields. Students analyze and solve mathematical problems based on real-life scenarios, enabling them to connect theoretical concepts with practical applications.
6. Computer-based Learning: Computer-based learning resources, such as online tutorials, interactive simulations, and mathematical software, are utilized to enhance students' understanding and proficiency in applying mathematical techniques.
7. Group Projects: Group projects promote teamwork, communication, and problem-solving skills. Students work collaboratively on mathematical projects or research assignments, allowing them to explore advanced topics or applications of mathematics.
8. Self-directed Learning: Students are encouraged to take responsibility for their learning by engaging in self-directed study. This may involve reading recommended textbooks, exploring additional resources, and practicing problem-solving independently.
9. Assessments: Regular assessments, including quizzes, tests, and assignments, evaluate students' understanding and application of mathematical concepts. These assessments provide feedback and help track progress throughout the module.

Tutorial Sessions: Tutorial sessions provide opportunities for students to seek clarification, discuss challenging topics, and receive individualized guidance from instructors or teaching assistants.

10. بنية المقرر الدراسي

الاسبوع	الساعات	مخرجات المتعلم المطلوبة	اسم الوحدات او الموضوع	طريقة التعلم	طريقة التقييم

اختبارات يومي	حضوري	Vector Analysis: Vector operations, dot and cross products.	Vector Analysis: Vector operations, dot and cross products.	5	Week 1
تقارير	حضوري	Vector Analysis: Lines and planes in space, vector-valued functions.	Vector Analysis: Lines and planes in space, vector-valued functions.	5	Week 2
واجبات	حضوري	Curve Sketching: Domain and range, symmetry, intercepts, asymptotes.	Curve Sketching: Domain and range, symmetry, intercepts, asymptotes.	5	Week 3
اختبارات يومي	حضوري	Curve Sketching: Concavity, inflection points. Complex Numbers: Complex plane, polar form.	Curve Sketching: Concavity, inflection points. Complex Numbers: Complex plane, polar form.	5	Week 4
تقارير	حضوري	Multiple Integrals: Summation in two directions, double integrals.	Multiple Integrals: Summation in two directions, double integrals.	5	Week 5
واجبات	حضوري	Multiple Integrals: Triple integrals, applications, alternative notation.	Multiple Integrals: Triple integrals, applications, alternative notation.	5	Week 6
اختبارات يومي	حضوري	Coordinate Geometry: Conic sections. Ordinary Differential Equations (ODE): Solution of first-order differential equations by separation of variables.	Coordinate Geometry: Conic sections. Ordinary Differential Equations (ODE): Solution of first-order differential equations by separation of variables.	5	Week 7
تقارير	حضوري	Coordinate Geometry: Polar coordinates, parametric equations. Ordinary Differential Equations (ODE): Homogeneous first-order differential equations, linear first-order differential equation.	Coordinate Geometry: Polar coordinates, parametric equations. Ordinary Differential Equations (ODE): Homogeneous first-order differential equations, linear first-order differential equation.	5	Week 8
واجبات	حضوري	Ordinary Differential Equations (ODE): Second-order differential equations, power series methods of solving ODEs.	Ordinary Differential Equations (ODE): Second-order differential equations, power series methods of solving ODEs.	5	Week 9
اختبارات يومي	حضوري	Ordinary Differential Equations (ODE): Higher order differential coefficients as series, Leibniz's theorem, power series solution by the Leibniz–Maclaurin method and the Frobenius Method. Partial Differential Equations	Ordinary Differential Equations (ODE): Higher order differential coefficients as series, Leibniz's theorem, power series solution by the Leibniz–Maclaurin method and the Frobenius Method.	5	Week 10

		(PDE): Partial integration, solution of PDEs by direct partial integration.	Partial Differential Equations (PDE): Partial integration, solution of PDEs by direct partial integration.		
تقارير	حضوري	Partial Differential Equations (PDE): Some important engineering PDEs, separating the variables.	Partial Differential Equations (PDE): Some important engineering PDEs, separating the variables.	5	Week 11
واجبات	حضوري	Partial Differential Equations (PDE): The wave equation, the heat conduction equation.	Partial Differential Equations (PDE): The wave equation, the heat conduction equation.	5	Week 12
اختبارات يومي	حضوري	Laplace Transforms: Introduction, properties of Laplace Transform, Laplace Transform of Functions.	Laplace Transforms: Introduction, properties of Laplace Transform, Laplace Transform of Functions.	5	Week 13
تقارير	حضوري	Laplace Transforms: The Initial and Final Value Theorems, inverse Laplace transform, inverse Laplace transform using Partial Fraction.	Laplace Transforms: The Initial and Final Value Theorems, inverse Laplace transform, inverse Laplace transform using Partial Fraction.	5	Week 14
واجبات	حضوري	Laplace Transforms: Solution of Differential Equations, solution of simultaneous differential equations.	Laplace Transforms: Solution of Differential Equations, solution of simultaneous differential equations.	5	Week 15

11. تقييم المقرر

As		Time/ Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	10% (10)	5, 10	LO #1, 2, 8 and 9
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Projects / Lab.				
	Report	1	10% (10)	14	LO # 1-14
Summative assessment	**Midterm Exam**	2 hours	20% (10)	7	LO # 1-7
	Final Exam	3 hours	50% (50)	16	All
Total assessment			100% (100 Marks)		

12. مصادر التعلم والتدريس

E. Kreyszig, "Advanced Engineering Mathematics," John Wiley & Sons, 2011.

M. L. Boas, "Mathematical Methods in the Physical Sciences," John Wiley & Sons, 2005.

نموذج وصف المقرر

1. أسم المقرر الدراسي:
Computer Application
2. رمز المقرر:
MTU1005
3. الفصل / السنة:
الفصل الأول 2024-2025/ مسار بولونيا
4. تاريخ اعداد هذا الوصف:
2025/7/15
5. حضوري / عبر الانترنت:
حضوري
6. عدد الساعات الدراسية (الكلي)/ عدد الوحدات/ (الكلي):
3 ساعات / 75 وحدة اوربية
7. أسم مسؤول المقرر الدراسي (اذا كان هناك اكثر من اسم يذكر ايضا):
8. أهداف المقرر
The module aims to: 1. To provide an overview of Microsoft Word, Excel, and PowerPoint, and familiarize students with their key features and user interfaces. 2. To develop essential skills in creating, saving, and opening documents in Microsoft Word, including formatting text and paragraphs and working with styles and themes. 3. To explore advanced features in Microsoft Word, such as page layout options, working with headers, footers, and page numbers, and incorporating tables, images, and objects. 4. To introduce spreadsheets and worksheets in Microsoft Excel, and develop students' skills in data entry, manipulation, and basic formulas and functions. 5. To delve into advanced Microsoft Excel features, including working with ranges and cells, sorting and filtering data, and creating charts and graphs. 6. To guide students in creating and editing slides in Microsoft PowerPoint, applying themes and templates, and adding text, images, and multimedia elements. 7. To explore advanced PowerPoint features, such as slide transitions, animations, using SmartArt and shapes, and utilizing presenter tools and slide show options. 8. To teach word processing techniques in Microsoft Word, such as mail merge, document collaboration, creating professional documents, and managing references and citations. 9. To provide advanced data analysis skills in Microsoft Excel, covering advanced formulas and functions, data validation, conditional formatting, and PivotTables. 10. To explore collaboration and sharing features in Microsoft Office, including sharing and co-authoring documents, using comments and track changes, and protecting documents.
9. استراتيجيات التعليم والتعلم
The learning and teaching strategies employed in the applied mathematics module are designed to facilitate active

engagement, critical thinking, and practical application of mathematical concepts. The following strategies are commonly used:

1. Lectures: Lectures serve as the primary mode of content delivery, where instructors present key concepts, theories, and techniques. Lectures may include visual aids, examples, and demonstrations to enhance understanding and provide real-world context.
2. Interactive Discussions: Interactive discussions encourage student participation and facilitate deeper understanding of the material. Students are encouraged to ask questions, share their insights, and engage in discussions on specific topics or problem-solving strategies.
3. Problem-solving Sessions: Problem-solving sessions allow students to apply mathematical principles to solve a variety of problems. These sessions may be conducted in groups or individually, allowing students to collaborate, exchange ideas, and develop problem-solving skills.
4. Practical Exercises: Practical exercises involve hands-on application of mathematical concepts through computational tasks, modeling exercises, or simulations. These exercises reinforce theoretical knowledge and help students develop proficiency in using mathematical tools and software.
5. Case Studies and Real-world Applications: Case studies and real-world applications demonstrate the relevance of mathematics in various fields. Students analyze and solve mathematical problems based on real-life scenarios, enabling them to connect theoretical concepts with practical applications.
6. Computer-based Learning: Computer-based learning resources, such as online tutorials, interactive simulations, and mathematical software, are utilized to enhance students' understanding and proficiency in applying mathematical techniques.
7. Group Projects: Group projects promote teamwork, communication, and problem-solving skills. Students work collaboratively on mathematical projects or research assignments, allowing them to explore advanced topics or applications of mathematics.
8. Self-directed Learning: Students are encouraged to take responsibility for their learning by engaging in self-directed study. This may involve reading recommended textbooks, exploring additional resources, and practicing problem-solving independently.
9. Assessments: Regular assessments, including quizzes, tests, and assignments, evaluate students' understanding and application of mathematical concepts. These assessments provide feedback and help track progress throughout the module.
10. Tutorial Sessions: Tutorial sessions provide opportunities for students to seek clarification, discuss challenging topics, and receive individualized guidance from instructors or teaching assistants.

10. بنية المقرر الدراسي

الاسبوع	الساعات	مخرجات المتعلم المطلوبة	اسم الوحدات او الموضوع	طريقة التعلم	طريقة التقييم
Week 1	3	Introduction to Lab Environment and Office Suite - Lab setup and software installation. Overview of Microsoft Office Suite tools and features.	Introduction to Microsoft Office Suite Overview of Microsoft Word, Excel, and PowerPoint Understanding the user interface and common features	حضوري	اختبارات يومي
Week 2	3	Microsoft Word Lab - Creating, editing, and formatting documents. Inserting and formatting images and tables.	Microsoft Word Basics Creating, saving, and opening documents Formatting text and paragraphs Working with styles and themes	حضوري	تقارير

واجبات	حضوري	Advanced Microsoft Word Features Page layout and formatting options Working with headers, footers, and page numbers Using tables, images, and other objects	Microsoft Excel Lab - Creating spreadsheets and entering data. Formulas and functions for calculations.	3	Week 3
اختبارات يومي	حضوري	Microsoft Excel Basics Introduction to spreadsheets and worksheets Data entry and manipulation Formulas and functions	Microsoft PowerPoint Lab - Creating, editing, and designing slides. Adding multimedia elements and animations.	3	Week 4
تقارير	حضوري	Advanced Microsoft Excel Features Working with ranges and cells Sorting and filtering data Creating charts and graphs	Word Processing Techniques Lab - Mail merge and document collaboration exercises. Creating professional documents with advanced formatting.	3	Week 5
واجبات	حضوري	Microsoft PowerPoint Basics Creating and editing slides Applying themes and templates Adding text, images, and multimedia elements	Data Analysis Lab with Excel - Advanced formula and function exercises. Sorting, filtering, and analyzing data.	3	Week 6
اختبارات يومي	حضوري	Advanced Microsoft PowerPoint Features Slide transitions and animations Using SmartArt and shapes Presenter tools and slide show options	Presentation Design Lab with PowerPoint - Applying design principles to create visually appealing slides. Adding interactive elements and customizing slide layouts.	3	Week 7
تقارير	حضوري	Word Processing Techniques in Microsoft Word Mail merge and document collaboration Creating professional documents (reports, resumes, etc.) Managing references and citations	Collaboration and Sharing Lab - Collaborative document editing and reviewing. Sharing and protecting documents with permissions.	3	Week 8
واجبات	حضوري	Data Analysis in Microsoft Excel Advanced formulas and functions Data validation and conditional formatting PivotTables and data visualization	Automation and Customization Lab - Recording and running macros for repetitive tasks. Customizing the ribbon and creating shortcuts.	3	Week 9

اختبارات يومي	حضوري	Presentation Design in Microsoft PowerPoint Design principles for effective presentations Customizing slide layouts and master slides Adding interactive elements (hyperlinks, buttons, etc.)	Integrating Office Applications Lab - Linking and embedding data between Word, Excel, and PowerPoint. Importing and exporting data between applications.	3	Week 10
تقارير	حضوري	Collaboration and Sharing in Microsoft Office Sharing and co-authoring documents Using comments and track changes Protecting documents and controlling access	Advanced Tips and Tricks Lab - Exploring time-saving techniques and productivity hacks. Troubleshooting common issues and errors.	3	Week 11
واجبات	حضوري	Automating Tasks in Microsoft Office Macros and automation in Word, Excel, and PowerPoint Customizing the ribbon and creating shortcuts Using add-ins and productivity tools	Project-based Labs - Students work on individual or group projects that integrate Word, Excel, and PowerPoint skills. Projects can involve tasks such as creating a professional report, analyzing data, or designing an interactive presentation.	3	Week 12
اختبارات يومي	حضوري	Integrating Office Applications Linking data between Word, Excel, and PowerPoint Embedding objects and creating dynamic content Importing and exporting data	Project-based Labs - Students work on individual or group projects that integrate Word, Excel, and PowerPoint skills. Projects can involve tasks such as creating a professional report, analyzing data, or designing an interactive presentation.	3	Week 13
تقارير	حضوري	Advanced Tips and Tricks Time-saving techniques and shortcuts Troubleshooting common issues Customizing settings and options	Project-based Labs - Students work on individual or group projects that integrate Word, Excel, and PowerPoint skills. Projects can involve tasks such as creating a professional report, analyzing data, or designing an interactive presentation.	3	Week 14
واجبات	حضوري	Final Projects and Review Students work on individual or group projects using Word, Excel, and PowerPoint Review of key concepts and features covered	Project-based Labs - Students work on individual or group projects that integrate Word, Excel, and PowerPoint skills. Projects can involve tasks such as creating a professional	3	Week 15

		throughout the course	report, analyzing data, or designing an interactive presentation.		

11. تقييم المقرر

As		Time/ Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5, 10	LO #1, 2, 8 and 9
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	14	LO # 1-14
Summative assessment	Midterm Exam	2 hours	10% (10)	7	LO # 1-7
	Final Exam	3 hours	50% (50)	16	All
Total assessment			100% (100 Marks)		

12. مصادر التعلم والتدريس

M. E. Vermaat, S. M. Freund, C. Hoisington, and E. Schmieder, "Microsoft Office 365 & Office 2019: Introductory," Boston, MA: Cengage Learning, 2020.

Triad Interactive, Inc., "Microsoft Office 2019: A Skills Approach," Boston, MA: Cengage Learning, 2019.

نموذج وصف المقرر

1. أسم المقرر الدراسي:

DC Motors

2. رمز المقرر:

EET2201

3. الفصل / السنة:

الفصل الأول 2024-2025/ مسار بولونيا

4. تاريخ اعداد هذا الوصف:

2025/7/15

5. حضوري / عبر الانترنت:

حضوري

6. عدد الساعات الدراسية (الكلي)/ عدد الوحدات/ (الكلي):

6 ساعات / 150 وحدة اوربية

7. أسم مسؤول المقرر الدراسي (اذا كان هناك اكثر من اسم يذكر ايضا):

8. أهداف المقرر

The module aims to achieve the following objectives:

1. To provide learners with a thorough understanding of the principles of operation of DC motors,

including the back EMF equation and voltage equation.
2. To enable learners to analyze and interpret torque development in DC motors, including armature torque, shaft torque, and torque characteristics.
3. To familiarize learners with different types of DC motors and their specific characteristics, as well as their applications in various industries.
4. To educate learners on the methods of starting and stopping DC motors, including direct starting, armature resistance starting, and various techniques for stopping the motor.
5. To equip learners with knowledge of speed control methods for DC motors, including field control, voltage control, and armature resistance control.
To introduce learners to testing procedures such as brake test, Swinburne's test, and temperature rise test, and enable them to evaluate motor performance and efficiency.

9. استراتيجيات التعليم والتعلم

The DC Motor Module can employ a variety of learning and teaching strategies to enhance understanding and engagement. Some suggested strategies include:

1. Lectures: Instructor-led lectures can provide an overview of key concepts, principles, and theories related to DC motors. This can serve as a foundation for further exploration.
2. Interactive Discussions: Engage learners in discussions to promote critical thinking and deeper understanding of the module topics. Encourage learners to ask questions, share their perspectives, and participate actively in group discussions.
3. Practical Demonstrations: Conduct practical demonstrations or laboratory sessions to illustrate the operation of DC motors, measurement techniques, and testing procedures. Hands-on activities can enhance understanding and provide real-world application experiences.
4. Simulations and Virtual Labs: Utilize interactive simulations or virtual laboratory environments to allow learners to experiment with DC motor operation, speed control, and performance evaluation. This can enhance their understanding of the concepts in a virtual environment.
5. Case Studies: Present case studies showcasing practical applications of DC motors in various industries. Analyze the motor requirements, challenges faced, and the solutions implemented. This will enable learners to connect theoretical knowledge to real-world scenarios.
6. Problem-solving Activities: Assign problem-solving activities related to DC motor operation, control, and performance. Encourage learners to apply their knowledge to solve complex problems, fostering critical thinking and problem-solving skills.
7. Group Projects: Divide learners into groups and assign them projects related to DC motors. This can involve designing motor control systems, optimizing motor performance, or developing innovative applications. This promotes teamwork, collaboration, and practical application of concepts.
8. Multimedia Resources: Utilize multimedia resources such as videos, animations, and interactive online modules to present complex concepts in an engaging and visual manner. This can enhance learner comprehension and retention.
9. Assessments: Include both formative and summative assessments to evaluate learner progress and understanding. This can include quizzes, assignments, practical demonstrations, and examinations.
10. Provide constructive feedback to help learners improve their understanding and performance.
Guest Speakers: Invite industry professionals or experts to deliver guest lectures on topics related to DC motors. This exposes learners to real-world experiences and industry perspectives.

10. بنية المقرر الدراسي					
الاسبوع	الساعات	مخرجات المتعلم المطلوبة	اسم الوحدات او الموضوع	طريقة التعلم	طريقة التقييم
Week 1	6	Introduction to the lab environment and safety guidelines. Familiarization with DC motor components and equipment.	Introduction to DC motors and their principles of operation. Back EMF equation and its significance.	حضوري	اختبارات يومي
Week 2	6	Experiment: Measurement of motor parameters (resistance, inductance, back EMF). Data analysis and interpretation.	Voltage equation of a DC motor and its applications Torque development in DC motors: armature torque and shaft torque.	حضوري	تقارير
Week 3	6	Experiment: Torque-speed characteristics of DC motors. Measurement and analysis of torque at different speeds.	Torque characteristics of DC motors and their analysis.	حضوري	واجبات
Week 4	6	Experiment: Starting methods for DC motors. Practical demonstration of direct starting and armature resistance starting.	Dynamic behavior of DC motors during acceleration, deceleration, and load changes.	حضوري	اختبارات يومي
Week 5	6	Experiment: Speed control methods for DC motors. Practical implementation of field control, voltage control, and armature resistance.	Types of DC motors and their characteristics: series, shunt, compound, permanent magnet.	حضوري	تقارير
Week 6	6	Experiment: Motor efficiency and losses. Calculation of motor efficiency and identification of different types of losses.	Losses in DC motors: iron losses, copper losses, mechanical losses. Calculation of motor efficiency and maximum power output.	حضوري	واجبات
Week 7	6	Experiment: Motor braking techniques. Implementation and analysis of electric braking, plugging, and rheostat braking.	DC motor starting methods: direct starting, armature resistance starting.	حضوري	اختبارات يومي
Week 8	6	Experiment: Testing procedures for DC motors. Practical application of brake test and Swinburne's test.	Three-point and four-point starters for DC motor starting. Reduced armature voltage starting techniques.	حضوري	تقارير
Week 9	6	Experiment: Temperature rise test. Measurement and evaluation of motor temperature rise.	Special methods of starting DC motors.	حضوري	واجبات

اختبارات يومي	حضوري	Stopping methods for DC motors: electric braking, plugging, rheostat braking.	Experiment: Hopkinson's test for motor efficiency. Calculation and analysis of motor efficiency at different loads.	6	Week 10
تقارير	حضوري	Regenerative braking and its benefits. Braking and mechanical time constant in DC motors.	Experiment: Solid-state devices in motor control. Practical implementation of electronic speed controllers and variable frequency drives.	6	Week 11
واجبات	حضوري	Speed control methods: field control, voltage control, armature resistance control.	Experiment: Motor starting and stopping methods. Application of different starting and stopping techniques.	6	Week 12
اختبارات يومي	حضوري	Introduction to solid-state devices in controlling DC motors.	Experiment: Speed control using solid-state devices. Hands-on experience with controlling motor speed using electronic devices.	6	Week 13
تقارير	حضوري	Testing procedures for DC motors: brake test, Swinburne's test.	Experiment: Motor control system design project. Group project to design a control system for a specific motor application.	6	Week 14
واجبات	حضوري	Temperature rise test and its significance. Hopkinson's test for motor efficiency evaluation.	Recap of lab experiments and review of key concepts. Lab examination or presentation of final projects.	6	Week 15

11. تقييم المقرر

As		Time/ Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	10% (10)	5, 10	LO #1, 2, 8 and 9
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	14	LO # 1-14
Summative assessment	**Midterm Exam**	2 hours	10% (10)	7	LO # 1-7
	Final Exam	3 hours	50% (50)	16	All
Total assessment			100% (100 Marks)		

12. مصادر التعلم والتدريس

A. Hughes and B. Drury, Electric Motors and Drives: Fundamentals, Types and Applications. Oxford, UK: Newnes, 2013.

B. S. Guru and H. R. Hiziroglu, Electric Machinery and Transformers. Hoboken, NJ: Wiley, 2001.

نموذج وصف المقرر

1. أسم المقرر الدراسي:
Electronic Circuits
2. رمز المقرر:
EET2202
3. الفصل / السنة:
الفصل الأول 2024-2025/ مسار بولونيا
4. تاريخ اعداد هذا الوصف:
2025/7/15
5. حضوري / عبر الانترنت:
حضوري
6. عدد الساعات الدراسية (الكلي)/ عدد الوحدات/ (الكلي):
5 ساعات / 125 وحدة اوربية
7. أسم مسؤول المقرر الدراسي (اذا كان هناك اكثر من اسم يذكر ايضا):
8. أهداف المقرر
The module aims : 1. To provide a comprehensive understanding of power devices, variable power supply, and voltage regulation, including the use of variable resistors, transistors, Darlington pairs, and integrated voltage regulators. 2. To introduce students to thyristors, diacs, and triacs, covering their structure, symbols, characteristics, and applications in dimmer circuits with protection and alarm systems. 3. To develop proficiency in silicon-controlled rectifier (SCR) applications, including load protection, circuit design, operation, and controlling lamp intensity, through practical circuit implementation and analysis. 4. To provide a comprehensive understanding of oscillators, covering their definition, conditions for oscillation, feedback types, frequency control, and various oscillator circuit examples. 5. To familiarize students with transistors as switches, multivibrators, multi-stage amplifiers, and different types of power amplifiers (Class A, Class B, Class AB, Class C, and Class D), including their operation principles and practical applications.
9. استراتيجيات التعليم والتعلم
The learning and teaching strategies for the module on Computer Principles and operating systems can include: 1. Lectures and Presentations: The instructor can deliver lectures and presentations to introduce and explain key concepts, theories, and principles related to computer fundamentals and operating systems. This can help students develop a foundational understanding of the subject matter. 2. Practical Demonstrations: Hands-on practical demonstrations can be conducted to illustrate the usage of different computer components, software applications, and operating system functionalities. This can enhance students' understanding of the practical aspects of computer systems. 3. Group Discussions and Collaborative Learning: Engaging students in group discussions and collaborative learning activities can promote active participation and deeper understanding. Students can discuss and analyze case studies, real-life examples, and scenarios related to computer fundamentals and operating systems. 4. Laboratory Exercises: Practical laboratory exercises can provide students with opportunities to apply their

knowledge and skills in a controlled environment. They can work on computer hardware, software installations, operating system configurations, and troubleshooting tasks, allowing them to gain practical experience.
5. Assignments and Projects: Assignments and projects can be assigned to students to encourage independent learning and critical thinking. They can involve research, analysis, problem-solving, and the application of concepts learned in the module. This can help students develop their skills and deepen their understanding.

10. بنية المقرر الدراسي

الاسبوع	الساعات	مخرجات المتعلم المطلوبة	اسم الوحدات او الموضوع	طريقة التعلم	طريقة التقييم
Week 1	5	Introduction to the lab environment and safety guidelines. Familiarization with DC motor components and equipment.	Power devices and variable power supply: Using variable resistors, using transistors with variable resistors, Using Darlington pair with variable resistors, comparing power devices using voltage regulation factor.	حضوري	اختبارات يومي
Week 2	5	Experiment: Measurement of motor parameters (resistance, inductance, back EMF). Data analysis and interpretation.	Voltage regulators: Integrated voltage regulator with three terminals, Reading the regulation voltage (positive, negative) and determining the current capacity, Connecting the regulator in a circuit, Variable voltage regulator types and their circuit connections.	حضوري	تقارير
Week 3	5	Experiment: Torque-speed characteristics of DC motors. Measurement and analysis of torque at different speeds.	Thyristors: Structure, properties, and symbol, Representation with two transistors, Quadruple-layer diode, Ideal latch: Circuit and operation (turn-on and turn-off).	حضوري	واجبات
Week 4	5	Experiment: Starting methods for DC motors. Practical demonstration of direct starting and armature resistance starting.	Diacs and Triacs: Structure, symbol, and characteristics, Applications in dimmer and light dimming with protection and alarm.	حضوري	اختبارات يومي
Week 5	5	Experiment: Speed control methods for DC motors. Practical implementation of field control, voltage control, and armature resistance.	Silicon-controlled rectifier (SCR) applications: Protection of loads from sudden voltage increases, Circuit design and operation, Using SCR to control lamp intensity, Practical circuit, equations, and waveforms, Design example.	حضوري	تقارير
Week 6	5	Experiment: Motor efficiency and losses. Calculation of motor efficiency and identification of different types of losses.	Op-Amp Fundamentals: Definition and Function of Op-Amps, Ideal Op-Amp Model and Characteristics, Op-Amp Open-Loop and Closed-Loop Configurations, Op-Amp Circuits and Configurations, Inverting Amplifiers, Non-	حضوري	واجبات

		Inverting Amplifiers, Summing Amplifiers, Difference Amplifiers, and Integrators and Differentiators.			
اختبارات يومي	حضوري	Oscillators: Definition and conditions for oscillation, Feedback and its types, drawing their diagrams, and finding the relevant mathematical relationships for system amplification (forward gain, feedback gain, feedback loop), Obtaining the start signal and controlling the frequency, How to reduce self-AB value, Examples of oscillator circuits (phase-shift oscillator, LC oscillator, Hartley oscillator, Colpitts oscillator, crystal oscillator), Crystal oscillator frequency and crystal stability range.	Experiment: Motor braking techniques. Implementation and analysis of electric braking, plugging, and rheostat braking.	5	Week 7
تقارير	حضوري	Transistors as switches: Operation specifications on the load line, Response to square input waveforms and transition times.	Experiment: Testing procedures for DC motors. Practical application of brake test and Swinburne's test.	5	Week 8
واجبات	حضوري	Multivibrators: Different types (monostable, astable, bistable), Mathematical relationships, Input and output waveforms, circuit diagrams, operation principles, Protection and overcoming possible distortions in output signals, Pulse width control, Calculating output pulse times and frequency.	Experiment: Temperature rise test. Measurement and evaluation of motor temperature rise.	5	Week 9
اختبارات يومي	حضوري	Multivibrators: Different types (monostable, astable, bistable), Mathematical relationships, Input and output waveforms, circuit diagrams, operation principles, Protection and overcoming possible distortions in output signals, Pulse width control, Calculating output pulse times and frequency.	Experiment: Hopkinson's test for motor efficiency. Calculation and analysis of motor efficiency at different loads.	5	Week 10
تقارير	حضوري	Multi-stage amplifiers and their connection methods at different frequencies: Connection in low-frequency components, Connection in mid-frequency components, Connection in high-frequency components.	Experiment: Solid-state devices in motor control. Practical implementation of electronic speed controllers and variable frequency	5	Week 11

			drives.		
واجبات	حضوري	Multi-stage amplifiers and their connection methods at different frequencies: Connection in low-frequency components, Connection in mid-frequency components, Connection in high-frequency components.	Experiment: Motor starting and stopping methods. Application of different starting and stopping techniques.	5	Week 12
اختبارات يومي	حضوري	Types of power amplifiers: Single-ended power amplifier (its features and drawbacks), Push-pull power amplifier (its features and drawbacks), Exercises and problem solving.	Experiment: Speed control using solid-state devices. Hands-on experience with controlling motor speed using electronic devices.	5	Week 13
تقارير	حضوري	Types of power amplifiers: Single-ended power amplifier (its features and drawbacks), Push-pull power amplifier (its features and drawbacks), Exercises and problem solving.	Experiment: Motor control system design project. Group project to design a control system for a specific motor application.	5	Week 14
واجبات	حضوري	Small Signal Amplifier , Hybrid Equivalent Model , Power Amplifiers, Class A Amplifier Class B Amplifier, Class AB, Class C&D	Recap of lab experiments and review of key concepts. Lab examination or presentation of final projects.	5	Week 15

11. تقييم المقرر

As		Time/ Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	10% (10)	5, 10	LO #1, 2, 8 and 9
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	14	LO # 1-14
Summative assessment	**Midterm Exam**	2 hours	10% (10)	7	LO # 1-7
	Final Exam	3 hours	50% (50)	16	All
Total assessment			100% (100 Marks)		

12. مصادر التعلم والتدريس

R. L. Boylestad and L. Nashelsky, "Electronic Devices and Circuit Theory," 11th ed. Upper Saddle River, NJ: Pearson, 2012.

A. Malvino and D. J. Bates, "Electronic Principles," 8th ed. New York, NY: McGraw-Hill, 2014.

نموذج وصف المقرر

1. أسم المقرر الدراسي:
Advanced Electrical Circuits Analysis
2. رمز المقرر:
EET2203
3. الفصل / السنة:
الفصل الأول 2024-2025/ مسار بولونيا
4. تاريخ اعداد هذا الوصف:
2025/7/15
5. حضوري / عبر الانترنت:
حضوري
6. عدد الساعات الدراسية (الكلي)/ عدد الوحدات/ (الكلي):
5 ساعات / 125 وحدة اوربية
7. أسم مسؤول المقرر الدراسي (اذا كان هناك اكثر من اسم يذكر ايضا):
8. أهداف المقرر

The aims of the Advanced Electrical Circuits Analysis module are to:

1. Develop a deeper understanding of three-phase circuits: The module aims to provide students with a comprehensive knowledge of three-phase circuits, including different connection configurations (wye-wye, delta-delta, wye-delta, delta-wye), and the ability to analyze both balanced and unbalanced systems.
2. Explore advanced circuit analysis techniques: The module aims to introduce students to advanced analysis techniques, such as the Laplace transform method. Students will learn how to apply the Laplace transform to analyze complex electrical circuits and solve differential equations.
3. Understand two-port networks and their parameters: The module aims to familiarize students with two-port networks and the various parameters used to describe them, including impedance, admittance, hybrid, and transmission parameters. Students will gain proficiency in analyzing and interconnecting two-port networks.
4. Study resonance phenomena in electrical circuits: The module aims to provide students with an understanding of resonance in electrical circuits. Students will learn about series resonance and parallel resonance, including the conditions, characteristics, and analysis techniques associated with each type of resonance.
5. Enhance problem-solving and analytical skills: Through the study of advanced electrical circuits and analysis techniques, the module aims to improve students' problem-solving abilities and enhance their analytical skills. Students will develop the capability to apply theoretical concepts to solve complex electrical circuit problems.

9. استراتيجيات التعليم والتعلم

The learning and teaching strategies for the module on Computer Principles and operating systems can include:

1. Lectures and Presentations: The instructor can deliver lectures and presentations to introduce and explain key concepts, theories, and principles related to computer fundamentals and operating systems. This can help students develop a foundational understanding of the subject matter.
2. Practical Demonstrations: Hands-on practical demonstrations can be conducted to illustrate the usage of different computer components, software applications, and operating system functionalities. This can enhance students' understanding of the practical aspects of computer systems.
3. Group Discussions and Collaborative Learning: Engaging students in group discussions and collaborative learning activities can promote active participation and deeper understanding. Students can discuss and analyze case studies, real-life examples, and scenarios related to computer fundamentals and operating systems.
4. Laboratory Exercises: Practical laboratory exercises can provide students with opportunities to apply their knowledge and skills in a controlled environment. They can work on computer hardware, software installations, operating system configurations, and troubleshooting tasks, allowing them to gain practical experience.
5. Assignments and Projects: Assignments and projects can be assigned to students to encourage independent learning and critical thinking. They can involve research, analysis, problem-solving, and the application of concepts learned in the module. This can help students develop their skills and deepen their understanding.

10. بنية المقرر الدراسي

الاسبوع	الساعات	مخرجات المتعلم المطلوبة	اسم الوحدات او الموضوع	طريقة التعلم	طريقة التقييم
Week 1	5	Introduction to Laboratory Safety and Equipment Familiarize students with laboratory safety protocols and equipment used in electrical circuit experiments. Demonstrate proper handling and usage of laboratory tools and instruments.	Three-phase circuits (wye-wye connections)	حضوري	اختبارات يومي
Week 2	5	Three-Phase Circuits Lab Perform experiments to analyze and measure three-phase circuits with different connection configurations (wye-wye, delta-delta, wye-delta, delta-wye). Measure voltages, currents, and power in three-phase circuits using appropriate instruments.	Three-phase circuits (delta-delta connections)	حضوري	تقارير
Week 3	5	Laplace Transform Lab Use simulation software to analyze electrical circuits using Laplace transform. Solve differential equations using Laplace transform and verify the results through simulation.	Three-phase circuits (wye-delta connections)	حضوري	واجبات
Week 4	5	Two-Port Networks Lab Measure impedance and admittance parameters of two-port networks using laboratory equipment. Analyze and compare measured parameters with theoretical	Three-phase circuits (delta-wye connections)	حضوري	اختبارات يومي

			calculations.		
تقارير	حضوري	Three-phase circuits (balanced systems)	Resonance Lab Construct and analyze series resonance circuits in the laboratory. Measure resonance frequencies, bandwidths, and quality factors of resonant circuits.	5	Week 5
واجبات	حضوري	Three-phase circuits (unbalanced systems)	Power Factor Correction Lab Design and implement power factor correction circuits in the laboratory. Measure power factor improvement and analyze the impact on power quality.	5	Week 6
اختبارات يومي	حضوري	Advanced circuit analysis using Laplace transform	Harmonic Analysis Lab Perform experiments to analyze harmonic distortions in electrical systems. Measure harmonic components and evaluate harmonic mitigation techniques.	5	Week 7
تقارير	حضوري	Two-port networks (impedance parameters)	Stability Analysis Lab Analyze stability of electrical networks through laboratory experiments. Investigate the effects of parameter variations on the stability of the system.	5	Week 8
واجبات	حضوري	Two-port networks (admittance parameters) Two-port networks (hybrid parameters)	Transient Analysis Lab Study the transient response of electrical circuits through laboratory experiments. Observe and measure transient phenomena, such as rise time, settling time, and overshoot.	5	Week 9
اختبارات يومي	حضوري	Multivibrators: Different types (monostable, astable, bistable), Mathematical relationships, Input and output waveforms, circuit diagrams, operation principles, Protection and overcoming possible distortions in output signals, Pulse width control, Calculating output pulse times and	Frequency-Domain Analysis Lab Use Fourier transform techniques to analyze the frequency response of electrical circuits. Measure frequency response characteristics, such as gain and phase shift.	5	Week 10

		frequency.			
تقارير	حضوري	Two-port networks (transmission parameters) Two-port networks (relationships between parameters)	Simulation Software Lab Familiarize students with circuit simulation software (e.g., SPICE). Perform circuit simulations to validate theoretical analysis and compare results.	5	Week 11
واجبات	حضوري	Multi-stage amplifiers and their connection methods at different frequencies: Connection in low-frequency components, Connection in mid-frequency components, Connection in high-frequency components.	Case Study Analysis Lab Analyze real-world case studies related to advanced circuit analysis. Apply theoretical concepts to solve practical problems and interpret the results.	5	Week 12
اختبارات يومي	حضوري	Two-port networks (interconnection between networks) Resonance (Series resonance)	Student-Designed Experiments Allow students to propose and design their own experiments related to advanced circuit analysis. Encourage creativity, critical thinking, and problem-solving skills.	5	Week 13
تقارير	حضوري	Types of power amplifiers: Single-ended power amplifier (its features and drawbacks), Push-pull power amplifier (its features and drawbacks), Exercises and problem solving.	Data Analysis and Report Writing Analyze data collected from experiments and simulations. Prepare formal laboratory reports summarizing the experimental procedures, results, and conclusions.	5	Week 14
واجبات	حضوري	Resonance (Parallel resonance)	Revision and Recap Review key concepts, techniques, and experiments covered throughout the module. Address any remaining questions or concerns before the final assessment.	5	Week 15

11. تقييم المقرر

As		Time/ Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	10% (10)	5, 10	LO #1, 2, 8 and 9
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Projects / Lab.	14	10% (10)	Continuous	All

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

12. مصادر التعلم والتدريس

Book Reference: J. W. Nilsson and S. A. Riedel, Electric Circuits. Boston, MA: Pearson, 2020.

Book Reference: W. H. Hayt Jr., J. E. Kemmerly, and S. M. Durbin, Engineering Circuit Analysis. New York, NY: McGraw-Hill, 2017.

نموذج وصف المقرر

1. أسم المقرر الدراسي:
Instruments and Measurements
2. رمز المقرر:
EET2204
3. الفصل / السنة:
الفصل الأول 2024-2025/ مسار بولونيا
4. تاريخ اعداد هذا الوصف:
2025/7/15
5. حضوري / عبر الانترنت:
حضوري
6. عدد الساعات الدراسية (الكلي)/ عدد الوحدات/ (الكلي):
6 ساعات / 150 وحدة اوربية
7. أسم مسؤول المقرر الدراسي (اذا كان هناك اكثر من اسم يذكر ايضا):
8. أهداف المقرر
The aims of the Instruments and Measurements module are: 1. To provide students with a comprehensive understanding of measurement systems and the principles of measurement, including accuracy, precision, resolution, and sensitivity. 2. To familiarize students with different systems of units, particularly the International System of Units (SI), electrical standards, and time and frequency standards. 3. To introduce students to various types of measuring instruments and their construction, operation, calibration, and applications. 4. To enable students to design and calculate multi-range DC voltmeters and ammeters, considering factors such as range selection, shunt resistors, and calibration techniques. 5. To introduce students to rectifier-type instruments used for measuring AC quantities and the design considerations for multi-range AC voltmeters and ammeters. 6. To enable students to design and calculate series-type and shunt-type ohmmeters, considering factors such as sensitivity and loading effects. 7. To introduce students to transducers and their role in converting physical quantities to electrical signals, and to familiarize them with different types of transducers and their applications. 8. To provide practical experience to students through exercises, calculations, and laboratory experiments, allowing them to apply theoretical concepts, develop practical skills, and gain hands-on experience with measuring instruments. 9. To equip students with the knowledge and skills to effectively use and troubleshoot a variety of measuring instruments in engineering and scientific fields.
9. استراتيجيات التعليم والتعلم
The Instruments and Measurements module can be effectively taught using a combination of learning and teaching

strategies that cater to both theoretical understanding and practical application. Here are some common strategies that can be employed:

1. Lectures: Traditional lectures can be used to introduce and explain theoretical concepts, principles, and mathematical calculations related to measurement systems, instrument design, and calibration techniques. Lectures can provide a structured approach to deliver foundational knowledge to students.
2. Interactive Discussions: Engaging students in interactive discussions can foster active learning and deeper understanding. Instructors can encourage students to ask questions, participate in group discussions, and share their insights and experiences related to measurement instruments and techniques. This strategy promotes critical thinking and helps students connect theoretical concepts with real-world applications.
3. Laboratory Experiments: Hands-on laboratory experiments are essential to provide students with practical experience in using measuring instruments and performing measurements. Instructors can design lab sessions where students can apply theoretical knowledge, calibrate instruments, conduct experiments, analyze data, and interpret results. This practical experience enhances understanding and reinforces theoretical concepts.
4. Case Studies: Presenting case studies or real-world examples of measurement systems and instruments can help students understand the practical applications and challenges associated with different measuring techniques. Students can analyze and discuss the design considerations, limitations, and troubleshooting methods related to these case studies.
5. Group Projects: Assigning group projects related to measurement systems or instrument design can promote collaborative learning and problem-solving skills. Students can work in teams to design and construct measurement systems, analyze requirements, select appropriate instruments, and present their findings. This strategy encourages teamwork, research skills, and the application of theoretical knowledge in practical scenarios.
6. Simulations and Virtual Laboratories: The use of computer-based simulations and virtual laboratories can provide additional opportunities for students to explore measurement techniques and instrument behavior in a controlled virtual environment. These tools can simulate different measurement scenarios, allow students to adjust parameters, and observe the outcomes. Simulations can enhance conceptual understanding and provide a platform for experimentation in a safe and cost-effective manner.
7. Formative Assessments: Regular formative assessments, such as quizzes, assignments, or short tests, can be used to assess students' understanding of the theoretical concepts, mathematical calculations, and practical applications covered in the module. These assessments provide timely feedback to students and help instructors identify areas where students may need additional support.
8. Individual Study and Research: Encouraging students to engage in individual study and research allows them to explore measurement-related topics in depth. Assigning relevant readings, research papers, or online resources can enhance students' understanding and expose them to current advancements and emerging trends in measurement systems and instruments.

10. بنية المقرر الدراسي

الاسبوع	الساعات	مخرجات المتعلم المطلوبة	اسم الوحدات او الموضوع	طريقة التعلم	طريقة التقييم
Week 1	6	Introduction to Laboratory Equipment and Safety Introduction to the laboratory environment, equipment, and safety protocols. Familiarization with basic measurement instruments	Introduction to Measurement Systems Systems of units: SI system, electrical standards, time and frequency standards. Principles of measurement: accuracy, precision, resolution, sensitivity.	حضوري	اختبارات يومي

		Sources of measurement errors and techniques for minimizing errors.	and their functions.		
تقارير	حضوري	PMMC-Based Measuring Instruments Construction and operation of PMMC-based measuring instruments. Calibration techniques for PMMC-based instruments. Applications of galvanometers in measuring electrical quantities.	Calibration Techniques and Measurement Uncertainty Hands-on calibration exercises for basic measuring instruments. Calculation and estimation of measurement uncertainty.	6	Week 2
واجبات	حضوري	Design of DC Voltmeters and Ammeters Design principles for multi-range DC voltmeters and ammeters. Range selection and sensitivity considerations. Calculation of shunt resistors and multiplier resistors.	PMMC-Based Measuring Instruments Construction and operation of PMMC-based measuring instruments, such as galvanometers. Calibration and verification of PMMC-based instruments.	6	Week 3
اختبارات يومي	حضوري	Rectifier-Type Instruments for AC Measurements Design considerations for multi-range AC voltmeters and ammeters. Rectification techniques for measuring AC quantities. Rectifier circuit design and calibration procedures.	Design and Calibration of DC Voltmeters and Ammeters Design and construction of multi-range DC voltmeters and ammeters. Calibration of DC instruments using reference standards.	6	Week 4
تقارير	حضوري	Design of Ohmmeters Design and calculation of series-type ohmmeters. Sensitivity and loading effects in ohmmeter design. Design and calculation of shunt-type ohmmeters.	Design and Calibration of AC Voltmeters and Ammeters Design and construction of multi-range AC voltmeters and ammeters. Calibration of AC instruments using reference standards.	6	Week 5
واجبات	حضوري	Transducers Introduction to transducers and their role in converting physical quantities to electrical signals. Types of transducers and their applications in measurement systems.	Design and Calibration of Ohmmeters Design and construction of series-type and shunt-type ohmmeters. Calibration and sensitivity adjustment of ohmmeters.	6	Week 6
اختبارات يومي	حضوري	Calibration of Instruments Calibration procedures for DC instruments, including voltmeters, ammeters, and ohmmeters. Importance of calibration	Transducers and Signal Conditioning Investigation of different transducer types and their characteristics. Signal conditioning	6	Week 7

		and traceability in measurement systems.	techniques for transducer measurements.		
تقارير	حضوري	Practical Experience and Laboratory Experiments (Part 1) Hands-on laboratory experiments focusing on PMMC-based instruments, DC voltmeters, and ammeters. Calibration techniques and verification of measurement accuracy.	Data Acquisition and Analysis Introduction to data acquisition systems and sensors. Data acquisition, analysis, and visualization using software tools.	6	Week 8
واجبات	حضوري	Practical Experience and Laboratory Experiments (Part 2) Hands-on laboratory experiments focusing on AC voltmeters, ammeters, and ohmmeters. Troubleshooting techniques and analysis of measurement errors.	Measurement System Design Design and implementation of measurement systems for specific applications. Consideration of factors such as accuracy, range, and signal conditioning.	6	Week 9
اختبارات يومي	حضوري	Practical Experience and Laboratory Experiments (Part 3) Hands-on laboratory experiments focusing on transducers and their applications. Data acquisition, analysis, and presentation using appropriate software tools.	Troubleshooting and Error Analysis Troubleshooting common measurement issues and errors. Techniques for error analysis and measurement verification.	6	Week 10
تقارير	حضوري	Case Studies Analysis of real-world measurement systems and instruments. Design considerations, limitations, and troubleshooting methods.	Advanced Measurement Techniques Exploration of advanced measurement techniques, such as frequency measurement and waveform analysis. Hands-on exercises using specialized instruments and equipment.	6	Week 11
واجبات	حضوري	Group Projects Group projects related to measurement system design or instrument selection. Research, analysis, and presentation of findings.	Transducer Calibration and Characterization Calibration and characterization of specific transducers (e.g., temperature, pressure, strain). Use of reference standards and calibration techniques.	6	Week 12

اختبارات يومي	حضوري	Simulations and Virtual Laboratories Computer-based simulations and virtual experiments to explore measurement techniques and instrument behavior.	Virtual Instrumentation and Automation Introduction to virtual instrumentation and software-based measurement systems. Implementation of automated measurement setups using software tools.	6	Week 13
تقارير	حضوري	Review and Revision Recap of key concepts, principles, and calculations. Review of practical skills and troubleshooting techniques.	Project Work Individual or group projects involving the design, implementation, and validation of measurement systems for specific applications. Presentation and demonstration of project outcomes.	6	Week 14
واجبات	حضوري	Final Assessments and Feedback Summative assessments, such as exams or projects. Feedback and discussion on individual performance and areas for improvement.	Review and Conclusion Recap of key laboratory techniques and concepts. Final assessments, feedback, and discussion on individual performance.	6	Week 15

11. تقييم المقرر

As		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5, 10	LO #1, 2, 8 and 9
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	14	LO # 1-14
Summative assessment	Midterm Exam	2 hours	10% (10)	7	LO # 1-7
	Final Exam	3 hours	50% (50)	16	All
Total assessment			100% (100 Marks)		

12. مصادر التعلم والتدريس

J. P. Bentley, "Principles of Measurement Systems," 4th ed. New York, NY: Prentice Hall, 2005.

A. K. Sawhney, "Electrical and Electronic Measurement and Instrumentation," 2nd ed. New Delhi, India: Dhanpat Rai & Co., 1998.

نموذج وصف المقرر

1. أسم المقرر الدراسي:
Engineering Analysis
2. رمز المقرر:
EET2205
3. الفصل / السنة:
الفصل الأول 2024-2025/ مسار بولونيا
4. تاريخ اعداد هذا الوصف:
2025/7/15
5. حضوري / عبر الانترنت:
حضوري
6. عدد الساعات الدراسية (الكلي)/ عدد الوحدات/ (الكلي):
6 ساعات / 150 وحدة اوربية
7. أسم مسؤول المقرر الدراسي (اذا كان هناك اكثر من اسم يذكر ايضا):
8. أهداف المقرر
The aims of the Engineering Analysis module can be summarized as follows: 1. To develop a deep understanding of ordinary differential equations, Fourier series, Laplace transforms, linear algebraic systems, and Z-transforms in the context of engineering. 2. To equip students with the necessary mathematical tools and techniques to analyze and solve engineering problems. 3. To foster critical thinking and problem-solving skills by applying mathematical methods to engineering scenarios. 4. To promote the use of numerical methods and computational tools for efficient engineering analysis. 5. To enable students to apply their knowledge and skills to real-world engineering applications, particularly in the field of electrical engineering.
9. استراتيجيات التعليم والتعلم
The Engineering Analysis module can employ various learning and teaching strategies to effectively deliver the content and achieve the intended learning outcomes. Some strategies that can be utilized include: 1. Lectures: Traditional lectures can be used to present theoretical concepts, derivations, and explanations of mathematical techniques. Lectures can provide a structured overview of the topics and

serve as a foundation for further learning.

2. Interactive Discussions: Encouraging interactive discussions during lectures or dedicated tutorial sessions can enhance understanding and engage students actively. This can involve asking questions, solving problems together, and facilitating student participation.

3. Problem-Solving Sessions: Dedicated problem-solving sessions can be conducted where students work on engineering analysis problems individually or in groups. This allows them to apply the mathematical techniques learned to solve real-world engineering problems, fostering critical thinking and problem-solving skills.

4. Practical Exercises: Incorporating practical exercises, either in a laboratory or computer-based setting, provides hands-on experience with numerical methods and computational tools. Students can implement algorithms, simulate systems, and analyze data, reinforcing their understanding of the concepts and their practical applications.

5. Case Studies: Presenting case studies or real-world engineering examples that require the application of engineering analysis techniques can help students connect theoretical concepts to practical scenarios. Analyzing and solving these case studies can enhance their problem-solving skills and illustrate the relevance of the module to real-world engineering challenges.

6. Tutorial Sessions: Regular tutorial sessions can be held to review and clarify concepts, work through problem sets, and provide individualized assistance to students. Tutorials offer opportunities for students to seek clarification, address specific difficulties, and reinforce their understanding of the material.

7. Computer-Based Tools: Utilizing computer software and tools specific to engineering analysis (such as MATLAB, Mathematica, or numerical analysis packages) allows students to perform complex calculations, visualize results, and explore numerical methods efficiently. Integrating these tools into coursework enhances computational skills and facilitates data analysis.

8. Self-Directed Learning: Encouraging students to engage in self-directed learning by providing recommended readings, online resources, and practice problems enables them to deepen their understanding independently. This approach promotes independent thinking, research skills, and self-motivation.

9. Assessments: Designing a variety of assessments, including assignments, quizzes, tests, and projects, ensures that students can demonstrate their understanding and application of the learned concepts. Assessments can include both theoretical questions and practical problem-solving tasks, providing a comprehensive evaluation of student learning.

10. Guest Lectures or Industry Experts: Inviting guest lecturers or industry experts who have practical experience in applying engineering analysis techniques can provide valuable insights and real-world perspectives. Their expertise can help students understand the relevance of the module to professional practice.

These strategies can be combined and tailored to the specific needs and context of the module, the institution, and the students. Employing a mix of teaching approaches promotes active learning, critical thinking, and the acquisition of practical skills in engineering analysis.

10. بنية المقرر الدراسي

الاسبوع	الساعات	مخرجات المتعلم المطلوبة	اسم الوحدات او الموضوع	طريقة التعلم	طريقة التقييم
Week 1	5	Introduction to the module and overview of engineering analysis techniques. Revision of first-order simultaneous differential equations.	Introduction to the module and overview of engineering analysis techniques. Revision of first-order simultaneous differential equations.	حضوري	اختبارات يومي

تقارير	حضوري	Revision of second-order simultaneous differential equations. Fourier series for periodic functions of period 2π.	Revision of second-order simultaneous differential equations. Fourier series for periodic functions of period 2π.	5	Week 2
واجبات	حضوري	Fourier series for non-periodic functions over a range of 2. Even and odd functions and half-range Fourier series.	Fourier series for non-periodic functions over a range of 2. Even and odd functions and half-range Fourier series.	5	Week 3
اختبارات يومي	حضوري	Fourier series over any range. Numerical methods of harmonic analysis.	Fourier series over any range. Numerical methods of harmonic analysis.	5	Week 4
تقارير	حضوري	Complex or exponential form of a Fourier series. Review and practice exercises.	Complex or exponential form of a Fourier series. Review and practice exercises.	5	Week 5
واجبات	حضوري	Introduction to Laplace transforms. Properties of Laplace transforms.	Introduction to Laplace transforms. Properties of Laplace transforms.	5	Week 6
اختبارات يومي	حضوري	Laplace transform of functions. Initial and final value theorems.	Laplace transform of functions. Initial and final value theorems.	5	Week 7
تقارير	حضوري	Inverse Laplace transform. Inverse Laplace transform using partial fractions.	Inverse Laplace transform. Inverse Laplace transform using partial fractions.	5	Week 8
واجبات	حضوري	Solution of differential equations using Laplace transforms. Solution of simultaneous differential equations using Laplace transforms.	Solution of differential equations using Laplace transforms. Solution of simultaneous differential equations using Laplace transforms.	5	Week 9
اختبارات يومي	حضوري	Application of Laplace transforms in the electrical engineering field. Review and practice exercises.	Application of Laplace transforms in the electrical engineering field. Review and practice exercises.	5	Week 10
تقارير	حضوري	Direct methods for solving linear algebraic systems: Matrix operations and the matrix inverse.	Direct methods for solving linear algebraic systems: Matrix operations and the matrix inverse.	5	Week 11
واجبات	حضوري	Gaussian elimination and pivoting. Backward error analysis and conditioning.	Gaussian elimination and pivoting. Backward error analysis and conditioning.	5	Week 12
اختبارات يومي	حضوري	Indirect methods for solving linear algebraic systems: Jacob's method and Gauss-	Indirect methods for solving linear algebraic systems: Jacob's method and Gauss-	5	Week 13

		Seidel method.	Seidel method.		
تقارير	حضوري	Z-transform: Region of convergence and properties. Z-transform pairs.	Z-transform: Region of convergence and properties. Z-transform pairs.	5	Week 14
واجبات	حضوري	Inverse Z-transform and analysis of discrete-time systems. Application of Z-transforms in engineering analysis. Review, revision, and preparation for the final assessment.	Inverse Z-transform and analysis of discrete-time systems. Application of Z-transforms in engineering analysis. Review, revision, and preparation for the final assessment.	5	Week 15

11. تقييم المقرر

As		Time/ Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	10% (10)	5, 10	LO #1, 2, 8 and 9
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Projects / Lab.				
	Report	1	10% (10)	14	LO # 1-14
Summative assessment	**Midterm Exam**	2 hours	20% (10)	7	LO # 1-7
	Final Exam	3 hours	50% (50)	16	All
Total assessment			100% (100 Marks)		

12. مصادر التعلم والتدريس

E. Kreyszig, "Advanced Engineering Mathematics," Wiley, 10th ed., 2011.

S. C. Chapra and R. P. Canale, "Numerical Methods for Engineers," McGraw-Hill Education, 7th ed., 2014.

نموذج وصف المقرر

1. أسم المقرر الدراسي:
English Language (Intermediate)
2. رمز المقرر:
MTU1003
3. الفصل / السنة:
الفصل الأول 2024-2025/ مسار بولونيا
4. تاريخ اعداد هذا الوصف:
2025/7/15
5. حضوري / عبر الانترنت:
حضوري
6. عدد الساعات الدراسية (الكلي)/ عدد الوحدات/ (الكلي):
2 ساعات / 50 وحدة اوربية
7. أسم مسؤول المقرر الدراسي (اذا كان هناك اكثر من اسم يذكر ايضا):
8. أهداف المقرر
The module aims of English Language (Intermediate) are designed to help learners at the beginner level develop their English language skills and achieve specific learning objectives. While I don't have access to the specific module aims of this coursebook, I can provide you with a general outline of the typical aims for a beginner-level English course: 1. To introduce beginner-level learners to the English language, focusing on building vocabulary and acquiring essential language structures. 2. To develop listening and speaking skills through interactive activities and engaging in basic conversational practice. 3. To enhance reading comprehension abilities by introducing simple texts and emphasizing vocabulary and sentence structures. 4. To provide foundational writing skills, including sentence formation, paragraph writing, and completing basic forms. 5. To cultivate cultural awareness and equip learners with practical language skills for everyday situations, such as ordering food, shopping, and asking for directions.
9. استراتيجيات التعليم والتعلم
The learning and teaching strategies for the English Language (Beginner) module may include: 1. Interactive Language Practice: Engage learners in communicative activities that promote active participation and language practice. This can include pair work, group discussions, role-plays, and language games. 2. Authentic Materials: Incorporate authentic materials such as videos, audio recordings, and reading texts that reflect real-life language use. This helps learners develop their listening, speaking, reading, and writing skills in authentic contexts. 3. Task-Based Learning: Design tasks and projects that require learners to use the target language to

accomplish specific goals or solve problems. This promotes meaningful language use and encourages critical thinking and problem-solving skills.

4. Visual Aids and Multimedia: Utilize visual aids, charts, diagrams, and multimedia resources to support language learning and comprehension. Visuals can enhance understanding, aid in vocabulary acquisition, and provide context for language use.

5. Error Correction and Feedback: Provide timely and constructive feedback on learners' language production to help them identify and correct errors. Encourage self-correction and peer correction to foster a supportive learning environment.

10. بنية المقرر الدراسي

الاسبوع	الساعات	مخرجات المتعلم المطلوبة	اسم الوحدات او الموضوع	طريقة التعلم	طريقة التقييم
Week 1	2	Famous couples.	Famous couples.	حضوري	اختبارات يومي
Week 2	2	Do’s and Don’ts.	Do’s and Don’ts.	حضوري	تقارير
Week 3	2	Going places.	Going places.	حضوري	واجبات
Week 4	2	Scared to death.	Scared to death.	حضوري	اختبارات يومي
Week 5	2	Things that changed the world.	Things that changed the world.	حضوري	تقارير
Week 6	2	Dreams and reality.	Dreams and reality.	حضوري	واجبات
Week 7	2	Earning a living.	Earning a living.	حضوري	اختبارات يومي
Week 8	2	Love you and leave you.	Love you and leave you.	حضوري	تقارير
Week 9	2	it's a wonderful world!	it's a wonderful world!	حضوري	واجبات
Week 10	2	Get happy.	Get happy.	حضوري	اختبارات يومي
Week 11	2	Telling tales.	Telling tales.	حضوري	تقارير

واجبات	حضوري	Doing the right thing.	Doing the right thing.	2	Week 12
اختبارات يومي	حضوري	on the move.	on the move.	2	Week 13
تقارير	حضوري	l just love.	l just love.	2	Week 14
واجبات	حضوري	The world of work.	The world of work.	2	Week 15

11. تقييم المقرر

As		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5, 10	LO #1, 2, 8 and 7
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Projects / Lab.				
	Report	1	10% (10)	14	LO # 1-7
Summative assessment	Midterm Exam	2 hours	20% (10)	7	LO # 1-4
	Final Exam	3 hours	50% (50)	16	All
Total assessment			100% (100 Marks)		

12. مصادر التعلم والتدريس

Soars, J., Soars, L. (2006). New Headway Plus: Pre-intermediate. United Kingdom: Oxford University Press.

Audio CDs or Online Audio: Recordings of listening exercises, dialogues, and pronunciation practice.

نموذج وصف المقرر

1. أسم المقرر الدراسي:
Principles of Power Engineering
2. رمز المقرر:
EET3101
3. الفصل / السنة:
الفصل الأول 2024-2025/ مسار بولونيا
4. تاريخ اعداد هذا الوصف:
2025/7/16
5. حضوري / عبر الانترنت:
حضوري
6. عدد الساعات الدراسية (الكلي)/ عدد الوحدات/ (الكلي):
7 ساعات / 175 وحدة اوربية
7. أسم مسؤول المقرر الدراسي (اذا كان هناك اكثر من اسم يذكر ايضا):
8. أهداف المقرر
The aims of the Principles of Power Engineering module are to: 1. Provide an understanding of the basic structure and components of a power system: The module aims to familiarize students with the key elements of a power system, including generators, transformers, transmission lines, and distribution networks. Students will gain knowledge about the functions and interconnections of these components within the overall power system. 2. Develop knowledge of overhead line insulators and their role in power transmission: Students will learn about the different types of insulators used in overhead power lines and their characteristics. They will understand the importance of insulators in maintaining electrical insulation and preventing current leakage, ensuring safe and reliable power transmission. 3. Explain the phenomenon of corona discharge and its implications: The module aims to provide an understanding of corona discharge, including its causes and effects on power transmission. Students will learn about the impact of corona on power loss, radio interference, and equipment reliability. They will also explore mitigation techniques to minimize corona effects. 4. Understand sag in overhead lines and its significance: Students will gain knowledge about sag, which refers to the vertical displacement of overhead line conductors. They will learn about the factors influencing sag and its implications for line clearance, mechanical stress, and electrical performance. The module aims to develop skills in calculating and managing sag for optimal line operation. 5. Explore line inductance and capacitance in power transmission: Students will gain an understanding of the concepts of line inductance and capacitance. They will learn about the calculation methods for determining inductance and capacitance in transmission lines and their effects on voltage regulation, power transfer capability, and system stability. 6. Discuss different types of transmission lines based on length: The module aims to introduce students to short, medium, and long transmission lines and their characteristics. Students will

understand the design considerations, performance parameters, and challenges associated with each type of transmission line.

9. استراتيجيات التعليم والتعلم

1. Lectures: Traditional lectures can be used to deliver theoretical concepts, provide an overview of key topics, and present complex information. Lectures can be enhanced with visual aids, multimedia presentations, and real-life examples to promote active learning.
2. Practical Demonstrations: Hands-on practical demonstrations and experiments can be conducted to illustrate the principles of power engineering. This can include laboratory sessions where students can work with power equipment, conduct measurements, and observe the behavior of power systems under different conditions.
3. Case Studies: Case studies can be utilized to apply theoretical knowledge to real-world scenarios. Students can analyze and solve practical problems related to power system design, operation, and optimization. Case studies can also provide insights into industry practices and challenges.
4. Group Projects: Group projects can encourage collaboration and teamwork. Students can work together to tackle complex power engineering problems, such as designing a transmission line or analyzing the performance of a power system. This strategy promotes critical thinking, problem-solving skills, and communication within a team.
5. Computer Simulations: Computer simulations and modeling software can be used to simulate power system behavior and analyze various scenarios. Students can use these tools to perform load flow analysis,
6. voltage regulation, and stability studies. Simulations provide a hands-on experience and enable students to observe the impact of different parameters on power system performance.

10. بنية المقرر الدراسي

الاسبوع	الساعات	مخرجات المتعلم المطلوبة	اسم الوحدات او الموضوع	طريقة التعلم	طريقة التقييم
Week 1	7	Introduction to Power System Laboratory. Safety protocols and laboratory guidelines. Introduction to laboratory equipment and tools. Familiarization with measurement instruments.	Introduction to Power Systems. Basic structure and components of a power system. Power generation, transmission, and distribution. Importance of reliable and efficient power systems.	حضوري	اختبارات يومي
Week 2	7	Overhead Line Insulators Laboratory. Testing and characterization of different types of insulators. Measurement of insulation resistance. Practical demonstrations of insulator stringing techniques.	Overhead Line Insulators. Types and materials of insulators. Insulator characteristics and selection criteria. Insulator stringing and electrical insulation principles.	حضوري	تقارير
Week 3	7	Corona Discharge Laboratory. Observation and measurement of corona discharge phenomena. Corona detection methods and equipment. Evaluation of corona mitigation techniques.	Corona Discharge. Causes and effects of corona discharge. Factors influencing corona formation. Mitigation techniques and corona control measures.	حضوري	واجبات

اختبارات يومي	حضوري	Sag in Overhead Lines. Factors affecting sag in power lines. Sag calculation methods. Sag monitoring and maintenance practices.	Sag in Overhead Lines Laboratory. Measurement of sag in overhead lines using various methods. Calculation of sag under different load and temperature conditions. Practical exercises on sag correction and maintenance.	7	Week 4
تقارير	حضوري	Line Inductance. Concept of line inductance and its significance. Calculation methods for line inductance. Impact of line inductance on power flow and system stability.	Line Parameters Measurement Laboratory. Measurement of line inductance using different techniques. Calculation of line inductance based on measured data. Measurement of line capacitance and calculation of charging current.	7	Week 5
واجبات	حضوري	Line Capacitance. Understanding line capacitance and its effects. Calculation methods for line capacitance. Influence of line capacitance on line charging current, power factor, and transient behavior.	Short Transmission Lines Laboratory. Analysis of transmission line characteristics through practical experiments. Measurement of line impedance and admittance. Evaluation of transmission line performance parameters.	7	Week 6
اختبارات يومي	حضوري	Short Transmission Lines. Characteristics and design considerations of short transmission lines. Performance parameters and challenges of short transmission lines.	Medium Transmission Lines Laboratory. Simulation and analysis of medium transmission line models using software tools. Study of transmission line parameters and performance under different load conditions. Practical exercises on line impedance matching and impedance transformation.	7	Week 7
تقارير	حضوري	Medium Transmission Lines. Characteristics and design considerations of medium transmission lines. Performance parameters and challenges of medium transmission lines.	Long Transmission Lines Laboratory. Investigation of the behavior of long transmission lines using simulation software. Analysis of power transfer capabilities and voltage regulation in long lines. Practical exercises on the design and optimization of long transmission lines.	7	Week 8

واجبات	حضوري	Long Transmission Lines. Characteristics and design considerations of long transmission lines. Performance parameters and challenges of long transmission lines.	Power System Simulation Laboratory. Introduction to power system simulation software. Load flow analysis and voltage regulation using simulation tools. Stability analysis and transient response simulation.	7	Week 9
اختبارات يومي	حضوري	Power System Analysis - Load Flow Analysis. Introduction to load flow analysis. Voltage regulation and power factor correction. Load flow calculation methods and software tools.	Protection and Control Laboratory. Study of protective relays and their applications in power systems. Testing and calibration of protective relays. Hands-on exercises on power system control and monitoring.	7	Week 10
تقارير	حضوري	Power System Analysis - Stability Analysis. Introduction to stability analysis. Transient stability and steady-state stability. Stability assessment and control techniques.	Renewable Energy Integration Laboratory. Analysis of renewable energy generation systems. Simulation of renewable energy integration in power systems. Evaluation of control strategies for optimal renewable energy utilization.	7	Week 11
واجبات	حضوري	Power Flow Control and Optimization. Reactive power control methods. Optimal power flow analysis and optimization techniques. Voltage stability and control strategies.	Smart Grids and Advanced Control Laboratory. Introduction to smart grid technologies and components. Implementation and testing of advanced control algorithms in power systems. Study of communication protocols and data management in smart grids.	7	Week 12
اختبارات يومي	حضوري	Renewable Energy Integration. Integration of renewable energy sources into power systems. Challenges and opportunities in renewable energy integration. Power system planning and operation with renewable energy.	Power System Stability Laboratory. Investigation of power system stability using simulation software. Analysis of transient stability and voltage stability. Evaluation of stability enhancement techniques and control strategies.	7	Week 13
تقارير	حضوري	Emerging Technologies and Future Trends. Overview of emerging technologies in power	Fault Analysis and Protection Laboratory. Study of fault detection, localization, and clearing in	7	Week 14

		engineering. Smart grids and advanced power system control and monitoring. Power system resilience and cybersecurity considerations.	power systems. Simulation of fault scenarios and analysis of protection schemes. Testing and calibration of protective devices for fault management.		
واجبات	حضوري	Review and Case Studies. Review of key concepts and topics covered. Discussion of case studies and real-world applications.	Review and Project Presentations. Review of laboratory experiments and concepts covered throughout the module. Group project presentations on selected power engineering topics. Discussion and reflection on the laboratory experience.	7	Week 15

11. تقييم المقرر

As		Time/ Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5, 10	LO #1, 2, 8 and 9
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Projects / Lab.	14	10% (10)	Continuous	All
	Report	14	10% (10)	14	LO # 1-14
Summative assessment	Midterm Exam	2 hours	10% (10)	7	LO # 1-7
	Final Exam	3 hours	50% (50)	16	All
Total assessment			100% (100 Marks)		

12. مصادر التعلم والتدريس

J. D. Glover, M. S. Sarma, and T. J. Overbye, "Power System Analysis and Design," 6th ed., Boston, MA: Cengage Learning, 2017.

A. von Meier, "Electric Power Systems: A Conceptual Introduction," Hoboken, NJ: Wiley, 2006.

نموذج وصف المقرر

1. أسم المقرر الدراسي:
DC Power Conversions
2. رمز المقرر:
EET3102
3. الفصل / السنة:
الفصل الأول 2024-2025/ مسار بولونيا
4. تاريخ اعداد هذا الوصف:
2025/7/16
5. حضوري / عبر الانترنت:
حضوري
6. عدد الساعات الدراسية (الكلي)/ عدد الوحدات/ (الكلي):
6 ساعات / 150 وحدة اوربية
7. أسم مسؤول المقرر الدراسي (اذا كان هناك اكثر من اسم يذكر ايضا):
8. أهداف المقرر
The aims of the DC Power Converter module can include: 1. To understand the construction and characteristics of power semiconductor devices, particularly thyristors, used in DC power converters. 2. To grasp the fundamentals of thyristors, including their working principles, turn-on and turn-off methods, and the functioning of thyristor firing circuits. 3. To familiarize themselves with the various types of thyristors within the thyristor family and their specific applications. Additionally, to comprehend thyristor ratings and their importance in ensuring safe and reliable operation. 4. To comprehend the principles of operation of AC to DC converters, specifically phase-controlled converters. This includes studying different converter configurations for converting AC power to DC power, such as single-phase and three-phase half-wave and full-wave converters, as well as techniques for power factor improvement. 5. To gain a solid understanding of DC to DC converters, including the basic principles of DC choppers. This involves learning about the different types of choppers, their classification, and the control strategies employed to regulate output voltage or current.
9. استراتيجيات التعليم والتعلم
The learning and teaching strategies for the DC Power Converter module may include: 1. Lectures: Conduct engaging lectures to present fundamental concepts, theories, and principles. Use visual aids, such as diagrams and illustrations, to enhance understanding and provide real-world examples to illustrate the applications of power converters. 2. Problem-Based Learning: Incorporate problem-solving activities that require students to apply their knowledge of power converters to solve practical problems. Present them with real-world

scenarios or case studies and encourage them to analyze, design, and optimize power converter circuits.
3. Hands-on Lab Experiments: Organize laboratory sessions where students can build and test power converter circuits. This hands-on experience allows them to observe the behavior of power semiconductor devices and verify theoretical concepts. Provide guidance and facilitate discussions during the experiments.
4. Group Projects: Assign group projects that involve designing and implementing power converter systems for specific applications. Encourage collaboration and division of tasks among group members. This approach promotes teamwork, problem-solving skills, and critical thinking.
5. Simulation and Modeling: Utilize computer simulations or modeling software to demonstrate the behavior and performance of power converters. Students can simulate different converter topologies, control strategies, and load conditions to observe their effects and make performance comparisons. Guide them in analyzing and interpreting simulation results.

10. بنية المقرر الدراسي

الاسبوع	الساعات	مخرجات المتعلم المطلوبة	اسم الوحدات او الموضوع	طريقة التعلم	طريقة التقييم
Week 1	6	Introduction to Lab Equipment and Safety Procedures Introduction to the lab environment, equipment, and safety protocols.	Introduction to Power Semiconductor Devices Overview of power semiconductor devices Characteristics and specifications of power semiconductor devices	حضوري	اختبارات يومي
Week 2	6	Thyristor Characteristics and Testing Measurement of thyristor characteristics such as forward voltage drop, reverse recovery time, and holding current. Testing of thyristor triggering and commutation methods.	Thyristor Fundamentals Structure and construction of thyristors Operation principles of thyristors	حضوري	تقارير
Week 3	6	Thyristor Firing Circuit Design and Testing Design and implementation of thyristor firing circuits. Testing and optimization of firing circuit parameters.	Thyristor Turn-On and Turn-Off Methods Gate triggering techniques Natural and forced commutation methods	حضوري	واجبات
Week 4	6	Single-Phase Half-Wave Converter Experiment Construction and testing of a single-phase half-wave converter circuit. Measurement and analysis of waveforms, voltage, and current values.	Thyristor Firing Circuits Basic firing circuit designs Gate pulse generation techniques	حضوري	اختبارات يومي
Week 5	6	Single-Phase Full-Wave Converter Experiment Construction and testing of a single-phase full-wave	Thyristor Ratings and Protection Understanding thyristor ratings	حضوري	تقارير

		Protection methods against overcurrent and overvoltage	converter circuit. Measurement and analysis of waveforms, voltage, and current values.		
واجبات	حضوري	Single-Phase Half-Wave Converter Principle of operation Analysis of waveforms and voltage/current calculations	Three-Phase Half-Wave Converter Experiment Construction and testing of a three-phase half-wave converter circuit. Measurement and analysis of waveforms, voltage, and current values.	6	Week 6
اختبارات يومي	حضوري	Single-Phase Full-Wave Converter Principle of operation Analysis of waveforms and voltage/current calculations	Three-Phase Full-Wave Converter Experiment Construction and testing of a three-phase full-wave converter circuit. Measurement and analysis of waveforms, voltage, and current values.	6	Week 7
تقارير	حضوري	Three-Phase Half-Wave Converter Principle of operation Analysis of waveforms and voltage/current calculations	Power Factor Improvement Techniques Experiment Implementation and testing of power factor improvement techniques such as passive and active power factor correction circuits.	6	Week 8
واجبات	حضوري	Three-Phase Full-Wave Converter Principle of operation Analysis of waveforms and voltage/current calculations	DC Chopper Circuit Design and Testing Design and construction of a DC chopper circuit (e.g., buck, boost, or buck-boost). Testing and optimization of chopper control strategies.	6	Week 9
اختبارات يومي	حضوري	Power Factor Improvement in AC to DC Conversion Power factor definition and importance Techniques for power factor improvement (e.g., power factor correction circuits)	Performance Analysis of DC Choppers Measurement and analysis of chopper waveforms, voltage, current, and efficiency. Comparison of different control strategies for DC choppers.	6	Week 10
تقارير	حضوري	Introduction to DC-DC Converters (Choppers) Basic principles and classification of DC choppers Control strategies for DC choppers (e.g., pulse width modulation)	PWM Control in DC Choppers Implementation and testing of pulse width modulation (PWM) control in DC choppers. Measurement and analysis of PWM waveforms and their effects on chopper performance.	6	Week 11

واجبات	حضوري	Buck and Boost Choppers Operation and analysis of buck and boost choppers Control strategies and performance evaluation	Current Mode Control in DC Choppers Implementation and testing of current mode control in DC choppers. Measurement and analysis of current mode control waveforms and their effects on chopper performance.	6	Week 12
اختبارات يومي	حضوري	Buck-Boost and Cuk Choppers Operation and analysis of buck-boost and Cuk choppers Control strategies and performance evaluation	Lab Project - Power Converter Design and Optimization Design and construction of a complete power converter system based on given specifications. Optimization of converter performance through parameter variation and control strategy selection.	6	Week 13
تقارير	حضوري	Control Strategies for Power Converters Pulse width modulation (PWM) control Current mode control Constant frequency control	Lab Project - Experimental Evaluation and Analysis Experimental testing and evaluation of the designed power converter system. Analysis of performance characteristics, efficiency, and comparison with theoretical predictions.	6	Week 14
واجبات	حضوري	Emerging Trends and Future Developments Latest trends in power semiconductor devices and converter topologies Potential applications and future developments in power conversion	Lab Project - Presentation and Discussion Presentation of the lab project results and findings to the class. Discussion and analysis of the project outcomes and lessons learned.	6	Week 15

11. تقييم المقرر

As		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5, 10	LO #1, 2, 8 and 9
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Projects / Lab.	14	10% (10)	Continuous	LO # 1-14
	Report	14	10% (10)	Continuous	LO # 1-14
Summative assessment	Midterm Exam	2 hours	10% (10)	7	LO # 1-7
	Final Exam	3 hours	50% (50)	16	All
Total assessment			100% (100 Marks)		

12. مصادر التعلم والتدريس

N. Mohan, T. M. Undeland, and W. P. Robbins, "Power Electronics: Converters, Applications, and Design." Hoboken, NJ: Wiley, 2003.

R. M. Mathur and R. K. Varma, "Thyristor-Based FACTS Controllers for Electrical Transmission Systems." Hoboken, NJ: Wiley, 2002.

نموذج وصف المقرر

1. أسم المقرر الدراسي:
Principles of Power Engineering
2. رمز المقرر:
EET3101
3. الفصل / السنة:
الفصل الأول 2024-2025/ مسار بولونيا
4. تاريخ اعداد هذا الوصف:
2025/7/16
5. حضوري / عبر الانترنت:
حضوري
6. عدد الساعات الدراسية (الكلي)/ عدد الوحدات/ (الكلي):
7 ساعات / 175 وحدة اوربية
7. أسم مسؤول المقرر الدراسي (اذا كان هناك اكثر من اسم يذكر ايضا):
8. أهداف المقرر
The aims of the Principles of Power Engineering module are to: 7. Provide an understanding of the basic structure and components of a power system: The module aims to familiarize students with the key elements of a power system, including generators, transformers, transmission lines, and distribution networks. Students will gain knowledge about the functions and interconnections of these components within the overall power system. 8. Develop knowledge of overhead line insulators and their role in power transmission: Students will learn about the different types of insulators used in overhead power lines and their characteristics. They will understand the importance of insulators in maintaining electrical insulation and preventing current leakage, ensuring safe and reliable power transmission. 9. Explain the phenomenon of corona discharge and its implications: The module aims to provide an understanding of corona discharge, including its causes and effects on power transmission. Students will learn about the impact of corona on power loss, radio interference, and equipment reliability. They will also explore mitigation techniques to minimize corona effects. 10. Understand sag in overhead lines and its significance: Students will gain knowledge about sag, which refers to the vertical displacement of overhead line conductors. They will learn about the factors influencing sag and its implications for line clearance, mechanical stress, and electrical performance. The module aims to develop skills in calculating and managing sag for optimal line operation. 11. Explore line inductance and capacitance in power transmission: Students will gain an understanding of the concepts of line inductance and capacitance. They will learn about the calculation methods for determining inductance and capacitance in transmission lines and their effects on voltage regulation, power transfer capability, and system stability. 12. Discuss different types of transmission lines based on length: The module aims to introduce students to short, medium, and long transmission lines and their characteristics. Students will

understand the design considerations, performance parameters, and challenges associated with each type of transmission line.

9. استراتيجيات التعليم والتعلم

7. Lectures: Traditional lectures can be used to deliver theoretical concepts, provide an overview of key topics, and present complex information. Lectures can be enhanced with visual aids, multimedia presentations, and real-life examples to promote active learning.
8. Practical Demonstrations: Hands-on practical demonstrations and experiments can be conducted to illustrate the principles of power engineering. This can include laboratory sessions where students can work with power equipment, conduct measurements, and observe the behavior of power systems under different conditions.
9. Case Studies: Case studies can be utilized to apply theoretical knowledge to real-world scenarios. Students can analyze and solve practical problems related to power system design, operation, and optimization. Case studies can also provide insights into industry practices and challenges.
10. Group Projects: Group projects can encourage collaboration and teamwork. Students can work together to tackle complex power engineering problems, such as designing a transmission line or analyzing the performance of a power system. This strategy promotes critical thinking, problem-solving skills, and communication within a team.
11. Computer Simulations: Computer simulations and modeling software can be used to simulate power system behavior and analyze various scenarios. Students can use these tools to perform load flow analysis,
12. voltage regulation, and stability studies. Simulations provide a hands-on experience and enable students to observe the impact of different parameters on power system performance.

10. بنية المقرر الدراسي

الاسبوع	الساعات	مخرجات المتعلم المطلوبة	اسم الوحدات او الموضوع	طريقة التعلم	طريقة التقييم
Week 1	7	Introduction to Power System Laboratory. Safety protocols and laboratory guidelines. Introduction to laboratory equipment and tools. Familiarization with measurement instruments.	Introduction to Power Systems. Basic structure and components of a power system. Power generation, transmission, and distribution. Importance of reliable and efficient power systems.	حضوري	اختبارات يومي
Week 2	7	Overhead Line Insulators Laboratory. Testing and characterization of different types of insulators. Measurement of insulation resistance. Practical demonstrations of insulator stringing techniques.	Overhead Line Insulators. Types and materials of insulators. Insulator characteristics and selection criteria. Insulator stringing and electrical insulation principles.	حضوري	تقارير
Week 3	7	Corona Discharge Laboratory. Observation and measurement of corona discharge phenomena. Corona detection methods and equipment. Evaluation of corona mitigation techniques.	Corona Discharge. Causes and effects of corona discharge. Factors influencing corona formation. Mitigation techniques and corona control measures.	حضوري	واجبات

اختبارات يومي	حضوري	Sag in Overhead Lines. Factors affecting sag in power lines. Sag calculation methods. Sag monitoring and maintenance practices.	Sag in Overhead Lines Laboratory. Measurement of sag in overhead lines using various methods. Calculation of sag under different load and temperature conditions. Practical exercises on sag correction and maintenance.	7	Week 4
تقارير	حضوري	Line Inductance. Concept of line inductance and its significance. Calculation methods for line inductance. Impact of line inductance on power flow and system stability.	Line Parameters Measurement Laboratory. Measurement of line inductance using different techniques. Calculation of line inductance based on measured data. Measurement of line capacitance and calculation of charging current.	7	Week 5
واجبات	حضوري	Line Capacitance. Understanding line capacitance and its effects. Calculation methods for line capacitance. Influence of line capacitance on line charging current, power factor, and transient behavior.	Short Transmission Lines Laboratory. Analysis of transmission line characteristics through practical experiments. Measurement of line impedance and admittance. Evaluation of transmission line performance parameters.	7	Week 6
اختبارات يومي	حضوري	Short Transmission Lines. Characteristics and design considerations of short transmission lines. Performance parameters and challenges of short transmission lines.	Medium Transmission Lines Laboratory. Simulation and analysis of medium transmission line models using software tools. Study of transmission line parameters and performance under different load conditions. Practical exercises on line impedance matching and impedance transformation.	7	Week 7
تقارير	حضوري	Medium Transmission Lines. Characteristics and design considerations of medium transmission lines. Performance parameters and challenges of medium transmission lines.	Long Transmission Lines Laboratory. Investigation of the behavior of long transmission lines using simulation software. Analysis of power transfer capabilities and voltage regulation in long lines. Practical exercises on the design and optimization of long transmission lines.	7	Week 8

واجبات	حضوري	Long Transmission Lines. Characteristics and design considerations of long transmission lines. Performance parameters and challenges of long transmission lines.	Power System Simulation Laboratory. Introduction to power system simulation software. Load flow analysis and voltage regulation using simulation tools. Stability analysis and transient response simulation.	7	Week 9
اختبارات يومي	حضوري	Power System Analysis - Load Flow Analysis. Introduction to load flow analysis. Voltage regulation and power factor correction. Load flow calculation methods and software tools.	Protection and Control Laboratory. Study of protective relays and their applications in power systems. Testing and calibration of protective relays. Hands-on exercises on power system control and monitoring.	7	Week 10
تقارير	حضوري	Power System Analysis - Stability Analysis. Introduction to stability analysis. Transient stability and steady-state stability. Stability assessment and control techniques.	Renewable Energy Integration Laboratory. Analysis of renewable energy generation systems. Simulation of renewable energy integration in power systems. Evaluation of control strategies for optimal renewable energy utilization.	7	Week 11
واجبات	حضوري	Power Flow Control and Optimization. Reactive power control methods. Optimal power flow analysis and optimization techniques. Voltage stability and control strategies.	Smart Grids and Advanced Control Laboratory. Introduction to smart grid technologies and components. Implementation and testing of advanced control algorithms in power systems. Study of communication protocols and data management in smart grids.	7	Week 12
اختبارات يومي	حضوري	Renewable Energy Integration. Integration of renewable energy sources into power systems. Challenges and opportunities in renewable energy integration. Power system planning and operation with renewable energy.	Power System Stability Laboratory. Investigation of power system stability using simulation software. Analysis of transient stability and voltage stability. Evaluation of stability enhancement techniques and control strategies.	7	Week 13
تقارير	حضوري	Emerging Technologies and Future Trends. Overview of emerging technologies in power	Fault Analysis and Protection Laboratory. Study of fault detection, localization, and clearing in	7	Week 14

		engineering. Smart grids and advanced power system control and monitoring. Power system resilience and cybersecurity considerations.	power systems. Simulation of fault scenarios and analysis of protection schemes. Testing and calibration of protective devices for fault management.		
واجبات	حضوري	Review and Case Studies. Review of key concepts and topics covered. Discussion of case studies and real-world applications.	Review and Project Presentations. Review of laboratory experiments and concepts covered throughout the module. Group project presentations on selected power engineering topics. Discussion and reflection on the laboratory experience.	7	Week 15

11. تقييم المقرر

As		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5, 10	LO #1, 2, 8 and 9
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Projects / Lab.	14	10% (10)	Continuous	LO # 1-14
	Report	14	10% (10)	Continuous	LO # 1-14
Summative assessment	Midterm Exam	2 hours	10% (10)	7	LO # 1-7
	Final Exam	3 hours	50% (50)	16	All
Total assessment			100% (100 Marks)		

12. مصادر التعلم والتدريس

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A. von Meier, "Electric Power Systems: A Conceptual Introduction," Hoboken, NJ: Wiley, 2006.

نموذج وصف المقرر

1. أسم المقرر الدراسي:

DC Power Conversions

2. رمز المقرر:

EET3102

3. الفصل / السنة:

الفصل الأول 2024-2025/ مسار بولونيا

4. تاريخ اعداد هذا الوصف:
2025/7/16
5. حضوري / عبر الانترنت:
حضوري
6. عدد الساعات الدراسية (الكلي)/ عدد الوحدات/ (الكلي):
6 ساعات / 150 وحدة اوربية
7. أسم مسؤول المقرر الدراسي (اذا كان هناك اكثر من اسم يذكر ايضا):
8. أهداف المقرر
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9. استراتيجيات التعليم والتعلم
The learning and teaching strategies for the DC Power Converter module may include: 1. Lectures: Conduct engaging lectures to present fundamental concepts, theories, and principles. Use visual aids, such as diagrams and illustrations, to enhance understanding and provide real-world examples to illustrate the applications of power converters. 2. Problem-Based Learning: Incorporate problem-solving activities that require students to apply their knowledge of power converters to solve practical problems. Present them with real-world scenarios or case studies and encourage them to analyze, design, and optimize power converter circuits. 3. Hands-on Lab Experiments: Organize laboratory sessions where students can build and test power converter circuits. This hands-on experience allows them to observe the behavior of power semiconductor devices and verify theoretical concepts. Provide guidance and facilitate discussions during the experiments. 4. Group Projects: Assign group projects that involve designing and implementing power converter systems for specific applications. Encourage collaboration and division of tasks among group members. This approach promotes teamwork, problem-solving skills, and critical thinking. 5. Simulation and Modeling: Utilize computer simulations or modeling software to demonstrate the behavior and performance of power converters. Students can simulate different converter topologies, control strategies, and load conditions to observe their effects and make performance comparisons. Guide them in analyzing and interpreting simulation results.

10. بنية المقرر الدراسي					
الاسبوع	الساعات	مخرجات المتعلم المطلوبة	اسم الوحدات او الموضوع	طريقة التعلم	طريقة التقييم
Week 1	6	Introduction to Lab Equipment and Safety Procedures Introduction to the lab environment, equipment, and safety protocols.	Introduction to Power Semiconductor Devices Overview of power semiconductor devices Characteristics and specifications of power semiconductor devices	حضوري	اختبارات يومي
Week 2	6	Thyristor Characteristics and Testing Measurement of thyristor characteristics such as forward voltage drop, reverse recovery time, and holding current. Testing of thyristor triggering and commutation methods.	Thyristor Fundamentals Structure and construction of thyristors Operation principles of thyristors	حضوري	تقارير
Week 3	6	Thyristor Firing Circuit Design and Testing Design and implementation of thyristor firing circuits. Testing and optimization of firing circuit parameters.	Thyristor Turn-On and Turn-Off Methods Gate triggering techniques Natural and forced commutation methods	حضوري	واجبات
Week 4	6	Single-Phase Half-Wave Converter Experiment Construction and testing of a single-phase half-wave converter circuit. Measurement and analysis of waveforms, voltage, and current values.	Thyristor Firing Circuits Basic firing circuit designs Gate pulse generation techniques	حضوري	اختبارات يومي
Week 5	6	Single-Phase Full-Wave Converter Experiment Construction and testing of a single-phase full-wave converter circuit. Measurement and analysis of waveforms, voltage, and current values.	Thyristor Ratings and Protection Understanding thyristor ratings Protection methods against overcurrent and overvoltage	حضوري	تقارير
Week 6	6	Three-Phase Half-Wave Converter Experiment Construction and testing of a three-phase half-wave converter circuit. Measurement and analysis of waveforms, voltage, and current values.	Single-Phase Half-Wave Converter Principle of operation Analysis of waveforms and voltage/current calculations	حضوري	واجبات
Week 7	6	Three-Phase Full-Wave Converter Experiment Construction and testing of a	Single-Phase Full-Wave Converter Principle of operation	حضوري	اختبارات يومي

		Analysis of waveforms and voltage/current calculations	three-phase full-wave converter circuit. Measurement and analysis of waveforms, voltage, and current values.		
تقارير	حضوري	Three-Phase Half-Wave Converter Principle of operation Analysis of waveforms and voltage/current calculations	Power Factor Improvement Techniques Experiment Implementation and testing of power factor improvement techniques such as passive and active power factor correction circuits.	6	Week 8
واجبات	حضوري	Three-Phase Full-Wave Converter Principle of operation Analysis of waveforms and voltage/current calculations	DC Chopper Circuit Design and Testing Design and construction of a DC chopper circuit (e.g., buck, boost, or buck-boost). Testing and optimization of chopper control strategies.	6	Week 9
اختبارات يومي	حضوري	Power Factor Improvement in AC to DC Conversion Power factor definition and importance Techniques for power factor improvement (e.g., power factor correction circuits)	Performance Analysis of DC Choppers Measurement and analysis of chopper waveforms, voltage, current, and efficiency. Comparison of different control strategies for DC choppers.	6	Week 10
تقارير	حضوري	Introduction to DC-DC Converters (Choppers) Basic principles and classification of DC choppers Control strategies for DC choppers (e.g., pulse width modulation)	PWM Control in DC Choppers Implementation and testing of pulse width modulation (PWM) control in DC choppers. Measurement and analysis of PWM waveforms and their effects on chopper performance.	6	Week 11
واجبات	حضوري	Buck and Boost Choppers Operation and analysis of buck and boost choppers Control strategies and performance evaluation	Current Mode Control in DC Choppers Implementation and testing of current mode control in DC choppers. Measurement and analysis of current mode control waveforms and their effects on chopper performance.	6	Week 12
اختبارات يومي	حضوري	Buck-Boost and Cuk Choppers Operation and analysis of buck-boost and Cuk choppers Control strategies and performance evaluation	Lab Project - Power Converter Design and Optimization Design and construction of a complete power converter system based on given specifications. Optimization of converter performance through parameter variation and	6	Week 13

			control strategy selection.		
تقارير	حضوري	Control Strategies for Power Converters Pulse width modulation (PWM) control Current mode control Constant frequency control	Lab Project - Experimental Evaluation and Analysis Experimental testing and evaluation of the designed power converter system. Analysis of performance characteristics, efficiency, and comparison with theoretical predictions.	6	Week 14
واجبات	حضوري	Emerging Trends and Future Developments Latest trends in power semiconductor devices and converter topologies Potential applications and future developments in power conversion	Lab Project - Presentation and Discussion Presentation of the lab project results and findings to the class. Discussion and analysis of the project outcomes and lessons learned.	6	Week 15

11. تقييم المقرر

As		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5, 10	LO #1, 2, 8 and 9
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Projects / Lab.				
	Report	1	10% (10)	15	LO # 1-14
Summative assessment	Midterm Exam	2 hours	20% (10)	7	LO # 1-7
	Final Exam	3 hours	50% (50)	16	All
Total assessment			100% (100 Marks)		

12. مصادر التعلم والتدريس

N. Mohan, T. M. Undeland, and W. P. Robbins, "Power Electronics: Converters, Applications, and Design." Hoboken, NJ: Wiley, 2003.

R. M. Mathur and R. K. Varma, "Thyristor-Based FACTS Controllers for Electrical Transmission Systems." Hoboken, NJ: Wiley, 2002.

نموذج وصف المقرر

1. أسم المقرر الدراسي:
Electrical Transformers and Induction Machines
2. رمز المقرر:
EET3103
3. الفصل / السنة:
الفصل الأول 2024-2025/ مسار بولونيا
4. تاريخ اعداد هذا الوصف:
2025/7/16
5. حضوري / عبر الانترنت:
حضوري
6. عدد الساعات الدراسية (الكلي)/ عدد الوحدات/ (الكلي):
5 ساعات / 125 وحدة اوربية
7. أسم مسؤول المقرر الدراسي (اذا كان هناك اكثر من اسم يذكر ايضا):
8. أهداف المقرر

The "Electrical Transformers and Induction Machines" module aims to achieve the following objectives:
To achieve the aims of the "Electrical Transformers and Induction Machines" module, the following steps will be taken:

1. To understand the basic construction and functioning of power transformers:
   - Familiarize students with the components and working principles of power transformers.
   - Explain the importance of core materials, winding arrangements, and cooling systems in transformer design.
2. To comprehend the theory and operation of transformers:
   - Introduce the theory of an ideal transformer and its fundamental principles.
   - Explain the concept of turns ratio, voltage transformation, and power relationships in transformers.
3. To perform and analyze transformer tests:
   - Equip students with the knowledge of various transformer tests, such as open-circuit, short-circuit, and impedance tests.
   - Develop the skills to conduct these tests and interpret the results to evaluate transformer performance and characteristics.
4. To understand the operation and control of transformers in power systems:
   - Explain the principles and considerations for parallel operation of transformers.
   - Discuss the advantages, limitations, and applications of auto-transformers.
5. To understand the basic construction and principles of induction motors:
   - Introduce students to the components and construction of induction motors.
   - Explain the principles of electromagnetism and induction that form the foundation of induction motor operation.

6. To comprehend the theory of electromagnetic induction and its application in induction motors:
- Introduce the concept of rotating magnetic fields and the notion of slip.
- Explain torque production and the fundamental principles of motor operation.

7. To explore various aspects of induction motors, including speed control methods and motor testing:
- Discuss different methods of speed control, such as changing the number of poles and stator voltage control.
- Cover motor testing techniques, including no-load tests, blocked-rotor tests, and efficiency measurement.

8. To understand single-phase induction motors and linear induction machines:
- Explain the working principles and construction of single-phase induction motors.
- Introduce linear induction machines and their basic principles, operating principles, applications, advantages, and challenges.

9. استراتيجيات التعليم والتعلم

The "Electrical Transformers and Induction Machines" module can be effectively delivered using a combination of learning and teaching strategies. Some of the strategies that can be employed are:

1. Lectures: Conduct interactive lectures to introduce theoretical concepts, principles, and fundamental knowledge related to transformers and induction motors. Use visual aids, examples, and real-life applications to enhance understanding.
2. Practical Demonstrations: Organize practical demonstrations to showcase the construction, operation, and testing of transformers and induction motors. This hands-on approach will help students visualize and apply theoretical concepts in a practical setting.
3. Case Studies: Present case studies that involve real-world applications of transformers and induction motors. Analyze and discuss the challenges faced, design considerations, and solutions employed, enabling students to connect theory with practical scenarios.
4. Group Discussions: Encourage group discussions and collaborative learning among students. Assign topics or problem-solving tasks related to transformers and induction motors for group discussions, promoting critical thinking and peer learning.
5. Laboratory Sessions: Conduct laboratory sessions where students can perform transformer tests and motor testing. This practical experience will enhance their skills in conducting tests, analyzing results, and troubleshooting.
6. Simulations and Virtual Labs: Utilize computer-based simulations and virtual lab environments to simulate transformer and motor operations. This enables students to explore different scenarios, conduct experiments, and visualize the effects of parameter variations.
7. Guest Lectures: Invite industry experts or professionals from the field of electrical engineering to deliver guest lectures. Their insights, experiences, and practical knowledge will provide valuable perspectives and enhance students' understanding of real-world applications.
8. Assignments and Projects: Assign individual or group assignments and projects related to transformers and induction motors. This encourages independent research, critical thinking, and problem-solving skills development.
9. Online Resources: Provide access to online resources such as e-books, articles, videos, and interactive tutorials. These resources can supplement classroom teaching and allow students to explore the topics at their own pace.
10. Assessments: Design formative and summative assessments to evaluate students' understanding of the concepts covered. Use a variety of assessment methods, including quizzes, exams, practical tests, and project evaluations, to assess both theoretical knowledge and practical skills.

10. بنية المقرر الدراسي

الاسبوع	الساعات	مخرجات المتعلم المطلوبة	اسم الوحدات او الموضوع	طريقة التعلم	طريقة التقييم

اختبارات يومي	حضوري	Introduction to Transformers Basic construction and components of power transformers. Core materials, winding arrangements, and cooling systems. Transformer ratings and specifications.	Introduction to Lab Equipment and Safety Introduction to lab equipment and tools used in transformer and motor testing. Lab safety procedures and protocols.	5	Week 1
تقارير	حضوري	Theory of Transformers Ideal transformer theory and principles. Turns ratio, voltage transformation, and power relationships. Equivalent circuit model of a loaded transformer.	Transformer Testing - Open-Circuit and Short-Circuit Tests Perform open-circuit and short-circuit tests on a power transformer. Measure and record the data. Analyze the test results and calculate transformer parameters.	5	Week 2
واجبات	حضوري	Transformer Testing Open-circuit, short-circuit, and impedance tests. Analysis and interpretation of transformer test results. Evaluation of transformer performance and characteristics.	Transformer Testing - Impedance Test Perform an impedance test on a power transformer. Measure and record the data. Analyze the test results and evaluate transformer performance.	5	Week 3
اختبارات يومي	حضوري	Transformer Operation and Control Parallel operation of transformers: principles and considerations. Advantages, limitations, and applications of auto-transformers.	Motor Testing - No-Load Test Perform a no-load test on an induction motor. Measure and record the data. Calculate motor parameters and efficiency.	5	Week 4
تقارير	حضوري	Introduction to Induction Motors Construction and components of induction motors. Principles of electromagnetism and induction. Types and applications of induction motors.	Induction Motor Testing - Blocked-Rotor Test Perform a blocked-rotor test on an induction motor. Measure and record the data. Calculate motor parameters and determine the torque-speed characteristics.	5	Week 5
واجبات	حضوري	Theory of Induction Motors Electromagnetic induction and Faraday's laws in the context of induction motors. Rotating magnetic fields and the concept of slip.	Induction Motor Testing - Load Test Perform a load test on an induction motor. Measure and record the data at different load conditions. Analyze the test results and evaluate motor performance.	5	Week 6

		Torque production and motor operation principles			
اختبارات يومي	حضوري	Three-Phase Induction Motors Three-phase power supply and advantages for induction motors. Squirrel cage and wound rotor designs. Torque-speed characteristics and performance curves.	Temperature Rise Test Perform a temperature rise test on a transformer or induction motor. Measure and record the temperatures at different points. Analyze the data and evaluate the thermal performance.	5	Week 7
تقارير	حضوري	Equivalent Circuit of Induction Motor Components of the equivalent circuit. Resistive, inductive, and leakage parameters. Voltage and current relationships in the circuit.	Insulation Testing Perform insulation tests on transformers and induction motors. Use appropriate testing equipment to measure insulation resistance and detect any insulation faults.	5	Week 8
واجبات	حضوري	Power Relations in Induction Motors Active power, reactive power, and apparent power. Power factor and power factor improvement techniques. Power flow and losses in induction motors.	Parallel Operation of Transformers Simulate the parallel operation of transformers using lab equipment. Study the effects of parallel operation on voltage, current, and load sharing.	5	Week 9
اختبارات يومي	حضوري	Methods of Starting of Induction Motors Direct-on-line (DOL) starting. Star-delta starting. Autotransformer starting. Soft starters and variable frequency drives (VFDs).	Autotransformer Operation and Control Experiment with autotransformers and study their operation and control mechanisms. Analyze the advantages and limitations of autotransformers.	5	Week 10
تقارير	حضوري	Induction Motor Tests No-load test and blocked-rotor test. Load test and efficiency measurement. Temperature rise test and insulation tests.	Variable Frequency Drive (VFD) Control Use a variable frequency drive to control the speed of an induction motor. Study the impact of varying the frequency on motor performance.	5	Week 11
واجبات	حضوري	Speed Control of Induction Motors Changing the number of poles. Stator voltage control. Frequency control using	Motor Starting Methods Experiment with different motor starting methods, such as direct-on-line (DOL), star-delta, and autotransformer starting. Compare and analyze the	5	Week 12

		variable frequency drives (VFDs).	performance of each starting method.		
اختبارات يومي	حضوري	Single-Phase Induction Motors Working principles and construction. Types of single-phase induction motors. Applications and limitations of single-phase motors.	Single-Phase Induction Motor Operation Study the operation and characteristics of single-phase induction motors. Perform experiments to analyze their performance and applications.	5	Week 13
تقارير	حضوري	Linear Induction Machines Basic principles and operating principles. Applications in transportation and linear motion systems. Advantages and challenges of linear induction machines.	Linear Induction Machine Experiment with a linear induction machine setup. Study its operating principles and characteristics. Explore its applications in transportation and linear motion systems.	5	Week 14
واجبات	حضوري	Review and Recapitulation Review of key concepts and principles. Recapitulation of transformer and induction motor operations. Discussion of practical applications and real-world examples.	Lab Report Preparation and Discussion Prepare lab reports summarizing the experiments conducted throughout the module. Discuss the findings, analyze the results, and draw conclusions.	5	Week 15

11. تقييم المقرر

As		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5, 10	LO #1, 2, 8 and 9
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Projects / Lab.	14	10% (10)	Continuous	LO # 1-14
	Report	14	10% (10)	Continuous	LO # 1-14
Summative assessment	Midterm Exam	2 hours	10% (10)	7	LO # 1-7
	Final Exam	3 hours	50% (50)	16	All
Total assessment			100% (100 Marks)		

12. مصادر التعلم والتدريس

Austin Hughes, Bill Drury, and Edwin Wright, "Electric Motors and Drives: Fundamentals, Types and Applications," 4th edition. Newnes, 2013.

W. G. Hurley and W. H. Wölfle, "Transformers and Inductors for Power Electronics: Theory, Design and Applications." Wiley-IEEE Press, 2013.

نموذج وصف المقرر

1. أسم المقرر الدراسي:
Electromagnetic Fields
2. رمز المقرر:
EET3104
3. الفصل / السنة:
الفصل الأول 2024–2025/ مسار بولونيا
4. تاريخ اعداد هذا الوصف:
2025/7/16
5. حضوري / عبر الانترنت:
حضوري
6. عدد الساعات الدراسية (الكلي)/ عدد الوحدات/ (الكلي):
5 ساعات / 125 وحدة اوربية
7. أسم مسؤول المقرر الدراسي (اذا كان هناك اكثر من اسم يذكر ايضا):
8. أهداف المقرر
The Electromagnetic Fields module aims to: 1. To develop a solid foundation in vector algebra and coordinate systems used in electromagnetics. 2. To familiarize students with fundamental concepts such as Coulomb's law, electric field intensity, electric flux density, and Gauss's law to comprehend the behavior and properties of electric fields. 3. To introduce the concepts of magnetic field intensity, magnetic flux density, Biot-Savart's law, Ampere's law, and curl to provide a thorough understanding of magnetic fields and their interactions. 4. To explore the principles of energy potential, energy density, resistance, capacitance, and inductance, enabling students to analyze and design electrical circuits and systems. 5. To equip students with a solid understanding of Maxwell's equations, Faraday's law, displacement current, and their application in potential and integral form, allowing for the study of electromagnetic waves, propagation, and radiation in various media.
9. استراتيجيات التعليم والتعلم
The Electromagnetic Fields module can be taught using a variety of learning and teaching strategies to engage students and facilitate their understanding of the subject matter. Some effective strategies include: 1. Lectures: Conducting lectures to deliver theoretical concepts, principles, and mathematical derivations associated with electromagnetic fields. Lectures can be supported by visual aids such as slides, diagrams, and demonstrations to enhance comprehension. 2. Practical Sessions: Providing hands-on practical sessions where students can perform experiments related to electric and magnetic fields, measure field parameters, and verify theoretical concepts. This allows students to apply theoretical knowledge in a practical setting and develop their problem-solving skills. 3. Problem-Solving Sessions: Organizing problem-solving sessions or tutorials to work through exercises and examples that apply the principles learned in class. This helps students develop their

analytical and problem-solving abilities and reinforces their understanding of electromagnetic field concepts.

4. Interactive Discussions: Encouraging interactive discussions, both in-class and online, where students can ask questions, share their perspectives, and engage in peer-to-peer learning. This fosters active participation and deeper understanding of the subject matter.
5. Computer Simulations and Modeling: Utilizing computer simulations and modeling tools to visualize and analyze electromagnetic phenomena. This enables students to explore complex scenarios, observe real-time behavior, and develop a deeper intuition for electromagnetic field concepts.

10. بنية المقرر الدراسي

الاسبوع	الساعات	مخرجات المتعلم المطلوبة	اسم الوحدات او الموضوع	طريقة التعلم	طريقة التقييم
Week 1	3	Introduction to the module: overview of the course objectives, assessment methods, and resources. Vector algebra review: vector operations, dot product, cross product, and coordinate systems.	Introduction to the module: overview of the course objectives, assessment methods, and resources. Vector algebra review: vector operations, dot product, cross product, and coordinate systems.	حضوري	اختبارات يومي
Week 2	3	Coulomb's law: understanding the force between electric charges. Electric field intensity: definition, calculation, and superposition principle.	Coulomb's law: understanding the force between electric charges. Electric field intensity: definition, calculation, and superposition principle.	حضوري	تقارير
Week 3	3	Electric flux density: introduction to electric flux and its relationship with electric fields. Gauss's law: application of Gauss's law to calculate electric fields for different charge distributions.	Electric flux density: introduction to electric flux and its relationship with electric fields. Gauss's law: application of Gauss's law to calculate electric fields for different charge distributions.	حضوري	واجبات
Week 4	3	Divergence and gradient: understanding divergence and gradient operators in vector calculus. Energy potential and energy density in electric fields: calculating electric potential and energy associated with electric fields.	Divergence and gradient: understanding divergence and gradient operators in vector calculus. Energy potential and energy density in electric fields: calculating electric potential and energy associated with electric fields.	حضوري	اختبارات يومي
Week 5	3	Current density and electric boundary conditions: introduction to current density and its role in determining electric boundary conditions. Resistance and capacitance: calculations and applications of resistance and capacitance in circuits.	Current density and electric boundary conditions: introduction to current density and its role in determining electric boundary conditions. Resistance and capacitance: calculations and applications of resistance and capacitance in circuits.	حضوري	تقارير

واجبات	حضوري	Poisson's and Laplace's equations: understanding and solving Poisson's and Laplace's equations in electrostatics. Examples and applications of Poisson's and Laplace's equations.	Poisson's and Laplace's equations: understanding and solving Poisson's and Laplace's equations in electrostatics. Examples and applications of Poisson's and Laplace's equations.	3	Week 6
اختبارات يومي	حضوري	Biot-Savart law and Ampere's law: calculations of magnetic fields due to steady currents. Curl and its applications in electromagnetics.	Biot-Savart law and Ampere's law: calculations of magnetic fields due to steady currents. Curl and its applications in electromagnetics.	3	Week 7
تقارير	حضوري	Magnetic field intensity and magnetic flux density: understanding the concepts and calculations. Scalar and vector magnetic potential: introduction to magnetic potentials and their applications.	Magnetic field intensity and magnetic flux density: understanding the concepts and calculations. Scalar and vector magnetic potential: introduction to magnetic potentials and their applications.	3	Week 8
واجبات	حضوري	Magnetic force and magnetic boundary conditions: calculations of magnetic forces on current-carrying conductors. Inductance and its applications in circuits.	Magnetic force and magnetic boundary conditions: calculations of magnetic forces on current-carrying conductors. Inductance and its applications in circuits.	3	Week 9
اختبارات يومي	حضوري	Faraday's law and displacement current: understanding electromagnetic induction and displacement current. Maxwell's equations in potential form.	Faraday's law and displacement current: understanding electromagnetic induction and displacement current. Maxwell's equations in potential form.	3	Week 10
تقارير	حضوري	Maxwell's equations in integral form: deriving and understanding the integral forms of Maxwell's equations. Electromagnetic waves in free space: propagation characteristics and wave equations.	Maxwell's equations in integral form: deriving and understanding the integral forms of Maxwell's equations. Electromagnetic waves in free space: propagation characteristics and wave equations.	3	Week 11
واجبات	حضوري	Electromagnetic waves in dielectrics: behavior and properties of electromagnetic waves in dielectric materials. Wave propagation in good conductors: skin effect and wave attenuation.	Electromagnetic waves in dielectrics: behavior and properties of electromagnetic waves in dielectric materials. Wave propagation in good conductors: skin effect and wave attenuation.	3	Week 12

اختبارات يومي	حضوري	Pointing vector and electromagnetic radiation: understanding the flow of electromagnetic energy. Reflection of electromagnetic waves at interfaces.	Pointing vector and electromagnetic radiation: understanding the flow of electromagnetic energy. Reflection of electromagnetic waves at interfaces.	3	Week 13
تقارير	حضوري	Antennas and their applications: principles of antenna design and radiation patterns. Propagation of electromagnetic waves in different media.	Antennas and their applications: principles of antenna design and radiation patterns. Propagation of electromagnetic waves in different media.	3	Week 14
واجبات	حضوري	Revision and recap of key concepts covered in the module. Final assessment and feedback.	Revision and recap of key concepts covered in the module. Final assessment and feedback.	3	Week 15

11. تقييم المقرر

As		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	10% (10)	5, 10	LO #1, 2, 8 and 9
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Projects / Lab.				
	Report	1	10% (10)	15	LO # 1-14
Summative assessment	**Midterm Exam**	2 hours	20% (10)	7	LO # 1-7
	Final Exam	3 hours	50% (50)	16	All
Total assessment			100% (100 Marks)		

12. مصادر التعلم والتدريس

W. H. Hayt Jr. and J. A. Buck, "Engineering Electromagnetics," 8th ed. New York, NY, USA: McGraw-Hill, 2011.

D. J. Griffiths, "Introduction to Electrodynamics," 4th ed. Upper Saddle River, NJ, USA: Pearson, 2013.

نموذج وصف المقرر

1. أسم المقرر الدراسي:
Microprocessor
2. رمز المقرر:
EET3105
3. الفصل / السنة:
الفصل الأول 2024-2025/ مسار بولونيا
4. تاريخ اعداد هذا الوصف:
2025/7/16
5. حضوري / عبر الانترنت:
حضوري
6. عدد الساعات الدراسية (الكلي)/ عدد الوحدات/ (الكلي):
4 ساعات / 100 وحدة اوربية
7. أسم مسؤول المقرر الدراسي (اذا كان هناك اكثر من اسم يذكر ايضا):
8. أهداف المقرر
Module Aims: 1. Understand the fundamentals of microprocessors and their significance in computer systems. Gain knowledge of the historical development of INTEL processors and different types of computers. 2. Familiarize oneself with the architecture of the 8086 microprocessor. Learn about the micro-architecture, software model, and the roles of the Execution Unit (EU) and Bus Interface Unit (BIU). 3. Explore the memory operation in microprocessors. Gain an understanding of various memory types such as RAM and ROM, their characteristics, configuration, segments, and design. Learn about the memory interface and its importance. 4. Comprehend the pin configuration of microprocessors, including the demultiplexing of data and address lines. Understand the function and description of each pin. Differentiate between the minimum and maximum modes of operation. 5. Gain practical knowledge of machine and assembly language programming for microprocessors. Understand the benefits of assembly language and how instructions are converted to machine language. Explore various addressing modes, instruction sets, and programming techniques. Learn about input/output ports and the design considerations involved. Finally, grasp the concept of interrupt mechanisms in microprocessors.
9. استراتيجيات التعليم والتعلم
Learning and Teaching Strategies: 1. Lectures: Engage students through informative lectures that cover the theoretical aspects of microprocessors, their architecture, and programming techniques. Provide clear explanations and examples to enhance understanding. 2. Practical Demonstrations: Conduct practical demonstrations to illustrate concepts such as pin

configurations, memory operations, and input/output port design. This hands-on approach allows students to visualize and apply their knowledge.

3. Laboratory Sessions: Provide laboratory sessions where students can work on microprocessor-based projects. This hands-on experience helps them gain practical skills in assembly language programming, memory interfacing, and input/output operations.

4. Case Studies: Present real-world case studies to showcase the application of microprocessors in different industries or sectors. This allows students to understand the practical implications and challenges faced in implementing microprocessor-based systems.

5. Group Discussions and Problem-Solving Activities: Encourage group discussions and problem-solving activities to promote active learning and critical thinking. Engage students in analyzing and solving complex problems related to microprocessors and their programming.

Tutorials: Conduct tutorials to reinforce understanding and provide additional support. These sessions allow students to ask questions, clarify concepts, and practice problem-solving with the guidance of the instructor.

10. بنية المقرر الدراسي

الاسبوع	الساعات	مخرجات المتعلم المطلوبة	اسم الوحدات او الموضوع	طريقة التعلم	طريقة التقييم
Week 1	4	Introduction to Microprocessors and Assembly Language Writing a program to display a simple message on an LED display. Using assembly language instructions to perform basic arithmetic calculations.	Introduction to Microprocessors and Computers: Overview of microprocessors and their significance. Historical development of INTEL processors and types of computers.	حضوري	اختبارات يومي
Week 2	4	8086 Microprocessor Architecture and Instruction Set Implementing a program to add two numbers and display the result. Exploring the effects of different addressing modes on program execution.	Architecture of the 8086 Microprocessor: Micro-architecture of the 8086 microprocessor. Software model of the 8086 microprocessor. Execution Unit (EU) and Bus Interface Unit (BIU).	حضوري	تقارير
Week 3	4	Memory Interfacing and Data Transfer Writing a program to store and retrieve data from memory locations. Implementing data transfer operations between registers and memory.	Memory Operation: Types of memory: RAM and ROM. Characteristics, configurations, and design of RAM and ROM. Memory size, configuration, segments, and design concepts.	حضوري	واجبات
Week 4	4	Arithmetic and Logic Operations Performing basic arithmetic calculations (addition, subtraction, multiplication) using the microprocessor. Implementing logical operations (AND, OR, XOR) on	Pin Configuration: Demultiplexing of data and address lines. Detailed description of each pin and its functions. Minimum and maximum modes of operation.	حضوري	اختبارات يومي

			binary numbers.		
تقارير	حضوري	Machine and Assembly Language Programming (Part 1): Introduction to assembly language programming. Instruction set and addressing modes. Data transfer instructions.	Control Flow and Subroutines Writing a program to implement a simple loop and display a count on an output device. Creating and calling subroutines to perform repetitive tasks.	4	Week 5
واجبات	حضوري	Machine and Assembly Language Programming (Part 2): Arithmetic and logic operations. Shift and rotate instructions. String instructions.	Input/Output Operations Interfacing with a push-button switch and controlling an LED based on its state. Reading data from a keypad and displaying it on a 7-segment display.	4	Week 6
اختبارات يومي	حضوري	Input/Output Ports: Design considerations for input and output ports. Types of input and output devices.	Interrupt Handling Configuring and handling interrupts from external devices such as buttons or sensors. Implementing an interrupt-driven program to respond to specific events.	4	Week 7
تقارير	حضوري	Interrupt Mechanism: Introduction to interrupt mechanisms in microprocessors. Interrupt handling and prioritization.	Memory Segmentation and Data Storage Storing and retrieving data in different memory segments using segment registers. Accessing specific segments of memory for different program requirements.	4	Week 8
واجبات	حضوري	Memory Interface: Interfacing memory with the microprocessor. Addressing modes for memory access.	Stack Operations and Parameter Passing Implementing a stack-based program to reverse a string of characters. Passing parameters between subroutines using the stack.	4	Week 9
اختبارات يومي	حضوري	Control Instructions and Subroutines: Control flow instructions for branching and looping. Subroutine instructions for modular programming.	Timers and Counters Generating time delays using the microprocessor's timer/counter. Creating a simple stopwatch program using timer-based interrupts.	4	Week 10
تقارير	حضوري	Input/Output Instructions and Interrupts: Instructions for input and output operations. Handling communication between microprocessors	Serial Communication Sending and receiving data between two microprocessors using a serial communication protocol. Implementing a basic serial	4	Week 11

		and external devices. Interrupt-driven programming.	data transmission program.		
واجبات	حضوري	Stack Operations and Assembly Language Programming (Part 3): Stack operations and their utilization in programming. Advanced assembly language programming techniques.	Parallel Communication Interfacing with a parallel LCD display and sending text messages. Implementing parallel data transfer between two microprocessors.	4	Week 12
اختبارات يومي	حضوري	System Design and Integration: Integrating microprocessors into larger systems. System-level considerations and design principles.	Project Work - Microprocessor System Design Designing and assembling a microprocessor-based traffic light simulation system. Creating a simple temperature monitoring system using a temperature sensor and output device.	4	Week 13
تقارير	حضوري	Review and Project Work: Review of key concepts and programming techniques. Project work to apply learned concepts.	Project Work - Assembly Language Programming Implementing a basic game or quiz program using assembly language. Developing a simple data logging system with storage capabilities.	4	Week 14
واجبات	حضوري	Project Work and Assessment: Finalize and present project work. Summative assessment, such as exams or project evaluation.	Project Presentation and Assessment Presenting the final project work and demonstrating its functionality. Conducting a comprehensive assessment of the project implementation and student understanding.	4	Week 15

11. تقييم المقرر

As		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	10% (10)	5, 10	LO #1, 2, 8 and 9
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Projects / Lab.	14	10% (10)	Continuous	All
	Report	14	10% (10)	Continuous	All
Summative assessment	**Midterm Exam**	2 hours	10% (10)	7	LO # 1-7
	Final Exam	3 hours	50% (50)	16	All
Total assessment			100% (100 Marks)		

12. مصادر التعلم والتدريس

K. Ayala, "The 8086 Microprocessor: Programming and Interfacing the PC," Boston, MA: Cengage Learning, 2010.

S. Mathur, "Microprocessor 8086: Architecture, Programming, and Interfacing," New Delhi, India: PHI Learning

Private Limited, 2011.

نموذج وصف المقرر

1. أسم المقرر الدراسي:
Numerical Analysis
2. رمز المقرر:
EET3106
3. الفصل / السنة:
الفصل الأول 2024–2025/ مسار بولونيا
4. تاريخ اعداد هذا الوصف:
2025/7/16
5. حضوري / عبر الانترنت:
حضوري
6. عدد الساعات الدراسية (الكلي)/ عدد الوحدات/ (الكلي):
3 ساعات / 75 وحدة اوربية
7. أسم مسؤول المقرر الدراسي (اذا كان هناك اكثر من اسم يذكر ايضا):
8. أهداف المقرر
The aims of the Numerical Analysis module you described are to: 1. Develop an understanding of the sources of errors and uncertainties in numerical computations, including round-off and truncation errors, blunders, model errors, and data uncertainties. 2. Explore different methods for finding roots of nonlinear equations, starting from graphical approaches to more efficient iterative methods such as the bisection method, false position method, and Newton-Raphson method. 3. Extend the Newton-Raphson method to handle equations with multiple roots using modified techniques. 4. Apply root-finding methods in practical scenarios related to electrical engineering and calculations involving bubble point and dew point. 5. Study interpolation techniques for approximating functions using polynomial interpolation methods like Newton's and Neville's methods, as well as cubic spline interpolation for constructing smooth curves. 6. Understand the concepts of linear and nonlinear regression for fitting data to mathematical models, including linear regressions, multiple linear regressions, and non-linear regressions using parabolic regression or power series approximations. 7. Gain knowledge of numerical methods for differentiation and integration, including numerical differentiation techniques such as derivatives estimation and Richardson extrapolation, as well as

integration methods like the trapezoid rule, Simpson's rule, and compound numerical integration.
8. Acquire skills in solving ordinary differential equations (ODEs) using numerical techniques such as Euler's method, modified Euler's method, linear multistep methods, one-step methods, Runge-Kutta methods, Milne's method, and understanding error estimation and adaptivity in solving ODEs.
Explore the numerical solution of partial differential equations (PDEs) by focusing on boundary value problems (BVPs) associated with second-order elliptic PDEs.

9. استراتيجيات التعليم والتعلم

The Numerical Analysis module can employ a variety of learning and teaching strategies to facilitate understanding and application of the subject matter. Some effective strategies include:
1. Lectures: Instructors can deliver lectures to introduce and explain key concepts, theories, and numerical methods. Lectures can include demonstrations, examples, and visuals to enhance understanding.
2. Problem-solving sessions: Organizing dedicated problem-solving sessions where students can work on numerical problems and practice applying different methods and techniques. These sessions can be instructor-led or in small groups, allowing students to actively engage with the material.
3. Interactive discussions: Encouraging interactive discussions in class to promote critical thinking and deepen understanding of the numerical concepts. This can involve asking open-ended questions, facilitating student-led discussions, and encouraging peer-to-peer learning.
4. Practical implementation: Providing opportunities for students to implement numerical methods through programming exercises or utilizing numerical software tools. Hands-on experience allows students to gain proficiency in implementing algorithms and analyzing the results.

10. بنية المقرر الدراسي

الاسبوع	الساعات	مخرجات المتعلم المطلوبة	اسم الوحدات او الموضوع	طريقة التعلم	طريقة التقييم
Week 1	3	Introduction to Numerical Analysis and Error Analysis Overview of numerical analysis. Sources of errors in numerical computations. Error analysis and propagation.	Introduction to Numerical Analysis and Error Analysis Overview of numerical analysis. Sources of errors in numerical computations. Error analysis and propagation.	حضوري	اختبارات يومي
Week 2	3	Roots Finding of Nonlinear Equations (Part 1) Graphical methods for estimating roots. Bisection method: Algorithm, convergence analysis, and error estimation.	Roots Finding of Nonlinear Equations (Part 1) Graphical methods for estimating roots. Bisection method: Algorithm, convergence analysis, and error estimation.	حضوري	تقارير
Week 3	3	Roots Finding of Nonlinear Equations (Part 2) False position method: Algorithm, convergence analysis, and error estimation. Newton-Raphson method: Algorithm, convergence analysis, and error estimation.	Roots Finding of Nonlinear Equations (Part 2) False position method: Algorithm, convergence analysis, and error estimation. Newton-Raphson method: Algorithm, convergence analysis, and error estimation.	حضوري	واجبات

اختبارات يومي	حضوري	Roots Finding of Nonlinear Equations (Part 3) Modified Newton-Raphson method for multiple roots. Applications in electrical engineering and thermodynamics.	Roots Finding of Nonlinear Equations (Part 3) Modified Newton-Raphson method for multiple roots. Applications in electrical engineering and thermodynamics.	3	Week 4
تقارير	حضوري	Interpolation and Curve Fitting (Part 1) Polynomial interpolation: Newton's method, divided differences, and interpolation error. Neville's method for polynomial interpolation.	Interpolation and Curve Fitting (Part 1) Polynomial interpolation: Newton's method, divided differences, and interpolation error. Neville's method for polynomial interpolation.	3	Week 5
واجبات	حضوري	Interpolation and Curve Fitting (Part 2) Cubic spline interpolation: Construction of splines, boundary conditions, and continuity requirements. Interpolation error analysis and selection of appropriate methods.	Interpolation and Curve Fitting (Part 2) Cubic spline interpolation: Construction of splines, boundary conditions, and continuity requirements. Interpolation error analysis and selection of appropriate methods.	3	Week 6
اختبارات يومي	حضوري	Linear and Non-linear Regression Introduction to regression analysis. Linear regression: Fitting a straight line using least squares approximation.	Linear and Non-linear Regression Introduction to regression analysis. Linear regression: Fitting a straight line using least squares approximation.	3	Week 7
تقارير	حضوري	Linear and Non-linear Regression (Continued) Multiple linear regression: Modeling relationships between multiple variables. Non-linear regression: Fitting non-linear models using iterative optimization methods.	Linear and Non-linear Regression (Continued) Multiple linear regression: Modeling relationships between multiple variables. Non-linear regression: Fitting non-linear models using iterative optimization methods.	3	Week 8
واجبات	حضوري	Numerical Differentiation Numerical estimation of derivatives using difference formulas. Richardson extrapolation for improving accuracy. Newton forward formula and Sterling formula for derivative estimation.	Numerical Differentiation Numerical estimation of derivatives using difference formulas. Richardson extrapolation for improving accuracy. Newton forward formula and Sterling formula for derivative estimation.	3	Week 9
اختبارات يومي	حضوري	Numerical Integration (Part 1) Trapezoid rule: Algorithm, error estimation, and	Numerical Integration (Part 1) Trapezoid rule: Algorithm, error estimation, and	3	Week 10

		composite trapezoidal rule.	composite trapezoidal rule.		
تقارير	حضوري	Numerical Integration (Part 2) Simpson's rule: Algorithm, error estimation, and composite Simpson's rule. Compound numerical integration: Integration over multiple subintervals.	Numerical Integration (Part 2) Simpson's rule: Algorithm, error estimation, and composite Simpson's rule. Compound numerical integration: Integration over multiple subintervals.	3	Week 11
واجبات	حضوري	Numerical Solution of Ordinary Differential Equations (ODEs) (Part 1) Initial value problem (IVP) and Euler's method. Modified Euler's method: Improved accuracy over Euler's method.	Numerical Solution of Ordinary Differential Equations (ODEs) (Part 1) Initial value problem (IVP) and Euler's method. Modified Euler's method: Improved accuracy over Euler's method.	3	Week 12
اختبارات يومي	حضوري	Numerical Solution of Ordinary Differential Equations (ODEs) (Part 2) Linear multistep methods: Adams-Bashforth and Adams-Moulton methods. One-step methods: Runge-Kutta methods (e.g., RK4).	Numerical Solution of Ordinary Differential Equations (ODEs) (Part 2) Linear multistep methods: Adams-Bashforth and Adams-Moulton methods. One-step methods: Runge-Kutta methods (e.g., RK4).	3	Week 13
تقارير	حضوري	Numerical Solution of Ordinary Differential Equations (ODEs) (Part 3) Error estimation and adaptivity in numerical ODE solutions. Stiffness in ODEs and techniques for handling stiff problems.	Numerical Solution of Ordinary Differential Equations (ODEs) (Part 3) Error estimation and adaptivity in numerical ODE solutions. Stiffness in ODEs and techniques for handling stiff problems.	3	Week 14
واجبات	حضوري	Numerical Solution of Partial Differential Equations (PDEs) Introduction to PDEs and boundary value problems (BVPs). Discretization techniques: Finite difference methods. Solution of resulting linear algebraic equations: Direct and iterative methods.	Numerical Solution of Partial Differential Equations (PDEs) Introduction to PDEs and boundary value problems (BVPs). Discretization techniques: Finite difference methods. Solution of resulting linear algebraic equations: Direct and iterative methods.	3	Week 15

11. تقييم المقرر

As		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	10% (10)	5, 10	LO #1, 2, 8 and 9
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Projects / Lab.				

	Report	1	10% (10)	14	LO # 1-14
Summative assessment	**Midterm Exam**	2 hours	20% (10)	7	LO # 1-7
	Final Exam	3 hours	50% (50)	16	All
Total assessment			100% (100 Marks)		

12. مصادر التعلم والتدريس

S. C. Chapra and R. P. Canale, "Numerical Methods for Engineers," 8th ed., McGraw-Hill Education, 2015. [ISBN: 978-0073401065]

R. L. Burden and J. D. Faires, "Numerical Analysis," 10th ed., Cengage Learning, 2015. [ISBN: 978-1305253667]

نموذج وصف المقرر

أسم المقرر الدراسي:
Advanced Power Engineering
رمز المقرر:
EET3201
الفصل / السنة:
الفصل الأول 2024–2025/ مسار بولونيا
تاريخ اعداد هذا الوصف:
2025/7/16
حضوري / عبر الانترنت:
حضوري
عدد الساعات الدراسية (الكلي)/ عدد الوحدات/ (الكلي):
7 ساعات / 175 وحدة اوربية
أسم مسؤول المقرر الدراسي (اذا كان هناك اكثر من اسم يذكر ايضا):
أهداف المقرر
The Advanced Power Engineering module aims to achieve the following objectives: To understand the principles and applications of underground cables, students will delve into topics such as cable design, installation procedures, and operational considerations. To simplify complex power system calculations and analysis, the module will introduce students to the per unit method, allowing them to normalize quantities and facilitate comparisons among system components. To gain proficiency in interpreting single line diagrams, students will learn to identify symbols and connections, enabling them to comprehend the layout and structure of electrical power systems. To analyze the electrical characteristics of power system components, students will study

impedance and reactance diagrams, which offer valuable insights for power flow analysis, fault calculations, and system stability assessment.
To tackle unbalanced conditions in power systems, the module will explore symmetrical components, breaking down unbalanced quantities into positive, negative, and zero sequence components, facilitating fault analysis, protection coordination, and power quality evaluation.
To comprehend the reactance values associated with positive, negative, and zero sequence components, students will explore positive, negative, and zero sequence reactance diagrams, enhancing their ability to analyze faults, design protection systems, and plan power systems.
To explore advanced power transmission technologies, students will delve into HVDC transmission systems, understanding the principles of AC-DC conversion, long-distance transmission, and AC-DC reconversion, while considering the advantages, challenges, and applications of HVDC in modern power networks.

استراتيجيات التعليم والتعلم

The advanced power engineering module can employ various learning and teaching strategies to effectively deliver the content and achieve the desired learning outcome:
Lectures: Traditional lectures can be used to deliver theoretical concepts, principles, and foundational knowledge related to underground cables, per unit method, single line diagrams, impedance and reactance diagrams, symmetrical components, positive, negative, and zero sequence reactance diagrams, and HVDC transmission systems. Lectures can provide a structured overview of the topics and serve as a starting point for further exploration.
Practical Demonstrations: Hands-on practical demonstrations can enhance understanding and application of the concepts. Students can be exposed to real-world examples of underground cable installation, testing procedures, per unit calculations, system analysis using single line diagrams, and HVDC system operation. This allows students to observe the practical aspects of power engineering and bridge the gap between theory and practice.
Case Studies: Case studies involving power system scenarios and problems can be utilized to promote critical thinking and problem-solving skills. Students can analyze and evaluate different power system configurations, fault scenarios, or HVDC transmission system design choices. Case studies encourage students to apply their knowledge and skills to real-world situations and develop effective solutions.
Laboratory Work: Laboratory experiments or simulations can be employed to reinforce theoretical concepts and allow students to gain practical experience. For example, students can conduct experiments related to cable insulation testing, per unit calculations using software tools, or simulating fault scenarios and analyzing the response using power system simulation software. Laboratory work provides a hands-on experience and enhances students' technical skills.
Assignments and Projects: Assignments and projects can be given to students to apply their knowledge and skills independently. These can include tasks such as analyzing a given power system using single line diagrams, performing fault calculations using impedance and reactance diagrams, designing protection systems based on symmetrical components, or conducting a feasibility study for an HVDC transmission project. Assignments and projects encourage independent thinking, research, and the application of concepts to solve specific problems.
Assessment Methods: Assessment methods can include written exams, laboratory reports, case study analyses, group projects, and presentations. These assessments allow students to demonstrate their understanding, analytical skills, and ability to apply knowledge in practical

scenarios. Varied assessment methods provide a comprehensive evaluation of students' learning and ensure a well-rounded assessment approach.

بنية المقرر الدراسي

الاسبوع	الساعات	مخرجات المتعلم المطلوبة	اسم الوحدات او الموضوع	طريقة التعلم	طريقة التقييم
Week 1	7	Introduction to the lab equipment and safety procedures. Familiarization with power system simulation software.	Introduction to the module and course overview. Overview of power engineering principles and concepts.	حضوري	اختبارات يومي
Week 2	7	Underground Cable Testing: Measurement of cable insulation resistance and capacitance. Analysis of cable test results.	Underground Cables: Construction, types, and characteristics. Cable insulation materials and properties.	حضوري	تقارير
Week 3	7	Per Unit Calculations: Calculation of per unit values for various power system components. Application of per unit method in power flow analysis.	Cable ampacity calculations and thermal considerations. Cable installation procedures and best practices.	حضوري	واجبات
Week 4	7	Single Line Diagram Analysis: Interpretation and analysis of single line diagrams. Power system layout and component identification.	Per Unit Method: Introduction and concept of base values. Conversion of system quantities to per unit values.	حضوري	اختبارات يومي
Week 5	7	Impedance and Reactance Calculations: Calculation and analysis of impedance and reactance values for power system components. Power flow analysis using impedance and reactance diagrams.	Per Unit Method: Calculation and application in power system analysis. Comparison and analysis of different system components using per unit values.	حضوري	تقارير
Week	7	Fault Analysis Using	Single Line Diagrams:	حضوري	واجبات

		Purpose, symbols, and representations. Interpretation of single line diagrams for power system layout and analysis.	Impedance and Reactance Diagrams: Calculation and analysis of fault currents and voltages using impedance and reactance diagrams. Fault location estimation.		6
اختبارات يومي	حضوري	Impedance and Reactance Diagrams: Introduction and concept. Calculation and interpretation of impedance and reactance values.	Symmetrical Components Analysis: Calculation and analysis of positive, negative, and zero sequence components. Fault analysis using symmetrical components.	7	Week 7
تقارير	حضوري	Impedance and Reactance Diagrams: Power flow analysis using impedance and reactance diagrams. Fault analysis and calculation using impedance and reactance diagrams.	Protection Coordination Using Symmetrical Components: Design and coordination of protective devices based on symmetrical components. Analysis of protection system performance during faults.	7	Week 8
واجبات	حضوري	Symmetrical Components: Theory and principles. Calculation and analysis of positive, negative, and zero sequence components.	Sequence Reactance Calculations: Calculation and interpretation of positive, negative, and zero sequence reactance values for power system components. Application of sequence reactance diagrams in fault analysis.	7	Week 9
اختبارات يومي	حضوري	Symmetrical Components: Application in fault analysis and protection coordination. Power quality assessment using	HVDC System Simulation: Simulation of HVDC transmission system using power system software. Analysis of HVDC system performance and control	7	Week 10

		symmetrical components.	parameters.		
تقارير	حضوري	Positive, Negative, and Zero Sequence Reactance Diagrams: Concept and purpose. Calculation and interpretation of reactance values for different sequence components.	HVDC Converter Station Operation: Familiarization with HVDC converter station equipment and control systems. Analysis of converter station operation under different scenarios.	7	Week 11
واجبات	حضوري	Positive, Negative, and Zero Sequence Reactance Diagrams: Application in fault analysis and protection design. System planning considerations using sequence reactance diagrams.	HVDC Transmission Line Design: Design considerations and calculations for HVDC transmission lines. Analysis of line losses and voltage regulation in HVDC systems.	7	Week 12
اختبارات يومي	حضوري	HVDC Transmission Systems: Principles, advantages, and challenges. HVDC converter stations and equipment.	Lab Report Preparation: Guidance and assistance in preparing lab reports for previous experiments and simulations.	7	Week 13
تقارير	حضوري	HVDC Transmission Systems: Transmission line design and operation. Control and protection of HVDC systems.	Lab Report Presentation: Students present their lab reports and findings from the previous experiments. Q&A and discussion on the lab reports.	7	Week 14
واجبات	حضوري	Review and revision of key concepts. Discussion of advanced topics and emerging trends in power engineering.	Review and Recap: Review of key concepts and topics covered throughout the lab sessions. Discussion of advanced power engineering topics and emerging trends.	7	Week 15

تقييم المقرر					
As		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5, 10	LO #1, 2, 8 and 9
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Projects / Lab.	14	10% (10)	Continuous	All
	Report	14	10% (10)	Continuous	All
Summative assessment	Midterm Exam	2 hours	10% (10)	7	LO # 1-7
	Final Exam	3 hours	50% (50)	16	All
Total assessment			100% (100 Marks)		

مصادر التعلم والتدريس
von Meier, "Electric Power Systems: A Conceptual Introduction." Boca Raton, FL: CRC Press, 2006. J. D. Glover, T. J. Overbye, and M. S. Sarma, "Power System Analysis and Design." Boston, MA: Cengage Learning, 2017.
M. Abdel-Salam, "High Voltage Engineering: Fundamentals and Applications." Boca Raton, FL: CRC Press, 2013.

نموذج وصف المقرر

1. أسم المقرر الدراسي:
AC Power Conversions
2. رمز المقرر:
EET3202
3. الفصل / السنة:
الفصل الأول 2024–2025/ مسار بولونيا
4. تاريخ اعداد هذا الوصف:
2025/7/16
5. حضوري / عبر الانترنت:
حضوري
6. عدد الساعات الدراسية (الكلي)/ عدد الوحدات/ (الكلي):
6 ساعات / 150 وحدة اوربية
7. أسم مسؤول المقرر الدراسي (اذا كان هناك اكثر من اسم يذكر ايضا):

8. أهداف المقرر

To provide a more concise statement, the AC Power Converter module aims:

1. To provide a comprehensive understanding of AC and DC power systems, including their differences, advantages, disadvantages, and applications.
2. To teach various DC to AC conversion techniques, such as voltage source inverters and current source inverters, covering their principles, control strategies, and applications.
3. To familiarize students with AC and DC static switches, including their operation, types, and applications in power conversion.
4. To develop proficiency in resonant pulse inverters, including series resonant inverters, parallel resonant inverters, class E resonant inverters, and their principles of operation and control techniques.
5. To provide knowledge of Uninterruptible Power Supply (UPS) systems, including their principles, types, and applications in ensuring power continuity during outages or disturbances.
6. To cultivate practical skills for applying knowledge to real-world scenarios, including designing, analyzing, and controlling AC power converter systems based on given specifications.
7. To enhance critical thinking and problem-solving skills through the analysis and resolution of complex power conversion problems.

9. استراتيجيات التعليم والتعلم

The AC Power Converter module can be delivered using a variety of learning and teaching strategies to enhance students' understanding and engagement. Here are some effective strategies that adopted:

1. Lectures: Traditional lectures can be used to introduce key concepts, theories, and principles related to AC power conversion. Lectures can provide a structured presentation of the content and allow for explanations, demonstrations, and examples.
2. Practical Laboratory Sessions: Practical laboratory sessions provide hands-on experience with AC power converter systems. Students can work with real-world equipment, simulation tools, and measurement instruments to design, build, test, and troubleshoot power converters. This approach helps reinforce theoretical concepts and develop practical skills.
3. Case Studies: Case studies allow students to apply their knowledge to real-world scenarios and analyze practical examples of AC power conversion systems. They can explore the challenges, design considerations, and solutions employed in various applications, such as renewable energy systems or industrial power systems.
4. Group Discussions and Problem-Solving Exercises: Group discussions and problem-solving exercises promote active learning and collaboration. Students can work together to analyze and solve complex problems related to AC power conversion. This approach encourages critical thinking, knowledge sharing, and the exploration of multiple perspectives.
5. Simulations and Modeling: Computer simulations and modeling tools can be used to supplement theoretical concepts and enable students to explore different AC power converter topologies, control strategies, and performance characteristics. Students can simulate and analyze the behavior of power converters under various operating conditions.
6. Guest Speakers and Industry Visits: Inviting guest speakers from industry or arranging visits to power converter manufacturing facilities or power system installations can provide students with real-world insights and practical applications of AC power conversion. It also helps students understand the industry trends, challenges, and career opportunities.
7. Online Resources and Learning Platforms: Utilizing online resources, such as educational websites, interactive simulations, and multimedia presentations, can enhance students' self-paced learning and provide additional learning materials beyond the classroom. Online discussion forums and collaboration platforms can facilitate communication and knowledge sharing among students.
8. Assessments and Feedback: Regular assessments, including quizzes, assignments, and exams, enable students to gauge their understanding of the subject matter and receive feedback on their

progress. Constructive feedback from instructors helps students identify areas for improvement and reinforce their learning.

9. Research Projects: Encouraging students to undertake research projects related to AC power conversion fosters independent thinking, problem-solving skills, and deeper exploration of specific topics. Research projects can involve literature reviews, experimentation, simulation, and the development of innovative solutions.

10. بنية المقرر الدراسي

الاسبوع	الساعات	مخرجات المتعلم المطلوبة	اسم الوحدات او الموضوع	طريقة التعلم	طريقة التقييم
Week 1	6	Lab Introduction and Safety Briefing: Familiarization with laboratory equipment and software tools.	Introduction to AC Power Conversion. Overview of AC and DC power systems. Basic principles of power electronics.	حضوري	اختبارات يومي
Week 2	6	Introduction to Voltage Source Inverters (VSI): Building and testing a single-phase VSI circuit. Measurement of output voltage and current waveforms. Control strategies and waveform analysis. Introduction to Voltage Source Inverters (VSI): Building and testing a single-phase VSI circuit. Measurement of output voltage and current waveforms. Control strategies and waveform analysis.	DC to AC Conversion Techniques: Voltage source inverters (VSI). Principles of operation and control strategies for VSI.	حضوري	تقارير
Week 3	6	Introduction to Current Source Inverters (CSI): Building and testing a single-phase CSI circuit. Measurement of output voltage and current waveforms. Control strategies and waveform analysis.	DC to AC Conversion Techniques: Current source inverters (CSI). Principles of operation and control strategies for CSI.	حضوري	واجبات
Week 4	6	AC Static Switches: Testing and characterization of AC static switches (thyristors, triacs). Understanding their switching characteristics and triggering methods.	AC and DC Static Switches. Thyristors, triacs, MOSFETs, IGBTs, and their characteristics. Applications of static switches in power systems.	حضوري	اختبارات يومي
Week 5	6	DC Static Switches: Testing and characterization of DC static switches (MOSFETs, IGBTs).	Resonant Pulse Inverters: Series resonant inverters. Operation, control, and design considerations for	حضوري	تقارير

		series resonant inverters.	Understanding their switching characteristics and control techniques.		
واجبات	حضوري	Resonant Pulse Inverters: Parallel resonant inverters. Operation, control, and design considerations for parallel resonant inverters.	Series Resonant Inverters: Building and testing a series resonant inverter circuit. Analysis of resonant frequency, voltage, and current waveforms. Control techniques and efficiency measurement.	6	Week 6
اختبارات يومي	حضوري	Resonant Pulse Inverters: Class E resonant inverters. Principles, advantages, and applications of class E resonant inverters.	Parallel Resonant Inverters: Building and testing a parallel resonant inverter circuit. Analysis of resonant frequency, voltage, and current waveforms. Control techniques and efficiency measurement.	6	Week 7
تقارير	حضوري	Resonant Pulse Inverters: Zero-current-switching and zero-voltage-switching resonant converters. Operation, control, and design considerations for these converters.	Class E Resonant Inverters: Building and testing a class E resonant inverter circuit. Analysis of waveforms and efficiency measurement. Comparison with conventional inverters.	6	Week 8
واجبات	حضوري	Resonant Pulse Inverters: Two-quadrant ZVS resonant converters. Principles, operation, and control strategies for two-quadrant ZVS converters.	Zero-Current-Switching and Zero-Voltage-Switching Resonant Converters: Building and testing zero-current-switching and zero-voltage-switching resonant converter circuits. Analysis of waveforms and efficiency measurement. Comparison with conventional inverters.	6	Week 9
اختبارات يومي	حضوري	Resonant Pulse Inverters: Resonant DC-link inverters. Principles, operation, and control strategies for resonant DC-link inverters.	Two-Quadrant ZVS Resonant Converters: Building and testing a two-quadrant ZVS resonant converter circuit. Analysis of waveforms, control strategies, and efficiency measurement.	6	Week 10
تقارير	حضوري	Uninterruptible Power Supply (UPS) Systems. Types of UPS systems, principles of operation, and backup strategies.	Uninterruptible Power Supply (UPS) Systems: Testing and analysis of UPS systems under different load conditions. Backup time calculation and performance evaluation.	6	Week 11

واجبات	حضوري	Design and Analysis of AC Power Converters. Converter topologies, control techniques, and design considerations.	Simulation and Modeling of AC Power Converters: Using simulation tools to model and simulate AC power converters. Analysis of converter performance and control strategies.	6	Week 12
اختبارات يومي	حضوري	Practical Applications and Case Studies. Applications of AC power converters in renewable energy systems, motor drives, and power factor correction.	Design and Analysis of AC Power Converter Systems: Designing and optimizing AC power converter systems based on given specifications. Simulation, prototyping, and testing of the designed systems.	6	Week 13
تقارير	حضوري	Emerging Trends and Future Developments in AC Power Conversion. Latest advancements in power electronics and integration with smart grids and energy storage systems.	Advanced Topics in AC Power Conversion: Exploring advanced topics such as power factor correction, multilevel converters, or grid-connected systems. Simulation, analysis, and performance evaluation.	6	Week 14
واجبات	حضوري	Review and Exam Preparation. Recap of key concepts, problem-solving exercises, and exam preparation.	Project Work and Presentation: Undertaking a mini project related to AC power conversion. Design, simulation, implementation, and presentation of the project.	6	Week 15

11. تقييم المقرر

As		Time/ Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	10% (10)	5, 10	LO #1, 2, 8 and 9
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Projects / Lab.	14	10% (10)	Continuous	All
	Report	14	10% (10)	Continuous	All
Summative assessment	**Midterm Exam**	2 hours	10% (10)	7	LO # 1-7
	Final Exam	3 hours	50% (50)	16	All
Total assessment			100% (100 Marks)		

12. مصادر التعلم والتدريس

N. Mohan, T. M. Undeland, and W. P. Robbins, "Power Electronics: Converters, Applications, and Design," 3rd ed. Hoboken, NJ: John Wiley & Sons, 2002.

M. H. Rashid, "Power Electronics: Circuits, Devices, and Applications," 4th ed. Boston, MA: Pearson, 2013.

نموذج وصف المقرر

1. أسم المقرر الدراسي:
Synchronous and Special Machines
2. رمز المقرر:
EET3203
3. الفصل / السنة:
الفصل الأول 2024-2025/ مسار بولونيا
4. تاريخ اعداد هذا الوصف:
2025/7/16
5. حضوري / عبر الانترنت:
حضوري
6. عدد الساعات الدراسية (الكلي)/ عدد الوحدات/ (الكلي):
5 ساعات / 125 وحدة اوربية
7. أسم مسؤول المقرر الدراسي (اذا كان هناك اكثر من اسم يذكر ايضا):
8. أهداف المقرر
The aims of the Synchronous and Special Machines module include: 1. To understand the construction, theory of operation, and characteristics of synchronous machines and special machines. 2. To comprehend the principles and methods of voltage regulation in synchronous machines. 3. To learn about the parallel operation of alternators and its significance in power generation systems. 4. To explore the applications, operating characteristics, and effects of changing field excitation at a constant load in synchronous motors. 5. To understand the power relations and power-flow equations in synchronous machines. 6. To analyze V curves for synchronous motors and their role in maintaining voltage stability. 7. To study linear synchronous machines and their applications in high-speed transportation systems. 8. To introduce and examine various types of special machines, including stepper motors, permanent magnet motors, servomotors, reluctance motors, switched reluctance motors, brushless DC motors, hysteresis motors, and linear induction motors. 9. To develop a comprehensive understanding of synchronous and special machines, enabling their effective utilization in industrial and technological fields.

9. استراتيجيات التعليم والتعلم

The Synchronous and Special Machines module can be effectively taught and learned through a combination of various strategies. Here are some suggested learning and teaching strategies for this module:

1. Lectures: Conduct interactive lectures to introduce the theoretical concepts, principles, and operating characteristics of synchronous and special machines. Use visual aids, illustrations, and examples to enhance understanding.
2. Practical Demonstrations: Organize hands-on demonstrations or laboratory sessions where students can observe and interact with actual synchronous machines and special machines. This provides practical exposure and reinforces theoretical concepts.
3. Case Studies: Present real-life case studies and examples to illustrate the application of synchronous and special machines in different industries. Analyze the challenges faced and the solutions implemented, encouraging critical thinking and problem-solving skills.
4. Group Discussions: Facilitate group discussions and brainstorming sessions to encourage students to actively participate and share their perspectives on various topics related to synchronous and special machines. This promotes collaboration and a deeper understanding of the subject matter.
5. Simulations and Virtual Labs: Utilize computer-based simulations and virtual laboratory environments to simulate the operation of synchronous machines and allow students to experiment with different parameters. This provides a safe and interactive learning experience.
6. Research Projects: Assign research projects to students on specific topics related to synchronous and special machines. This encourages independent learning, research skills development, and the exploration of advanced concepts and emerging technologies.

10. بنية المقرر الدراسي

الاسبوع	الساعات	مخرجات المتعلم المطلوبة	اسم الوحدات او الموضوع	طريقة التعلم	طريقة التقييم
Week 1	5	Introduction to Lab Equipment and Safety Lab equipment overview and safety guidelines. Introduction to the synchronous and special machines used in the lab.	Introduction to Synchronous Machines Basic principles and applications. Overview of synchronous machines in power systems and industries.	حضوري	اختبارات يومي
Week 2	5	Synchronous Machine Construction Disassembly and assembly of a synchronous machine. Identification of components and their functions.	Construction of Synchronous Machines Stator and rotor construction. Winding configurations and types.	حضوري	تقارير
Week 3	5	Voltage Regulation in Synchronous Machines Practical demonstration of different methods of voltage regulation. Measurement and analysis of voltage regulation characteristics.	Theory of Synchronous Machines Electromagnetic induction and magnetic fields. Generation of EMF and torque.	حضوري	واجبات
Week 4	5	Alternator Operation and Parallel Operation Hands-on experimentation with alternators and	Alternators Operating principles and characteristics. Types of alternators.	حضوري	اختبارات يومي

		Excitation systems and voltage regulation.	synchronization techniques. Parallel operation of alternators and load sharing control.		
تقارير	حضوري	Methods of Voltage Regulation Synchronous impedance method. EMF or Potier method.	Synchronous Motor Characteristics Performance testing of synchronous motors. Measurement and analysis of torque-speed characteristics.	5	Week 5
واجبات	حضوري	Parallel Operation of Alternators Synchronization and paralleling of alternators. Load sharing and control mechanisms.	Field Excitation Effects on Synchronous Motors Investigation of the impact of changing field excitation on motor performance. Measurement and analysis of torque, power factor, and efficiency.	5	Week 6
اختبارات يومي	حضوري	Synchronous Motors Operating principles and characteristics. Field excitation methods.	Power Relations in Synchronous Machines Measurement and analysis of active power, reactive power, and power factor. Study of power-angle characteristics.	5	Week 7
تقارير	حضوري	Effect of Changing Field Excitation at Constant Load Impact on motor performance. Field weakening and strengthening techniques.	V Curves for Synchronous Motors Experimental determination of V curves for synchronous motors. Analysis of the relationship between field excitation and terminal voltage.	5	Week 8
واجبات	حضوري	Power Relations in Synchronous Machines Active power, reactive power, and power factor. Power-angle characteristics and equations.	Linear Synchronous Machines Study of linear synchronous machines and their applications. Practical demonstration of their operation and characteristics.	5	Week 9
اختبارات يومي	حضوري	V Curves for Synchronous Motors Characteristics and interpretation of V curves. Determination of field excitation for voltage regulation.	Stepper Motor Control Hands-on experience with stepper motor control techniques. Programming and implementation of different stepping modes.	5	Week 10
تقارير	حضوري	Linear Synchronous Machines Principles and applications in high-speed transportation systems. Construction and operation	Permanent Magnet Motors Testing and analysis of permanent magnet DC motors and synchronous motors. Measurement of their	5	Week 11

		of linear synchronous motors.	performance parameters.		
واجبات	حضوري	Stepper Motors Types, operation, and control strategies.	Servomotor Control Practical exercises involving control of DC and AC servomotors. Implementation of position and speed control algorithms.	5	Week 12
اختبارات يومي	حضوري	Permanent Magnet Motors DC motors and synchronous motors utilizing permanent magnets.	Other Special Machines Exploration and experimentation with reluctance motors, switched reluctance. motors, brushless DC motors, hysteresis motors, and linear induction motors.	5	Week 13
تقارير	حضوري	Servomotors DC servomotors and AC servomotors.	Lab Review and Project Work Review of key concepts and lab experiments. Project work related to synchronous and special machines.	5	Week 14
واجبات	حضوري	Other Special Machines Reluctance motors switched reluctance motors, brushless DC motors, hysteresis motors, and linear induction motors.	Lab Exams and Project Presentations Individual or group lab exams assessing practical skills and knowledge. Project presentations and discussions.	5	Week 15

11. تقييم المقرر

As		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	10% (10)	5, 10	LO #1, 2, 8 and 9
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Projects / Lab.	14	10% (10)	Continuous	All
	Report	14	10% (10)	Continuous	All
Summative assessment	**Midterm Exam**	2 hours	10% (10)	7	LO # 1-7
	Final Exam	3 hours	50% (50)	16	All
Total assessment			100% (100 Marks)		

12. مصادر التعلم والتدريس

S. J. Chapman, "Electric Machinery Fundamentals." McGraw-Hill, 2004.

Boldea and S. A. Nasar, "Synchronous Generators." CRC Press, 2018.

S. K. Srinivasan, "Special Electrical Machines." McGraw-Hill Education, 2017.

نموذج وصف المقرر

1. أسم المقرر الدراسي:
Digital Controllers
2. رمز المقرر:
EET3204
3. الفصل / السنة:
الفصل الأول 2024–2025/ مسار بولونيا
4. تاريخ اعداد هذا الوصف:
2025/7/16
5. حضوري / عبر الانترنت:
حضوري
6. عدد الساعات الدراسية (الكلي)/ عدد الوحدات/ (الكلي):
7 ساعات / 175 وحدة اوربية
7. أسم مسؤول المقرر الدراسي (اذا كان هناك اكثر من اسم يذكر ايضا):
8. أهداف المقرر
The Digital Controllers module aims to achieve the following objectives: 1. To provide an introduction to the concept of single-chip microcomputers (microcontrollers) and their applications in various industries. 2. To familiarize students with different types of microcontrollers, their features, and their suitability for different applications. 3. To explain the architecture of microcontrollers, including the block diagram, pin functions, and memory organization. 4. To introduce students to program development tools such as Integrated Development Environments (IDEs), assemblers, compilers, linkers, simulators, and debuggers. 5. To cover the concept of sensor interfacing with microcontrollers, types of sensors, and their applications. 6. To explain analog-to-digital (A/D) and digital-to-analog (D/A) conversion techniques used in microcontroller interfacing. 7. To provide an understanding of input/output (I/O) instructions and their usage in microcontroller programming. 8. To introduce students to programmable logic controllers (PLCs), including their history, operation principles, and advantages. 9. To explain ladder diagrams, a commonly used programming language for PLCs. 10. To familiarize students with the processors used in PLCs, the process scan cycle, and system power supply requirements. 11. To cover memory systems, including their organization, configuration, and interaction with input/output devices in PLCs. 12. To discuss discrete and analog input/output systems, including I/O racks, instructions, data representation, and handling. 13. To introduce special function I/O interfaces, such as analog, temperature, PID control, and

positioning interfacing.
14. To cover different programming languages used in PLCs and focus on ladder relay programming.
15. To explore various programming concepts and instructions used in PLCs, including timers, counters, arithmetic operations, data manipulations, and flow control.
16. To provide guidance on system programming and implementation, including control strategies, I/O control programming, and implementation guidelines.
To illustrate real-world industrial applications of PLCs, such as drilling machines, package sorting, injection molding, bottle filling, X-Y dispensers, and more.

9. استراتيجيات التعليم والتعلم

The Digital Controllers module can employ various learning and teaching strategies to facilitate student understanding and engagement. Here are some effective strategies:
1. Lectures: Instructor-led lectures can provide a structured presentation of the module's content, covering theoretical concepts, principles, and key information. Visual aids, such as slides or demonstrations, can enhance understanding.
2. Interactive Discussions: Engage students in interactive discussions to promote critical thinking and application of concepts. Encourage students to ask questions, share their perspectives, and participate in group discussions to deepen their understanding.
3. Hands-on Practical Sessions: Provide hands-on practical sessions where students can work with microcontrollers and PLCs, programming software, and interfacing components. This experiential learning approach enhances understanding and helps students apply theoretical knowledge in practical scenarios.
4. Case Studies: Present real-world case studies that showcase the practical applications of microcontrollers and PLCs in industrial settings. Analyzing and discussing these case studies can help students connect theory to practice and understand the challenges and solutions in real-life scenarios.
5. Group Projects: Assign group projects where students work together to design and implement microcontroller or PLC-based systems for specific applications. This encourages teamwork, problem-solving, and application of knowledge in a practical context.
6. Simulations and Virtual Labs: Utilize simulations and virtual lab environments to provide virtual hands-on experiences. This allows students to practice programming and interfacing without requiring physical hardware, making it accessible and convenient for learning.
7. Guest Lectures and Industry Experts: Invite guest lecturers or industry experts to share their experiences and insights related to microcontrollers and PLCs. This can provide real-world perspectives, practical tips, and industry trends to enhance students' understanding and career awareness.
Assessments and Feedback: Use a variety of assessment methods, such as quizzes, assignments, practical projects, and examinations, to evaluate students' understanding and progress. Provide timely feedback to help students identify areas of improvement and reinforce their learning.

10. بنية المقرر الدراسي

الاسبوع	الساعات	مخرجات المتعلم المطلوبة	اسم الوحدات او الموضوع	طريقة التعلم	طريقة التقييم
Week 1	7	Introduction to Arduino IDE and Basic Programming Setting up Arduino IDE and connecting the Arduino board. Writing and uploading a simple program to blink an LED. Experimenting with different input/output (I/O) pins and	Introduction to Single-Chip Microcomputers (Microcontrollers) Overview of microcontrollers and their applications. Types of microcontrollers and	حضوري	اختبارات يومي

		their features.	basic programming constructs.		
تقارير	حضوري	Microcontroller Architecture Block diagram of microcontrollers. Pin diagram and pin functions. General purpose and special-function registers.	Arduino Sensor Interfacing Interfacing various sensors (e.g., temperature, light, motion) with Arduino. Reading sensor data and displaying it on the serial monitor or LCD. Implementing sensor-based control and feedback systems.	7	Week 2
واجبات	حضوري	Program Development Tools (IDE) Integrated Development Environments (IDEs). Assembler, compiler, linker, simulator, and debugger.	Arduino Actuator Interfacing Interfacing actuators (e.g., LEDs, motors, relays) with Arduino. Controlling actuators based on sensor inputs or program logic. Building automation tasks and projects using Arduino.	7	Week 3
اختبارات يومي	حضوري	Microcontroller Interfacing Sensors and their interfacing with microcontrollers. Analog-to-digital (A/D) and digital-to-analog (D/A) conversion.	Advanced Arduino Programming Techniques Utilizing libraries and functions for advanced Arduino programming. Implementing communication protocols (e.g., I2C, SPI) for sensor and actuator integration. Creating custom functions and modularizing Arduino code.	7	Week 4
تقارير	حضوري	Input/Output (I/O) Instructions I/O instructions and their usage in microcontroller programming.	Introduction to PLC and Basic Programming Understanding the fundamentals of PLCs and their applications. Introduction to ladder logic programming language. Creating and simulating ladder logic programs for basic control tasks.	7	Week 5
واجبات	حضوري	Introduction to Programmable Logic Controllers (PLCs) Definition and history of PLCs. Operation principles of PLCs.	PLC Input/Output Interfacing Interfacing digital and analog inputs/outputs with the PLC. Configuring I/O modules and addressing inputs/outputs. Testing and verifying the PLC I/O operation.	7	Week 6
اختبارات يومي	حضوري	Processors and Power Supply of PLCs Processors used in PLCs. Process scan cycle. System power supply requirements.	PLC Programming - Sequential Control Implementing sequential control using ladder logic programming. Designing and programming simple sequential tasks and state machines. Simulating and testing the PLC program for sequential control.	7	Week 7

تقارير	حضوري	Memory Systems and I/O Interaction in PLCs Memory overview, structure, and organization in PLCs. Configuration of memory systems. Interaction with input/output devices.	PLC Programming - Timer and Counter Applications Understanding timer and counter instructions in ladder logic programming. Creating timer-based control and delay operations. Implementing counting operations for various applications.	7	Week 8
واجبات	حضوري	Discrete and Analog Input/Output Systems in PLCs I/O racks and modules in PLCs. Discrete I/O types and instructions. Analog I/O instructions.	PLC Programming - Data Manipulation and Arithmetic Operations Utilizing data manipulation instructions (e.g., move, compare, convert) in PLC programming. Performing arithmetic operations and mathematical calculations in ladder logic. Applying data manipulation and arithmetic operations in control tasks.	7	Week 9
اختبارات يومي	حضوري	Special Function I/O and Interfaces in PLCs Special analog interfaces (e.g., temperature, PID control). Positioning interfacing.	PLC Programming - Analog Control Interfacing and controlling analog devices (e.g., sensors, actuators) with the PLC. Configuring and calibrating analog inputs and outputs. Implementing analog control using ladder logic programming.	7	Week 10
تقارير	حضوري	PLC Programming Types of PLC programming languages. Ladder diagram format. Ladder relay programming.	PLC Networking and Communication Configuring communication protocols (e.g., Modbus, Ethernet/IP) for data exchange. Implementing networked control systems using PLCs. Establishing communication between PLC and external devices (e.g., HMI, SCADA).	7	Week 11
واجبات	حضوري	Programming Techniques and Instructions Timers and counters in PLC programming. Arithmetic and data manipulation instructions. Flow control instructions.	Advanced PLC Programming Techniques Utilizing advanced instructions (e.g., shift registers, math operations) in ladder logic programming. Implementing complex control algorithms and logic using PLC programming. Developing modular and structured PLC programs.	7	Week 12

اختبارات يومي	حضوري	System Programming and Implementation Control strategy development. Implementation guidelines. I/O control programming.	Integration of Arduino and PLC Connecting Arduino and PLC together using appropriate interfaces (e.g., digital inputs/outputs). Integrating Arduino and PLC for combined control and monitoring tasks. Implementing complex control strategies and automation systems using Arduino and PLC in conjunction.	7	Week 13
تقارير	حضوري	Industrial Applications of PLCs Examples of industrial applications utilizing PLCs.	Industrial Applications and Project Development Undertaking industrial automation projects using Arduino and PLC. Designing and implementing control systems for specific applications (e.g., conveyor control, temperature regulation). Testing, troubleshooting, and refining the developed projects.	7	Week 14
واجبات	حضوري	Review and Assessment Recap of key concepts and topics. Final assessment or project presentations.	Project Presentations and Review Students present their final projects, demonstrating their understanding and application of digital controllers. Review of key concepts, techniques.	7	Week 15

11. تقييم المقرر

As		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	10% (10)	5, 10	LO #1, 2, 8 and 9
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Projects / Lab.	14	10% (10)	Continuous	All
	Report	14	10% (10)	Continuous	All
Summative assessment	**Midterm Exam**	2 hours	10% (10)	7	LO # 1-7
	Final Exam	3 hours	50% (50)	16	All
Total assessment			100% (100 Marks)		

12. مصادر التعلم والتدريس

S. H. Zak, "Microcontrollers: Fundamentals and Applications with PIC," Cengage Learning, 2018.
T. J. Williams, "Programmable Logic Controllers," 6th edition, McGraw-Hill Education, 2017.

F. P. Beer, E. R. Johnston Jr., and D. F. Mazurek, "Process Dynamics and Control," 4th edition, Wiley, 2018.
S. B. Niku, "Introduction to Robotics: Analysis, Systems, Applications," Oxford University Press, 2018.
G. F. Franklin, J. D. Powell, and A. Emami-Naeini, "Digital Control of Dynamic Systems," Pearson, 2014

نموذج وصف المقرر

1. أسم المقرر الدراسي:
Transmission and Distribution Systems
2. رمز المقرر:
EET4101
3. الفصل / السنة:
الفصل الأول 2024-2025/ مسار بولونيا
4. تاريخ اعداد هذا الوصف:
2025/7/16
5. حضوري / عبر الانترنت:
حضوري
6. عدد الساعات الدراسية (الكلي)/ عدد الوحدات/ (الكلي):
5 ساعات / 125 وحدة اوربية
7. أسم مسؤول المقرر الدراسي (اذا كان هناك اكثر من اسم يذكر ايضا):
8. أهداف المقرر
The aims of the Transmission and Distribution Module are to provide students or participants with a solid understanding of the following: 1. To provide students or participants with a solid understanding of electric power transmission and distribution systems. 2. To familiarize students with the overall structure and components of electric power supply systems, including power generation, transmission, and distribution. 3. To enable students to compare and evaluate different conductor materials, such as copper and aluminum, based on their electrical properties, cost, availability, and other relevant factors. 4. To provide students with the ability to calculate the appropriate size of conductors using Kelvin's law and understand the relationship between conductor size, electrical resistance, and temperature rise. 5. To educate students about different grounding techniques and their importance in electrical systems, including system grounding, equipment grounding, and grounding electrode systems. 6. To provide students with an understanding of the performance characteristics of transmission lines, including line losses, voltage regulation, and power factor correction. 7. To familiarize students with the components and configurations of power distribution systems, such as substations, transformers, distribution lines, and distribution transformers.
9. استراتيجيات التعليم والتعلم
The Transmission and Distribution Module can be effectively taught using a combination of various learning and teaching strategies. Here are some strategies that can be employed: 1. Lectures: Traditional lectures can be used to deliver foundational knowledge and concepts related to electric power transmission and distribution. Lectures can provide an overview of the subject matter, explain theoretical principles, and highlight key concepts.

2. Interactive Discussions: Engaging students in interactive discussions can help deepen their understanding of the topics covered. This can involve group discussions, brainstorming sessions, and question-and-answer sessions to encourage active participation and critical thinking.
3. Case Studies and Real-World Examples: Presenting real-world case studies and examples related to transmission and distribution can help students relate theoretical concepts to practical applications. Analyzing and discussing these cases can enhance problem-solving skills and promote a deeper understanding of the subject matter.
4. Hands-on Experiments and Simulations: Conducting hands-on experiments or using simulations can provide students with a practical experience of working with transmission and distribution systems. This can include laboratory experiments, computer simulations, or virtual reality simulations to demonstrate concepts and allow students to apply their knowledge.
5. Group Projects and Presentations: Assigning group projects related to transmission and distribution can encourage teamwork, research skills, and critical analysis. Students can work together to design transmission lines, analyze distribution systems, or propose improvements to existing infrastructure. Presentations of project findings can enhance communication and presentation skills.
6. Site Visits and Guest Speakers: Organizing site visits to transmission substations, distribution centers, or renewable energy facilities can provide students with firsthand exposure to the actual infrastructure and operations. Inviting guest speakers from industry professionals can also offer insights into real-world challenges and experiences in transmission and distribution.
7. Technology Integration: Integrating technology tools and resources can enhance learning experiences. This can include using multimedia presentations, interactive simulations, online resources, and virtual learning platforms to supplement classroom instruction and provide additional learning materials.
8. Assessment Methods: Assessments should be designed to evaluate students' understanding and application of the concepts learned. This can include quizzes, exams, project reports, presentations, and practical assessments to gauge their knowledge, problem-solving abilities, and practical skills.
9. Continuous Feedback and Support: Regularly providing feedback and support to students can help them track their progress and address any difficulties they may face. This can include one-on-one discussions, office hours, and constructive feedback on assignments and projects.
10. Industry Collaboration and Internships: Collaborating with industry partners or offering internships can provide students with valuable hands-on experience in transmission and distribution. This can enhance their understanding of industry practices, build professional networks, and bridge the gap between theoretical knowledge and practical applications.

10. بنية المقرر الدراسي

الاسبوع	الساعات	مخرجات المتعلم المطلوبة	اسم الوحدات او الموضوع	طريقة التعلم	طريقة التقييم
Week 1	5	Lab Safety and Introduction to Lab Equipment Introduction to lab safety procedures and protocols. Familiarization with lab equipment and tools used in transmission and distribution experiments.	Introduction to Electric Power Supply Systems Overview of electric power supply systems. Types of power plants and energy sources.	حضوري	اختبارات يومي
Week 2	5	Conductor Material Comparison Conduct experiments to compare the electrical properties of different conductor materials. Measure conductivity, resistivity,	Conductor Materials and Comparison Properties of conductor materials. Comparison of	حضوري	تقارير

		conductor materials: copper, aluminum, others.	and other relevant parameters.		
واجبات	حضوري	Conductor Sizing and Kelvin's Law Calculation of conductor size using Kelvin's law. Current carrying capacity and temperature rise considerations.	Conductor Sizing and Kelvin's Law Perform experiments to understand the relationship between conductor size, electrical resistance, and temperature rise. Use Kelvin's law to calculate the appropriate size of conductors for given scenarios.	5	Week 3
اختبارات يومي	حضوري	Grounding Systems and Techniques Purpose and importance of grounding in electrical systems. Types of grounding systems: system grounding, equipment grounding, grounding electrode systems.	Grounding Systems and Techniques Set up experiments to demonstrate different grounding techniques. Measure and compare the effectiveness of system grounding, equipment grounding, and grounding electrode systems.	5	Week 4
تقارير	حضوري	Performance of Transmission Lines Transmission line parameters: line losses, impedance, reactance. Voltage regulation and power factor correction.	Transmission Line Performance Analysis Conduct experiments to measure line losses, voltage regulation, and power factor correction in transmission lines. Analyze the impact of line parameters on transmission line performance.	5	Week 5
واجبات	حضوري	Short Transmission Lines	Distribution System Components and Configurations Set up experiments to study the behavior and characteristics of distribution system components such as transformers and distribution lines. Explore different distribution system configurations and their effects on power flow.	5	Week 6
اختبارات يومي	حضوري	Medium Transmission Lines Type T. Type Pi.	Power Quality Analysis in Distribution Systems Perform experiments to measure and analyze power quality issues in distribution systems. Investigate voltage sags, swells, harmonics, and their impacts.	5	Week 7
تقارير	حضوري	Long Transmission Lines	Safety Measures in Transmission and Distribution Conduct hands-on activities to reinforce safety practices in	5	Week 8

			transmission and distribution environments. Perform risk assessments, demonstrate proper use of personal protective equipment (PPE), and simulate emergency scenarios.		
واجبات	حضوري	Distribution Systems and Components Overview of power distribution systems. Substations, transformers, and distribution lines.	Renewable Energy Integration in Transmission and Distribution Set up experiments to explore the integration of renewable energy sources in transmission and distribution systems. Analyze the challenges and benefits of incorporating renewable energy.	5	Week 9
اختبارات يومي	حضوري	Distribution System Configurations Radial distribution systems. Loop and network distribution systems.	Smart Grid Technologies and Grid Modernization Perform experiments related to smart grid technologies such as advanced metering infrastructure (AMI) and demand response. Investigate the impact of grid modernization on transmission and distribution systems.	5	Week 10
تقارير	حضوري	Safety and Regulatory Requirements Safety regulations and codes in transmission and distribution. Occupational safety practices.	Fault Detection and Protection in Transmission Lines Set up experiments to detect and simulate faults in transmission lines. Study protective devices and analyze their performance in fault conditions.	5	Week 11
واجبات	حضوري	Power Quality in Distribution Systems Power quality issues and considerations. Voltage sags, swells, and harmonics.	Distribution Network Planning and Optimization Perform simulations or use software tools to plan and optimize distribution networks. Consider factors such as load balancing, voltage control, and system reliability.	5	Week 12
اختبارات يومي	حضوري	Practical Applications and Case Studies Analysis of transmission line designs. Distribution network planning and optimization.	Project Work and Presentations Work on group projects related to transmission and distribution. Design and simulate transmission lines, distribution networks, or implement improvements to existing systems. Present project findings and recommendations.	5	Week 13
تقارير	حضوري	Project Work and Presentations Collaborative projects on transmission and	Review and Revision Review lab experiments, concepts, and practical applications covered in the module.	5	Week 14

		distribution systems. Presentation of project findings and recommendations.	Address any questions or concerns related to lab work.		
واجبات	حضوري	Final Assessment and Evaluation Final examination or assessment. Course evaluation and feedback.	Lab Assessment and Evaluation Complete a lab assessment or practical examination. Evaluate the effectiveness of the lab sessions and provide feedback.	5	Week 15

11. تقييم المقرر

As		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5, 10	LO #1, 2, 8 and 9
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Projects / Lab.	14	10% (10)	Continuous	All
	Report	14	10% (10)	Continuous	All
Summative assessment	Midterm Exam	2 hours	10% (10)	7	LO # 1-7
	Final Exam	3 hours	50% (50)	16	All
Total assessment			100% (100 Marks)		

12. مصادر التعلم والتدريس

V. K. Mehta, "Principles of Power Systems" 2nd ed., S. Chand & Company LTD.

S. Sivanagaraju, "Electric Power Transmission and Distribution," 2nd ed., New Delhi, India: Pearson Education India, 2015.

A. von Meier, "Electric Power Systems: A Conceptual Introduction," Hoboken, NJ: Wiley, 2018.

نموذج وصف المقرر

1. أسم المقرر الدراسي:
Power Systems Analysis
2. رمز المقرر:
EET4103
3. الفصل / السنة:
الفصل الأول 2024-2025/ مسار بولونيا
4. تاريخ اعداد هذا الوصف:

2025/7/16
5. حضوري / عبر الانترنت:
حضوري
6. عدد الساعات الدراسية (الكلي)/ عدد الوحدات/ (الكلي):
5 ساعات / 125 وحدة اوربية
7. أسم مسؤول المقرر الدراسي (اذا كان هناك اكثر من اسم يذكر ايضا):
8. أهداف المقرر
The Power Systems Analysis module aims to achieve the following objectives: 1. To provide a clear overview, the aims of the Power Systems Analysis module are as follows: 2. To develop a comprehensive understanding of the fundamental concepts and principles that underpin power system analysis. 3. To familiarize students with the mathematical tools and techniques employed in power system analysis, including the per unit system, node equations, single line diagram and impedance/reactance diagrams. 4. To enable students to effectively utilize the bus admittance matrix and bus impedance matrix in network calculations and analysis. 5. To equip students with the skills and knowledge necessary to solve the power flow problems by employing methods such as the Gauss-Seidel power flow solution. 6. To cultivate an understanding of symmetrical faults in power systems and their implications on the system operation and protection. 7. To empower students to analyze and interpret power system behavior, encompassing voltage levels, current flows, and power flows. 8. To enhance problem-solving and critical-thinking abilities through practical applications and exercises centered on power systems analysis. 9. To foster an awareness of the challenges and considerations involved in power system analysis, including system stability, voltage control, and fault analysis. 10. To encourage students to apply power system analysis techniques to real-world scenarios, considering factors such as system reliability, efficiency, and safety. To promote effective communication and collaboration skills through engaging in group discussions, delivering presentations, and undertaking project work focused on power systems analysis.
9. استراتيجيات التعليم والتعلم
The Power Systems Analysis module can employ a variety of learning and teaching strategies to facilitate effective understanding and application of the subject matter. Some common strategies used in this module include: 1. Lectures: Instructors deliver lectures to introduce key concepts, theories, and principles related to power systems analysis. Lectures provide a structured overview of the topic and can include examples, demonstrations, and visuals to enhance understanding. 2. Practical Work: Practical sessions allow students to apply the theoretical knowledge gained in lectures. This can involve using software tools for power system analysis, solving numerical problems, and conducting experiments or simulations to analyze power system behavior. 3. Problem-Solving Exercises: In-class or homework exercises are assigned to students to practice problem-solving skills and reinforce understanding of power system analysis techniques. These exercises can involve solving power flow problems, analyzing fault scenarios, and calculating system parameters. 4. Case Studies: Case studies provide real-world examples and scenarios where students can apply power system analysis techniques. Students analyze and interpret data, identify issues, and propose

solutions based on their understanding of power system analysis principles.
5. Group Discussions and Presentations: Group discussions and presentations encourage active participation and collaboration among students. They provide opportunities to discuss and debate power system analysis topics, share insights, and present findings from case studies or practical work.
6. Laboratory Work: Laboratory sessions offer hands-on experiences with power system analysis equipment and tools. Students can conduct experiments, collect data, and analyze the behavior of power system components under various conditions.
7. Computer-Based Simulations: Computer-based simulations enable students to explore power system behavior in a controlled virtual environment. Simulations can help students visualize the effects of parameter changes, faults, and control strategies on system operation.
8. Guest Lectures and Industry Visits: Inviting guest speakers from the power industry or organizing visits to power system facilities provide real-world perspectives and insights. Industry professionals can share their experiences, challenges, and practical applications of power system analysis.
9. Self-Directed Learning: Encouraging students to engage in independent study and research fosters self-directed learning. This can involve reading recommended textbooks, scholarly articles, and online resources to deepen understanding of power system analysis concepts.
10. Assessments: Regular assessments, such as quizzes, exams, and coursework, evaluate students' knowledge and understanding of power system analysis. These assessments can include problem-solving questions, analysis of case studies, and interpretation of power system data.

10. بنية المقرر الدراسي

الاسبوع	الساعات	مخرجات المتعلم المطلوبة	اسم الوحدات او الموضوع	طريقة التعلم	طريقة التقييم
Week 1	5	Introduction to Power Systems Analysis Software Familiarization with power system analysis software tools. Basic software functionalities and user interface navigation.	Introduction to Power Systems Analysis Overview of power systems and their components. Basic power system equations and concepts.	حضوري	اختبارات يومي
Week 2	5	Per Unit System and Node Equations in Software Utilizing power system analysis software for per unit calculations. Inputting and solving node equations using software.	Per Unit System and Node Equations Introduction to the per unit system and its advantages. Conversion of quantities to per unit values. Formulation and solution of node equations.	حضوري	تقارير
Week 3	5	Single Line Diagrams and Impedance Diagrams in Software Creating single line diagrams in software. Generating impedance diagrams and analyzing power system components.	Single Line Diagrams and Impedance Diagrams Representation of power systems using single line diagrams. Interpretation of single line diagrams for system analysis. Construction and analysis of impedance diagrams.	حضوري	واجبات
Week 4	5	Bus Admittance Matrix and Network Calculations in Software	Bus Admittance Matrix and Network Calculations Introduction to the bus	حضوري	اختبارات يومي

		admittance matrix. Construction of the bus admittance matrix from system data. Network calculations using the bus admittance matrix.	Constructing the bus admittance matrix using software. Performing network calculations and analyzing results.		
تقارير	حضوري	Bus Impedance Matrix and Network Calculations Introduction to the bus impedance matrix. Construction of the bus impedance matrix from system data. Network calculations using the bus impedance matrix.	Bus Impedance Matrix and Network Calculations in Software Building the bus impedance matrix using software. Conducting network calculations and interpreting the outcomes.	5	Week 5
واجبات	حضوري	Power Flow Problem and Gauss-Seidel Power Flow Solution Formulation of the power flow problem and its importance. Iterative methods for solving power flow equations. Application of Gauss-Seidel method to solve the power flow problems.	Power Flow Analysis in Software Setting up power flow studies in software. Analyzing power flow results and identifying system conditions.	5	Week 6
اختبارات يومي	حضوري	Symmetrical Faults Introduction to symmetrical faults and their types. Calculation of fault currents and voltages in power systems. Analysis of system behavior during symmetrical faults.	Symmetrical Fault Analysis in Software Simulating symmetrical faults using software. Analyzing fault currents, voltages, and their impact on the system.	5	Week 7
تقارير	حضوري	Power System Analysis Software Tools Introduction to software tools commonly used for power system analysis. Hands-on experience with power system analysis software. Interpretation and analysis of results obtained from software tools.	Stability Analysis in Software Conducting stability studies using software tools. Evaluating system stability and identifying potential issues.	5	Week 8
واجبات	حضوري	Practical Applications and Case Studies Application of power system analysis techniques to real-world scenarios. Case studies highlighting power system analysis challenges and solutions. Analysis of system stability,	Voltage Control and Reactive Power Analysis in Software Analyzing voltage control strategies using software. Performing reactive power analysis and voltage regulation.	5	Week 9

		voltage control, and fault scenarios.			
اختبارات يومي	حضوري	Problem-Solving Exercises and Review In-class problem-solving exercises to reinforce concepts and techniques. Review of key topics and techniques covered in the module.	Protection Coordination in Software Utilizing software for protective device coordination. Analyzing fault clearing times and coordination curves.	5	Week 10
تقارير	حضوري	Group Discussions and Presentations Group discussions on power system analysis topics and case studies. Student presentations on specific power system analysis applications or research.	Load Flow Control and Optimization in Software Applying load flow control techniques using software. Optimizing system operation and analyzing load flow results.	5	Week 11
واجبات	حضوري	Laboratory Work and Simulations Hands-on laboratory sessions to analyze power system behavior. Computer-based simulations to explore power system operation and control.	Transient Stability Analysis in Software Simulating transient stability using software tools. Assessing system behavior during transient events.	5	Week 12
اختبارات يومي	حضوري	Guest Lecture or Industry Visit Inviting a guest speaker from the power industry or organizing a visit to a power system facility to gain industry insights and perspectives.	Renewable Integration Analysis in Software Analyzing renewable energy integration using software. Evaluating the impact of renewable sources on system operation.	5	Week 13
تقارير	حضوري	Final Review and Assessment Preparation Final review of key concepts and techniques. Preparation for the final assessment, including practice exercises and review sessions.	Advanced Topics and Case Studies in Software Exploring advanced power system analysis topics using software. Investigating case studies and real-world applications.	5	Week 14
واجبات	حضوري	Final Assessment.	Project Work and Presentation Undertaking a project using power system analysis software. Presenting project findings and conclusions.	5	Week 15

11. تقييم المقرر

	Time/	Weight (Marks)	Week Due	Relevant Learning

As		Number			Outcome
Formative assessment	Quizzes	2	10% (10)	5, 10	LO #1, 2, 8 and 9
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Projects / Lab.	14	10% (10)	Continuous	All
	Report	14	10% (10)	Continuous	All
Summative assessment	Midterm Exam	2 hours	10% (10)	7	LO # 1-7
	Final Exam	3 hours	50% (50)	16	All
Total assessment			100% (100 Marks)		

12. مصادر التعلم والتدريس

J. J. Grainger and W. D. Stevenson Jr., "Power Systems Analysis," 2nd ed. New York, NY: McGraw-Hill, 1994.

H. Saadat, "Power System Analysis," 3rd ed. New York, NY: McGraw-Hill, 2010.
V. K. Mehta Rohit Mehta " Principles of power system," 4th ed. RAM Nagar, New Delhi, 2008.

نموذج وصف المقرر

1. أسم المقرر الدراسي:
Electric Power Generation Stations
2. رمز المقرر:
EET4104
3. الفصل / السنة:
الفصل الأول 2024-2025/ مسار بولونيا
4. تاريخ اعداد هذا الوصف:
2025/7/16
5. حضوري / عبر الانترنت:
حضوري
6. عدد الساعات الدراسية (الكلي)/ عدد الوحدات/ (الكلي):
5 ساعات / 125 وحدة اوربية
7. أسم مسؤول المقرر الدراسي (اذا كان هناك اكثر من اسم يذكر ايضا):

8. أهداف المقرر

The aims of the Electric Power Generation Stations module include:

1. To provide students with a comprehensive understanding of electric power generation stations, their purpose, and their role in meeting the electricity demands of society.
2. To familiarize students with various power generation technologies, such as thermal stations, hydroelectric stations, diesel electric stations, nuclear power stations, and gas turbine plants, including their working principles, components, advantages, and limitations.
3. To help students gain knowledge about the major electrical equipment used in power stations, such as transformers, generators, turbines, and control systems, and to explain their functions, operational characteristics, and integration within the power generation process.
4. To educate students about the operational considerations and safety measures involved in power generation stations, covering topics such as maintenance practices, environmental impact, safety protocols, and regulatory compliance.
5. To provide students with an understanding of how power generation stations operate within a larger power system, exploring concepts such as load balancing, combined operation of power systems, grid stability, and the integration of renewable energy sources.
6. To enhance students' problem-solving skills and critical thinking abilities in the context of electric power generation stations, through practical exercises, case studies, and discussions to analyze and address various challenges related to power generation.
7. To raise awareness about the importance of energy efficiency and sustainable practices in power generation, covering topics such as energy conservation, renewable energy integration, and the transition towards cleaner and more sustainable power generation technologies.
8. To provide students with opportunities to apply their knowledge in practical scenarios, through projects, simulations, or hands-on exercises, reinforcing the concepts learned and encouraging critical and creative thinking.

To equip students with a solid foundation in electric power generation stations, enabling them to understand the technical aspects, operational considerations, and challenges associated with generating electricity in various power generation facilities.

9. استراتيجيات التعليم والتعلم

The Electric Power Generation Stations module can be taught using a variety of learning and teaching strategies to enhance student engagement and understanding. Here are some suggested strategies:

1. Lectures: Conducting lectures to deliver theoretical concepts, principles, and foundational knowledge related to power generation stations. These lectures can be accompanied by visual aids, such as slides or diagrams, to facilitate understanding.
2. Case Studies: Presenting real-world case studies of power generation stations to illustrate practical applications, challenges, and decision-making processes. This allows students to analyze and apply their knowledge in realistic scenarios.
3. Laboratory Sessions: Organizing laboratory sessions to provide hands-on experience with electrical equipment and systems commonly found in power generation stations. Students can engage in practical exercises, measurements, and troubleshooting activities to reinforce their theoretical understanding.
4. Group Discussions: Encouraging group discussions and brainstorming sessions to promote active learning. Students can share their perspectives, exchange ideas, and collectively solve problems related to power generation stations.
5. Site Visits and Guest Speakers: Arranging site visits to operating power generation stations or inviting industry professionals as guest speakers. This offers students the opportunity to observe power generation facilities firsthand and learn from experts who can provide insights into practical challenges and industry practices.
6. Simulations and Virtual Labs: Utilizing computer simulations and virtual laboratory

environments to simulate power generation processes, control systems, and system operation. This allows students to experiment, observe outcomes, and analyze results in a controlled virtual setting.
7. Project-based Learning: Assigning individual or group projects that require students to design, analyze, or optimize power generation systems. This hands-on approach fosters critical thinking, problem-solving skills, and application of theoretical knowledge in practical scenarios.
8. Collaborative Learning: Promoting collaborative learning activities, such as group projects or problem-solving exercises, to encourage teamwork, communication, and the exchange of ideas among students. This can be done in-class or through online collaboration platforms.
9. Assessments: Employing a variety of assessment methods, including quizzes, exams, assignments, and presentations, to evaluate students' understanding of the concepts and their ability to apply knowledge to solve problems related to power generation stations.
10. Technology Integration: Utilizing educational technologies, such as interactive simulations, online resources, and virtual learning environments, to supplement learning materials and engage students in self-paced learning activities.
Reflective Practice: Encouraging students to reflect on their learning experiences and consolidate their understanding through activities like journaling, self-assessment, or group reflections. This helps students develop metacognitive skills and deepen their comprehension of the subject matter.

10. بنية المقرر الدراسي

الاسبوع	الساعات	مخرجات المتعلم المطلوبة	اسم الوحدات او الموضوع	طريقة التعلم	طريقة التقييم
Week 1	5	Lab Safety and Introduction to Electrical Equipment Safety protocols and guidelines in the lab. Introduction to electrical equipment used in power generation stations (transformers, generators, etc.). Familiarization with lab instruments and tools.	Introduction to Electric Power Generation Stations Importance of power generation stations. Overview of power generation, transmission, and distribution systems.	حضوري	اختبارات يومي
Week 2	5	Thermal Power Plant Lab Hands-on experience with a thermal power plant simulator or a scaled-down model. Operating and monitoring the components of a thermal power plant (boilers, turbines, generators, etc.). Analyzing the impact of various parameters on plant performance.	Thermal Stations Working principles of thermal power plants. Components of a thermal power plant. Types of fuels used in thermal power generation.	حضوري	تقارير
Week 3	5	Hydroelectric Power Plant Lab Experimentation with a hydroelectric power plant model or simulator. Operating and observing the components of a hydroelectric	Hydro-electric Station Overview of hydroelectric power generation. Types of hydroelectric power plants.	حضوري	واجبات

		Components of a hydroelectric power plant.	power plant (dams, turbines, generators). Measuring and analyzing energy conversion and efficiency.		
اختبارات يومي	حضوري	Diesel Electric Station Introduction to diesel electric power generation. Working principles of diesel engines. Components of a diesel electric power plant.	Diesel Electric Power Plant Lab Working with diesel engines and generators in the lab. Starting, stopping, and monitoring diesel engines. Assessing the performance and characteristics of a diesel electric power plant.	5	Week 4
تقارير	حضوري	Nuclear Power Stations Overview of nuclear power generation. Types of nuclear reactors. Safety measures and considerations in nuclear power plants.	Nuclear Power Plant Lab Simulation or experimental setup to study nuclear power generation. Understanding the operation and control of nuclear reactors. Measurement of radiation levels and safety precautions.	5	Week 5
واجبات	حضوري	Gas Turbine Plants Introduction to gas turbine power generation. Working principles of gas turbines. Open-cycle and combined-cycle gas turbine plants.	Gas Turbine Power Plant Lab Hands-on experience with gas turbine systems. Operating and monitoring gas turbines in a lab setting. Analyzing the efficiency and performance of gas turbine power plants.	5	Week 6
اختبارات يومي	حضوري	Combined Operation of Power Systems Coordinated operation of power generation stations. Load balancing and frequency control. Integration of renewable energy sources in power systems.	Control Systems and Protection Lab Experimentation with control systems used in power generation stations. Programming and testing control algorithms. Evaluating the effectiveness of protection systems in power plants.	5	Week 7
تقارير	حضوري	Major Electrical Equipment in Power Stations Transformers: types, functions, and operation. Generators: types, characteristics, and control. Switchgear and protection devices.	Variable Load Management Lab Simulation or experimental setup for load forecasting and management. Implementing load balancing strategies and demand response techniques. Analyzing the impact of variable loads on power system stability.	5	Week 8
واجبات	حضوري	Variable Load Problem Load forecasting techniques. Load management	Instrumentation and Measurement Lab Practical exercises on electrical measurements in power	5	Week 9

		strategies. Energy storage systems for load balancing.	generation stations. Calibration and use of instruments such as multimeters, oscilloscopes, and power analyzers. Data acquisition and analysis techniques.		
اختبارات يومي	حضوري	Site Visit to a Power Generation Station Organize a site visit to an operational power generation station to observe the equipment, control systems, and operations firsthand.	Renewable Energy Integration Lab Experimentation with the integration of renewable energy sources in power systems. Assessing the performance and challenges of renewable energy integration. Investigating control strategies for maximizing renewable energy utilization.	5	Week 10
تقارير	حضوري	Case Studies and Guest Speaker Session Real-world case studies of power generation stations. Guest speaker session from industry professionals.	Troubleshooting and Maintenance Lab Practical exercises on troubleshooting electrical equipment and systems. Identifying and rectifying common faults in power generation stations. Performing routine maintenance tasks on equipment.	5	Week 11
واجبات	حضوري	Laboratory Session Hands-on experience with electrical equipment and systems. Practical exercises, measurements, and troubleshooting activities.	Project Work Working on individual or group projects related to power generation systems. Designing, analyzing, or optimizing a power generation system. Presenting project progress and findings to peers and instructors.	5	Week 12
اختبارات يومي	حضوري	Project-based Learning Individual or group projects on power generation system design or optimization.	Lab Report Writing and Documentation Guided sessions on writing lab reports and documentation. Practice in documenting experimental procedures, results, and analysis. Developing technical writing skills for effective communication.	5	Week 13
تقارير	حضوري	Environmental and Sustainability Considerations Energy efficiency and conservation in power generation. Integration of sustainable practices in	Lab Review and Revision Recap of key lab experiments and concepts covered throughout the module. Review of data analysis techniques and lab procedures.	5	Week 14

		power stations.			
واجبات	حضوري	Review and Revision, Final Assessments Recap of key concepts and topics covered throughout the module. Review of problem-solving techniques and applications. Final exams, assignments, or presentations to assess students' understanding of the module content.	Final Lab Assessment Final lab assessment to evaluate students' practical skills and understanding. Demonstration of competency in conducting experiments, analyzing data, and troubleshooting electrical equipment.	5	Week 15

11. تقييم المقرر

As		Time/ Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	10% (10)	6, 10	LO #1,2, 3, 4, 6 and 8
	Assignments	2	10% (10)	5, 12	LO # 5, and 7
	Projects / Lab.	14	10% (10)	Continuous	All
	Report	14	10% (10)	Continuous	All
Summative assessment	**Midterm Exam**	2 hours	10% (10)	7	LO # 1-7
	Final Exam	3 hours	50% (50)	16	All
Total assessment			100% (100 Marks)		

12. مصادر التعلم والتدريس

P. K. Nag, "Power Plant Engineering," 3rd ed. New Delhi, India: McGraw-Hill Education, 2014.

S. N. Singh, "Electric Power Generation, Transmission, and Distribution," 2nd ed. Boca Raton, FL: CRC Press, 2018.
von Meier, "Electric Power Systems: A Conceptual Introduction," Hoboken, NJ: John Wiley & Sons, 2006.

نموذج وصف المقرر

1. أسم المقرر الدراسي:

Control Systems Analysis

2. رمز المقرر:
EET4105
3. الفصل / السنة:
الفصل الأول 2024-2025/ مسار بولونيا
4. تاريخ اعداد هذا الوصف:
2025/7/16
5. حضوري / عبر الانترنت:
حضوري
6. عدد الساعات الدراسية (الكلي)/ عدد الوحدات/ (الكلي):
5 ساعات / 125 وحدة اوربية
7. أسم مسؤول المقرر الدراسي (اذا كان هناك اكثر من اسم يذكر ايضا):
8. أهداف المقرر
The aims of the Control Systems Analysis Module are to provide students or participants with a solid understanding of the following: 1. To provide students with a comprehensive understanding of control systems analysis, the module aims to cover topics such as the introduction to control systems, transfer function analysis, and block diagram reduction. 2. To enhance students' analytical skills, the module focuses on signal flow graphs and the application of the Mason rule for calculating transfer functions. 3. To prepare students for multivariable control systems, the module delves into the concept of transfer matrices and their role in analyzing systems with multiple inputs and outputs. 4. To develop a solid foundation in control systems theory, the module introduces state space representation and emphasizes its application in system analysis and design. 5. To expose students to modern control system techniques, the module explores advanced topics including optimal control, robust control, adaptive control, and nonlinear control. 6. To enable students to assess control system behavior in the time domain, the module covers time domain analysis techniques such as step response analysis and meeting time-domain specifications. To ensure a comprehensive understanding of stability analysis, the module includes topics such as Routh stability analysis and the root locus method for assessing system stability and transient response.
9. استراتيجيات التعليم والتعلم
The module may employ various learning and teaching strategies to facilitate the acquisition of knowledge and development of skills. Some common strategies include: 1. Lectures: In-class lectures delivered by the instructor provide foundational knowledge and explanations of key concepts and theories. This allows students to understand the theoretical aspects of control systems analysis. 2. Practical Demonstrations: Practical demonstrations and examples help students connect theoretical concepts to real-world applications. They may involve the use of simulation software, control system hardware, or case studies to illustrate how control systems are implemented and analyzed in practice. 3. Problem-Solving Sessions: Dedicated problem-solving sessions allow students to apply their knowledge and skills to solve control system analysis problems. These sessions may be conducted in

class or in smaller groups, enabling active participation and collaborative learning.
4. Tutorial Sessions: Tutorials provide an opportunity for students to engage in interactive discussions and seek clarification on challenging topics. They may involve solving practice problems, reviewing assignments, or addressing specific queries related to the module content.
5. Computer-Based Tools: The use of computer-based tools and software, such as MATLAB or control system simulation software, can aid in visualizing and analyzing control system behavior. Students may be assigned tasks or projects that involve utilizing these tools to reinforce theoretical concepts.
6. Group Projects: Group projects encourage teamwork and collaboration among students. They may involve designing and analyzing control systems for specific applications or conducting experiments to validate control system performance. These projects promote practical application of knowledge and the development of problem-solving and communication skills.
7. Self-Study and Research: Encouraging self-study and research allows students to deepen their understanding of control systems analysis beyond the core module content. Assigning additional readings, research assignments, or encouraging independent exploration of related topics can foster independent learning and critical thinking.
Assessment Methods: Various assessment methods, such as written exams, quizzes, assignments, and project presentations, may be employed to evaluate students' knowledge and skills in control systems analysis. These assessments assess their understanding, problem-solving abilities, and application of theoretical concepts.

10. بنية المقرر الدراسي

الاسبوع	الساعات	مخرجات المتعلم المطلوبة	اسم الوحدات او الموضوع	طريقة التعلم	طريقة التقييم
Week 1	5	Introduction to MATLAB Introduction to MATLAB environment and basic commands. Creating and manipulating variables and arrays. Plotting functions and data in MATLAB.	Introduction to Control Systems Basic concepts of control systems. Types of control systems: open-loop and closed-loop. Feedback control and control objectives.	حضوري	اختبارات يومي
Week 2	5	Transfer Function Analysis in MATLAB Creating transfer function models in MATLAB. Frequency response analysis using Bode plots in MATLAB.	Transfer Function Analysis Definition and properties of transfer functions. Transfer function models for various system elements. Frequency response analysis and Bode plots.	حضوري	تقارير
Week 3	5	Block Diagram Reduction in MATLAB Implementing block diagram reduction techniques in MATLAB. Simulating and analyzing control system structures using block diagrams in MATLAB.	Block Diagram Reduction Block diagram representation of control systems. Block diagram algebra and simplification techniques.	حضوري	واجبات
Week 4	5	Signal Flow Graph and Mason Rule in MATLAB	Signal Flow Graph and Mason Rule	حضوري	اختبارات يومي

		Construction and interpretation of signal flow graphs. Mason's gain formula for calculating transfer functions.	Constructing signal flow graphs in MATLAB. Applying the Mason rule to calculate transfer functions in MATLAB.		
تقارير	حضوري	Multivariable Systems and Transfer Matrices Introduction to multivariable control systems. Transfer matrix representation of multivariable systems.	Multivariable Systems and Transfer Matrices in MATLAB Representing multivariable control systems using transfer matrices in MATLAB. Analyzing and designing multivariable systems in MATLAB.	5	Week 5
واجبات	حضوري	State Space Theory Introduction to state space representation. State equations and output equations.	State Space Representation in MATLAB Creating state space models in MATLAB. Simulating and analyzing control systems in state space form using MATLAB.	5	Week 6
اختبارات يومي	حضوري	State Space Representation State transition matrix and its properties. Controllability and observability in state space.	Modern Control System Techniques in MATLAB Implementing advanced control system techniques in MATLAB. Optimization-based control design in MATLAB.	5	Week 7
تقارير	حضوري	Modern Control System Techniques Overview of advanced control system techniques. Optimal control, robust control, adaptive control, and nonlinear control.	Time Domain Analysis in MATLAB Analyzing step and impulse responses in MATLAB. Meeting time-domain specifications using MATLAB.	5	Week 8
واجبات	حضوري	Time Domain Analysis Step response analysis and performance specifications. Impulse response analysis and system dynamics.	Stability Analysis: Routh Stability Analysis in MATLAB Implementing Routh stability analysis in MATLAB. Determining system stability and analyzing stability margins using MATLAB.	5	Week 9
اختبارات يومي	حضوري	Stability Analysis: Routh Stability Analysis Routh stability criterion and its application. Determination of system stability based on Routh array.	Stability Analysis: Root Locus Method in MATLAB Constructing root locus plots in MATLAB. Analyzing system stability and transient response using root locus plots in MATLAB.	5	Week 10
تقارير	حضوري	Stability Analysis: Root Locus Method Introduction to root locus method.	Design and Simulation Project 1 Designing and simulating a control system using	5	Week 11

		Construction of root locus plots.	MATLAB. Analyzing the performance and stability of the designed system.		
واجبات	حضوري	Stability Analysis: Root Locus Method (continued) Analysis of system stability and transient response from root locus plots.	Design and Simulation Project 2 Designing and simulating a more complex control system using MATLAB. Evaluating the system's performance and stability.	5	Week 12
اختبارات يومي	حضوري	Review and Recapitulation	Experimental Validation Project Implementing a control system design on hardware or simulation software. Conducting experiments to validate the control system's performance.	5	Week 13
تقارير	حضوري	Case Studies and Applications Application of control systems analysis in real-world scenarios. Case studies and examples of control system analysis and design.	Case Studies and Applications in MATLAB Solving real-world control system problems using MATLAB. Analyzing and designing control systems for specific applications.	5	Week 14
واجبات	حضوري	Review and Final Assessment Preparation.	Review and Final Assessment Preparation.	5	Week 15

11. تقييم المقرر

As		Time/ Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5, 10	LO #1, 2, 8 and 9
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Projects / Lab.	14	10% (10)	Continuous	All
	Report	14	10% (10)	Continuous	All
Summative assessment	Midterm Exam	1 hours	10% (10)	7	LO # 1-7
	Final Exam	3 hours	50% (50)	16	All
Total assessment			100% (100 Marks)		

12. مصادر التعلم والتدريس

K. Ogata, "Modern Control Engineering," 5th ed. Boston, MA, USA: Pearson Education, 2010.

N. S. Nise, "Control Systems Engineering," 7th ed. Hoboken, NJ, USA: Wiley, 2015.

نموذج وصف المقرر

1. أسم المقرر الدراسي:
Project 1
2. رمز المقرر:
EET4106
3. الفصل / السنة:
الفصل الأول 2024-2025/ مسار بولونيا
4. تاريخ اعداد هذا الوصف:
2025/7/16
5. حضوري / عبر الانترنت:
حضوري
6. عدد الساعات الدراسية (الكلي)/ عدد الوحدات/ (الكلي):
5 ساعات / 125 وحدة اوربية
7. أسم مسؤول المقرر الدراسي (اذا كان هناك اكثر من اسم يذكر ايضا):
8. أهداف المقرر
The module aims of the Project 1 module can be summarized as follows: 1. Project Topic Selection: The module aims to guide students in selecting appropriate project topics within the field of electrical engineering. This includes exploring various areas of interest, considering the relevance and feasibility of different project ideas, and making informed decisions based on their individual interests and career aspirations. 2. Electrical Engineering Project Planning: The module aims to develop students' skills in project planning specific to their selected electrical engineering project topics. This involves aligning the project objectives with the chosen topic, defining the scope and boundaries of the project, and creating a comprehensive project plan that incorporates electrical engineering principles and methodologies. 3. Literature Review in Electrical Engineering: The module aims to enhance students' ability to conduct a literature review specific to their selected project topics in electrical engineering. This includes identifying key research papers, technical resources, and relevant industry standards related to their specific project areas, and analyzing the existing knowledge and research gaps within their chosen topic. 4. Proposal Development for Selected Electrical Engineering Projects: The module aims to guide students in developing a project proposal tailored to their selected project topics in electrical engineering. This includes formulating research objectives that align with their chosen topic, designing experiments or simulations specific to their project area, and outlining the expected outcomes and impact of their proposed project. 5. Electrical Engineering Research and Project Management Skills: The module aims to help students develop essential research and project management skills directly applicable to their selected

electrical engineering projects. This includes skills related to designing and implementing electrical circuits, data collection and analysis techniques, utilizing simulation software, selecting appropriate equipment and materials, and optimizing electrical systems.

6. Technical Communication in Electrical Engineering: The module aims to improve students' technical communication skills within the context of their selected electrical engineering projects. This includes effectively presenting their project ideas, methodologies, results, and findings in a clear and concise manner, using appropriate electrical engineering terminology and visual aids.
7. Critical Thinking and Analysis in Electrical Engineering: The module aims to foster students' critical thinking skills within the context of their selected electrical engineering projects. This involves evaluating and comparing different approaches and solutions, analyzing experimental data and simulation results, troubleshooting electrical systems, and making informed decisions based on technical considerations within their specific project areas.
8. Ethical Considerations in Electrical Engineering Projects: The module aims to raise students' awareness of ethical considerations specific to their selected electrical engineering projects. This includes understanding the ethical implications of their research, ensuring the responsible and sustainable use of technology, and addressing potential ethical challenges related to their specific project topics.

Self-Reflection and Professional Development in Electrical Engineering: The module aims to encourage students to reflect on their own learning and professional development within the context of their selected electrical engineering project topics. This includes identifying areas for improvement, exploring emerging technologies and trends relevant to their projects, and actively engaging in continuous learning and professional growth within their chosen project areas.

9. استراتيجيات التعليم والتعلم

The learning and teaching strategies for the Project 1 module in electrical engineering can vary based on the educational institution's approach and the specific preferences of the instructors. However, here are some commonly employed strategies that can be effective for this module:

1. Lectures: Instructors can deliver lectures to provide theoretical foundations, introduce concepts, and explain project planning methodologies specific to electrical engineering. These lectures can also cover topics related to literature review, research skills, and ethical considerations.
2. Practical Workshops: Practical workshops allow students to apply their knowledge and skills in a hands-on environment. These sessions can involve designing and implementing electrical circuits, using software tools for data analysis, and conducting experiments or simulations related to their project topics.
3. Group Discussions: Facilitating group discussions allows students to share their project ideas, discuss research findings, and explore different perspectives on electrical engineering topics. This can promote critical thinking, collaboration, and knowledge sharing among students.
4. Literature Review Assignments: Assignments focused on conducting a literature review help students develop research skills and gain a deeper understanding of their chosen project area. They can learn to evaluate and synthesize existing knowledge, identify research gaps, and consider the engineering and scientific implications of the literature findings.
5. Project Proposal Development: Guided sessions on project proposal development assist students in formulating clear research objectives, designing methodologies, and defining the scope of their projects. Instructors can provide feedback and guidance throughout the proposal development process.
6. Mentorship and Guidance: Providing individual or group mentorship sessions allows students to receive personalized guidance from instructors or industry professionals. These sessions can address specific challenges, offer technical advice, and support the students' project planning and implementation.
7. Guest Speakers: Inviting guest speakers from industry or academia can expose students to real-world applications and perspectives in electrical engineering. These speakers can share their

experiences, provide insights into the engineering and scientific implications of specific topics, and inspire students in their project work.

8. Assessment and Feedback: Regular formative assessments, such as quizzes or progress reports, can help students track their understanding and progress. Summative assessments, including project proposal submissions, project reports, and presentations, allow for comprehensive evaluation of the students' performance. Timely and constructive feedback from instructors and the examine committee supports students' learning and improvement.

9. Online Resources and Tools: Utilizing online resources, such as research databases, educational platforms, and simulation tools, can enhance students' access to information, facilitate self-directed learning, and provide opportunities for remote collaboration.

10. Self-Reflection and Peer Evaluation: Encouraging students to reflect on their learning journey, set personal goals, and assess their own progress fosters a sense of ownership and accountability. Peer evaluations and peer feedback sessions can also promote collaboration and provide additional perspectives on project ideas and implementation.

10. بنية المقرر الدراسي

الاسبوع	الساعات	مخرجات المتعلم المطلوبة	اسم الوحدات او الموضوع	طريقة التعلم	طريقة التقييم
Week 1	6	Introduction to the module and course objectives. Overview of project planning principles and methodologies. Introduction to research skills and literature review in electrical engineering.	Introduction to the module and course objectives. Overview of project planning principles and methodologies. Introduction to research skills and literature review in electrical engineering.	حضوري	اختبارات يومي
Week 2	6	Selecting and proposing project topics. Formulating research questions or problem statements. Understanding the engineering and scientific implications of project topics.	Selecting and proposing project topics. Formulating research questions or problem statements. Understanding the engineering and scientific implications of project topics.	حضوري	تقارير
Week 3	6	Conducting a literature review in electrical engineering. Searching and accessing relevant literature sources. Evaluating and critically analyzing research papers and technical documents.	Conducting a literature review in electrical engineering. Searching and accessing relevant literature sources. Evaluating and critically analyzing research papers and technical documents.	حضوري	واجبات
Week 4	6	Identifying research gaps and emerging trends in the chosen project area. Synthesizing information from the literature review. Considering the engineering and scientific implications of the literature findings.	Identifying research gaps and emerging trends in the chosen project area. Synthesizing information from the literature review. Considering the engineering and scientific implications of the literature findings.	حضوري	اختبارات يومي
Week 5	6	Defining project objectives and scope.	Defining project objectives and scope.	حضوري	تقارير

		Designing methodologies or experimental setups. Addressing ethical considerations and potential challenges in the project proposal.	Designing methodologies or experimental setups. Addressing ethical considerations and potential challenges in the project proposal.		
واجبات	حضوري	Creating a project plan, timeline, and work breakdown structure. Time management techniques and strategies for effective project scheduling. Resource allocation and optimization in electrical engineering projects.	Creating a project plan, timeline, and work breakdown structure. Time management techniques and strategies for effective project scheduling. Resource allocation and optimization in electrical engineering projects.	6	Week 6
اختبارات يومي	حضوري	Practical workshop: Hands-on session on electrical circuit design and analysis techniques. Data collection methods and analysis using software tools and equipment.	Practical workshop: Hands-on session on electrical circuit design and analysis techniques. Data collection methods and analysis using software tools and equipment.	6	Week 7
تقارير	حضوري	Refining the project proposal based on feedback. Presenting the project proposal to the class for discussion and feedback.	Refining the project proposal based on feedback. Presenting the project proposal to the class for discussion and feedback.	6	Week 8
واجبات	حضوري	Implementing the project plan: conducting experiments, simulations, or data collection. Troubleshooting and adapting the project plan as needed.	Implementing the project plan: conducting experiments, simulations, or data collection. Troubleshooting and adapting the project plan as needed.	6	Week 9
اختبارات يومي	حضوري	Analysis and interpretation of experimental data or simulation results. Assessing the engineering and scientific implications of the project findings.	Analysis and interpretation of experimental data or simulation results. Assessing the engineering and scientific implications of the project findings.	6	Week 10
تقارير	حضوري	Practical workshop: Software simulations and analysis related to electrical engineering projects. Visual aids and data visualization techniques for effective communication.	Practical workshop: Software simulations and analysis related to electrical engineering projects. Visual aids and data visualization techniques for effective communication.	6	Week 11
واجبات	حضوري	Writing project documentation, reports, and interim progress reports. Effective written	Writing project documentation, reports, and interim progress reports. Effective written communication skills for	6	Week 12

		communication skills for technical documentation.	technical documentation.		
اختبارات يومي	حضوري	Oral presentations of the project progress and findings. Effective oral communication skills for presenting technical information.	Oral presentations of the project progress and findings. Effective oral communication skills for presenting technical information.	6	Week 13
تقارير	حضوري	Self-reflection and personal development: Reflection on the learning journey and setting goals for continuous improvement. Exploration of emerging technologies and advancements in electrical engineering.	Self-reflection and personal development: Reflection on the learning journey and setting goals for continuous improvement. Exploration of emerging technologies and advancements in electrical engineering.	6	Week 14
واجبات	حضوري	Preparatory week before the final Exam.	Preparatory week before the final Exam.	6	Week 15

11. تقييم المقرر

As		Time/ Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5, 10	LO #1, 2, 8 and 9
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	14	LO # 1-14
Summative assessment	Midterm Exam	1 hours	10% (10)	7	LO # 1-7
	Final Exam	3 hours	50% (50)	16	All
Total assessment			100% (100 Marks)		

12. مصادر التعلم والتدريس

C. L. Rethlefsen and R. E. Karper, "Engineering Research: Planning, Writing, and Presenting," 2nd ed. New York, NY, USA: Taylor & Francis, 2019.

D. S. Viswanath, "Research Methods for Engineers," 2nd ed. Boca Raton, FL, USA: CRC Press, 2018.

نموذج وصف المقرر

1. أسم المقرر الدراسي:

Power Systems Protection

2. رمز المقرر:
EET4202
3. الفصل / السنة:
الفصل الأول 2024-2025/ مسار بولونيا
4. تاريخ اعداد هذا الوصف:
2025/7/16
5. حضوري / عبر الانترنت:
حضوري
6. عدد الساعات الدراسية (الكلي)/ عدد الوحدات/ (الكلي):
5 ساعات / 125 وحدة اوربية
7. أسم مسؤول المقرر الدراسي (اذا كان هناك اكثر من اسم يذكر ايضا):
8. أهداف المقرر
The Power Systems Protection module aims to achieve several key objectives: 1. To provide students with a comprehensive understanding of power systems protection principles and concepts, the module aims to cover topics such as fault analysis, protective devices, and system coordination. 2. To ensure practical knowledge and skills, the module aims to familiarize students with various protection equipment used in power systems, including circuit breakers, relays, and associated devices. 3. To enhance system reliability and security, students will learn about the importance of redundancy and backup protection in the design and implementation of protection schemes. 4. To develop students' analytical abilities, the module will focus on analyzing protection schemes for different power system components, such as transmission lines, generators, and transformers. 5. To enable effective troubleshooting and fault diagnosis, students will learn to interpret relay operation data, analyze fault records, and identify the root causes of system disturbances. 6. To stay up to date with the latest advancements and challenges, the module will explore emerging technologies in power systems protection, such as renewable energy integration, smart grids, and cybersecurity considerations. 7. To encourage practical application of knowledge, the module may include case studies and simulation exercises to simulate real-world protection scenarios. 8. To foster critical thinking and problem-solving skills, students will be encouraged to evaluate and propose improvements to existing protection schemes based on industry standards and best practices. 9. To promote a holistic understanding of power systems protection, the module may also address ethical considerations, environmental impact, and regulatory requirements associated with protection systems. To facilitate active learning and engagement, the module may include group discussions, hands-on laboratory experiments, and project assignments related to power systems protection.
9. استراتيجيات التعليم والتعلم
The Power Systems Protection module can be effectively taught using a variety of learning and teaching strategies. Some strategies that can be employed include:

1. Lectures: Conducting lectures to introduce and explain theoretical concepts, principles, and techniques related to power systems protection. Lectures can provide a foundational understanding of the subject matter and help students grasp the key concepts.
2. Interactive Discussions: Encouraging interactive discussions in the classroom to promote active learning and critical thinking. This can involve asking thought-provoking questions, facilitating group discussions, and encouraging students to share their insights and experiences related to power systems protection.
3. Case Studies: Incorporating case studies and real-world examples to demonstrate the practical application of power systems protection principles. Analyzing actual protection schemes, investigating system failures, and discussing lessons learned can enhance students' problem-solving abilities and provide them with practical insights.
4. Laboratory Exercises: Organizing laboratory sessions to allow students to gain hands-on experience with protection equipment, testing procedures, and fault analysis techniques. This practical exposure can enhance students' understanding of protection devices, system behavior, and fault diagnosis methods.
5. Simulations and Software Tools: Utilizing simulation software and tools to create virtual scenarios for protection system analysis, coordination studies, and fault simulations. This enables students to simulate and analyze different protection schemes, evaluate their performance, and understand the impact of various fault conditions.
6. Group Projects: Assigning group projects that involve designing and analyzing protection schemes for specific power system scenarios. This encourages teamwork, collaboration, and application of learned concepts in a practical setting.
7. Guest Lectures and Industry Visits: Inviting guest lecturers from industry or organizing visits to power system facilities and control centers. This provides students with insights into real-world power systems protection practices, current industry trends, and technological advancements.
8. Assessments and Feedback: Conducting regular assessments, such as quizzes, assignments, and examinations, to evaluate students' understanding of the subject matter. Providing timely feedback on their performance helps students identify areas for improvement and reinforces their learning.
9. Online Resources and Materials: Making use of online resources, such as e-books, articles, video lectures, and simulation tools, to supplement classroom teaching and provide additional learning materials for self-study.

Continuous Professional Development: Encouraging students to engage in continuous professional development by attending conferences, workshops, and seminars related to power systems protection. This helps them stay updated with the latest advancements and industry practices.

10. بنية المقرر الدراسي

الاسبوع	الساعات	مخرجات المتعلم المطلوبة	اسم الوحدات او الموضوع	طريقة التعلم	طريقة التقييم
Week 1	5	Lab Introduction and Safety Procedures Introduction to the lab facilities and equipment. Overview of safety procedures and guidelines.	Introduction to Power Systems Protection Overview of power systems components and protection requirements. Importance of protection systems for system reliability and equipment safety. Historical development and evolution of power systems protection.	حضوري	اختبارات يومي

تقارير	حضوري	Fault Analysis and System Modeling Types of faults in power systems and fault analysis techniques. Symmetrical components and per-unit system for fault analysis. Modeling of power system components for fault analysis.	Circuit Breaker Testing Familiarization with different types of circuit breakers. Hands-on testing and operation of circuit breakers. Analysis of circuit breaker characteristics and coordination.	5	Week 2
واجبات	حضوري	Circuit Breakers and Protective Relays Types, operation principles, and coordination requirements of circuit breakers. Types and functions of protective relays in power system protection. Current transformers and voltage transformers for protection systems.	Protective Relay Testing Introduction to protective relays and their functions. Hands-on testing and calibration of protective relays. Verification of relay settings and coordination with circuit breakers.	5	Week 3
اختبارات يومي	حضوري	Transmission Line Protection Overview of transmission line protection schemes. Distance protection: Principles and characteristics. Overcurrent and differential protection for transmission lines.	Current Transformer (CT) Testing Principles of current transformers and their role in protection systems. Testing and calibration of current transformers. Verification of CT performance and accuracy.	5	Week 4
تقارير	حضوري	Generator and Transformer Protection Protection requirements for generators and transformers. Differential protection: Principles and application in generator and transformer protection. Overcurrent, overvoltage, and underfrequency protection for generators.	Voltage Transformer (VT) Testing Principles of voltage transformers and their role in protection systems. Testing and calibration of voltage transformers. Verification of VT performance and accuracy.	5	Week 5
واجبات	حضوري	Busbar and Substation Protection Busbar protection schemes: Differential, overcurrent, and directional comparison protection. Substation protection configurations and coordination considerations.	Distance Protection Testing Introduction to distance protection principles and characteristics. Simulation of fault conditions and testing of distance relays. Analysis of relay responses and	5	Week 6

		Fault detection and protection for substation equipment.	coordination with other protection devices.		
اختبارات يومي	حضوري	Backup Protection and Coordination Principles of backup protection and its importance in system reliability. Coordination requirements and techniques for protective devices. Time-current coordination and selectivity considerations.	Differential Protection Testing Principles and application of differential protection in power systems. Testing and analysis of differential relays for generators and transformers. Verification of differential protection scheme coordination.	5	Week 7
تقارير	حضوري	Emerging Technologies in Power Systems Protection Integration of renewable energy sources and their impact on protection systems. Smart grid technologies and their implications for protection schemes. Cybersecurity considerations and protection measures for power systems.	Overcurrent Protection Testing Principles and settings of overcurrent protection schemes. Hands-on testing of overcurrent relays for transmission lines and equipment. Analysis of relay coordination and selectivity.	5	Week 8
واجبات	حضوري	Fault Diagnosis and Troubleshooting Analysis of fault records and event reports. Interpretation of relay operation data and fault location estimation. Techniques for fault diagnosis and identification of root causes.	Busbar Protection Testing Introduction to busbar protection schemes and their operation. Testing and coordination of busbar protection relays. Verification of busbar protection performance and stability.	5	Week 9
اختبارات يومي	حضوري	Case Studies in Power Systems Protection Analysis and design of protection schemes for practical power system scenarios. Investigation of real-world protection system failures and lessons learned.	Substation Protection Testing Testing and calibration of substation protection equipment (switchgear, capacitors, etc.). Analysis of substation protection coordination and fault detection. Troubleshooting and maintenance of substation protection systems.	5	Week 10
تقارير	حضوري	Protection System Simulation and Software Tools Introduction to protection system simulation software and tools. Simulation exercises for	Simulation Exercises Use of protection system simulation software for practical exercises. Simulating fault scenarios and analyzing protection	5	Week 11

		protection coordination and fault analysis.	system responses. Evaluation and optimization of protection coordination.		
واجبات	حضوري	Ethical and Regulatory Considerations Ethical considerations in power systems protection. Environmental impact assessment and regulatory requirements.	Fault Records Analysis Analysis of fault records and event reports from real power systems. Interpretation of relay operation data for fault diagnosis. Identification of root causes and troubleshooting techniques.	5	Week 12
اختبارات يومي	حضوري	Review and Revision Review of key concepts, principles, and techniques covered in the module. Practice exercises and discussions for reinforcement.	Protection System Design Project Group project to design a protection scheme for a given power system scenario. Application of learned concepts, coordination studies, and relay settings. Presentation and evaluation of protection system designs.	5	Week 13
تقارير	حضوري	Assessment Preparation Preparation for module assessments (quizzes, assignments, etc.). Clarification of doubts and additional practice as needed.	Review and Revision Review of lab experiments, simulations, and project outcomes. Practice exercises and discussions for reinforcement.	5	Week 14
واجبات	حضوري	Assessment and Feedback Conducting module assessments. Providing feedback on students' performance and addressing any outstanding questions.	Lab Assessment and Feedback Conducting lab assessments to evaluate practical skills and knowledge. Providing feedback on students' performance and addressing any outstanding questions.	5	Week 15

11. تقييم المقرر

As		Time/ Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	10% (10)	5, 10	LO #1, 2, 8 and 9
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Projects / Lab.	14	10% (10)	Continuous	All
	Report	14	10% (10)	Continuous	All

Summative assessment	**Midterm Exam**	2 hours	10% (10)	7	LO # 1-7
	Final Exam	3 hours	50% (50)	16	All
Total assessment			100% (100 Marks)		

12. مصادر التعلم والتدريس

JV. K. Mehta, "Principles of Power Systems" 2nd ed., S. Chand & Company LTD.

B. Ram and D.N. Vishwakarma, "Power System Protection and Switchgear." New Delhi, India: McGraw Hill Education, 2014.

نموذج وصف المقرر

1. أسم المقرر الدراسي:
Stability of Power Systems
2. رمز المقرر:
EET4203
3. الفصل / السنة:
الفصل الأول 2024-2025/ مسار بولونيا
4. تاريخ اعداد هذا الوصف:
2025/7/16
5. حضوري / عبر الانترنت:
حضوري
6. عدد الساعات الدراسية (الكلي)/ عدد الوحدات/ (الكلي):
5 ساعات / 125 وحدة اوربية
7. أسم مسؤول المقرر الدراسي (اذا كان هناك اكثر من اسم يذكر ايضا):
8. أهداف المقرر
The aims of the "Stability of Power System" module are as follows: 1. Understand the concept of stability in power systems: The module aims to provide an understanding of stability and its significance in power systems. It covers the different types of stability, such as steady-state stability and transient stability. 2. Study symmetrical components and sequence networks: The module focuses on the analysis of unbalanced conditions in power systems using symmetrical components and sequence networks. This includes understanding sequence impedances of synchronous machines, transmission lines, and transformers. 3. Analyze unsymmetrical faults: The module aims to teach the analysis of unsymmetrical faults, such as single line to ground faults, line to line faults, and double line to ground faults. It covers the behavior of power system components during these fault conditions using bus impedance matrices. 4. Explore stability problems and solutions: The module aims to delve into stability problems that can occur in power systems. It covers topics such as rotor dynamics, swing equations, and the equal-area criterion of stability. It also focuses on the numerical solution of swing equations. Apply stability analysis to practical scenarios: The module aims to provide practical applications of stability analysis. It covers the application of the equal-area criterion to sudden large changes in load and three-phase faults. It helps students understand how stability analysis can be used to assess the stability of a power system in real-world situations.

9. استراتيجيات التعليم والتعلم

The "Stability of Power System" module can be taught using a variety of learning and teaching strategies to ensure a comprehensive understanding of the subject matter. Some effective strategies that can be employed are:

1. Lectures: In-class lectures can be used to deliver theoretical concepts, principles, and fundamental knowledge related to power system stability. Lectures can be supplemented with visual aids such as slides, diagrams, and animations to enhance understanding.
2. Practical Examples and Case Studies: Providing practical examples and case studies allows students to apply theoretical concepts to real-world scenarios. This can help them develop problem-solving skills and gain a deeper understanding of the practical implications of stability analysis.
3. Interactive Discussions: Encouraging students to participate in discussions can foster critical thinking and enhance their understanding of complex topics. Group discussions, debates, and brainstorming sessions can be organized to explore different perspectives and encourage peer-to-peer learning.
4. Simulations and Software Tools: Utilizing power system simulation software tools can provide hands-on experience in analyzing power system stability. Students can simulate various scenarios and observe the effects of stability problems, helping them gain practical skills in stability analysis.
5. Laboratory Sessions: Conducting laboratory sessions allows students to perform experiments and measurements related to power system stability. They can analyze data, interpret results, and draw conclusions, reinforcing their understanding of stability concepts.
6. Guest Lectures and Industry Experts: Inviting guest lecturers or industry experts who have practical experience in power system stability can provide valuable insights and real-world examples. They can share their experiences, discuss challenges, and highlight the importance of stability analysis in power system operation.
7. Assignments and Problem-Solving Exercises: Assigning problem-solving exercises and assignments helps students apply theoretical knowledge to solve practical stability problems. This can include analyzing system diagrams, calculating sequence impedances, and solving swing equations.
8. Assessments: Conducting quizzes, tests, and examinations can evaluate students' understanding of the concepts covered in the module. These assessments can include both theoretical knowledge and problem-solving skills.
9. Online Resources and Learning Platforms: Providing access to online resources, such as e-books, videos, and interactive tutorials, can support self-paced learning and revision outside the classroom. Online learning platforms can also facilitate discussion forums and provide additional study materials.

Continuous Feedback and Support: Offering regular feedback and support to students allows them to track their progress and address any difficulties they may encounter. This can be done through individual consultations, group feedback sessions, or online communication channels.

10. بنية المقرر الدراسي

الاسبوع	الساعات	مخرجات المتعلم المطلوبة	اسم الوحدات او الموضوع	طريقة التعلم	طريقة التقييم
Week 1	5	Lab Introduction and Safety Briefing. Familiarization with Power System Simulation Software.	Symmetrical Components Analysis: Introduction and Principles.	حضوري	اختبارات يومي
Week 2	5	Symmetrical Components Analysis: Positive Sequence Analysis. Simulation of Balanced Three-Phase System.	Symmetrical Components Analysis: Sequence Impedances.	حضوري	تقارير

واجبات	حضوري	Symmetrical Components Analysis: Sequence Networks.	Symmetrical Components Analysis: Negative and Zero Sequence Analysis. Simulation of Unbalanced Faults and Sequence Networks.	5	Week 3
اختبارات يومي	حضوري	Unsymmetrical Faults Analysis: Introduction and Single Line to Ground Fault.	Unsymmetrical Fault Analysis: Single Line to Ground Fault. Calculation of Fault Currents and Voltages.	5	Week 4
تقارير	حضوري	Unsymmetrical Faults Analysis: Line to Line Fault.	Unsymmetrical Fault Analysis: Line to Line Fault. Calculation of Fault Currents and Voltages. Unsymmetrical Fault Analysis: Double Line to Ground Fault. Calculation of Fault Currents and Voltages.	5	Week 5
واجبات	حضوري	Unsymmetrical Faults Analysis: Double Line to Ground Fault.	Bus Impedance Matrix Calculation.	5	Week 6
اختبارات يومي	حضوري	Unsymmetrical Faults Using Bus Impedance Matrix.	Stability Problems: Swing Equation Simulation. Transient Stability Analysis.	5	Week 7
تقارير	حضوري	Introduction to Power System Stability.	Stability Problems: Equal-Area Criterion Simulation. Application to Sudden Large Changes in Load.	5	Week 8
واجبات	حضوري	Types of Stability: Steady-state Stability and Transient Stability.	Stability Problems: Equal-Area Criterion Simulation. Application to Three-Phase Faults.	5	Week 9
اختبارات يومي	حضوري	Stability Problems: Rotor Dynamics and Swing Equation.	Numerical Solution of Swing Equation: Introduction to Numerical Methods. Simulation of Swing Equation using Numerical Techniques.	5	Week 10
تقارير	حضوري	Stability Problems: Factors Affecting Transient Stability.	Advanced Stability Analysis: Voltage Stability Analysis. Simulation of Voltage Stability Issues.	5	Week 11

واجبات	حضوري	Stability Problems: Equal-Area Criterion of Stability.	Advanced Stability Analysis: Small-Signal Stability Analysis. Modal Analysis and Eigenvalue Methods.	5	Week 12
اختبارات يومي	حضوري	Stability Problems: Applications of Equal-Area Criterion to Sudden Large Change in Load.	Lab Review and Project Work. Preparation for Final Lab Assessment.	5	Week 13
تقارير	حضوري	Stability Problems: Applications of Equal-Area Criterion to Three-Phase Fault	Lab Assessment: Practical Exam or Project Presentation.	5	Week 14
واجبات	حضوري	Numerical Solution of Swing Equation.	Lab Review and Wrap-Up. Feedback and Discussion on Lab Experience	5	Week 15

11. تقييم المقرر

As		Time/ Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	4, 10	LO #1, 2, 3, 6,7 and 9
	Assignments	2	10% (10)	6, 12	LO # 4, 5 and 8
	Projects / Lab.	14	10% (10)	Continuous	All
	Report	14	10% (10)	Continuous	All
Summative assessment	Midterm Exam	2 hours	10% (10)	7	LO # 1-7
	Final Exam	3 hours	50% (50)	16	All
Total assessment			100% (100 Marks)		

12. مصادر التعلم والتدريس

P. Kundur, "Power System Stability and Control," 2nd ed. New York, NY, USA: McGraw-Hill, 1994.
J. J. Grainger and W. D. Stevenson Jr., "Power Systems Analysis," 2nd ed. New York, NY: McGraw-Hill, 1994.

J. D. Glover, M. S. Sarma, and T. J. Overbye, "Power System Analysis and Design," 6th ed. Boston, MA, USA: Cengage Learning, 2017.

نموذج وصف المقرر

1. أسم المقرر الدراسي:

High Voltage Techniques

2. رمز المقرر:

EET4204

3. الفصل / السنة:
الفصل الأول 2024-2025/ مسار بولونيا
4. تاريخ اعداد هذا الوصف:
2025/7/16
5. حضوري / عبر الانترنت:
حضوري
6. عدد الساعات الدراسية (الكلي)/ عدد الوحدات/ (الكلي):
5 ساعات / 125 وحدة اوربية
7. أسم مسؤول المقرر الدراسي (اذا كان هناك اكثر من اسم يذكر ايضا):
8. أهداف المقرر
The aims of the High Voltage Techniques module are typically as follows: 1. To provide students with a fundamental understanding of high voltage engineering principles and their applications. 2. To introduce students to various insulation materials used in high voltage systems and enable them to make informed decisions regarding material selection. 3. To familiarize students with the generation methods of high voltage and the equipment used for this purpose. 4. To develop students' knowledge and skills in high voltage measurements, including the use of appropriate instruments and techniques. 5. To provide students with an understanding of different high voltage testing methods and their importance in assessing insulation performance and safety. 6. To explore the phenomenon of parallel discharge and its impact on high voltage systems. 7. To develop students' knowledge of over voltages, their causes, and their effects on electrical equipment. 8. To introduce students to the characteristics of lightning phenomena and their relevance to high voltage systems. 9. To enhance students' understanding of insulation coordination and the importance of selecting compatible insulation systems for different components in a high voltage system. 10. To provide students with knowledge of the thermal characteristics of high voltage cables and the factors influencing their heat transfer and cooling. 11. To familiarize students with the insulation materials used in high voltage cables and their properties. To develop students' understanding of high dielectric strength cables and their applications in high voltage systems.
9. استراتيجيات التعليم والتعلم
The High Voltage Techniques module can be delivered using a combination of learning and teaching strategies to ensure effective comprehension and skill development. Some suitable strategies for this module include: 1. Lectures: Traditional lectures can be used to introduce key theoretical concepts, principles, and techniques related to high voltage generation, measurement, testing, and overvoltage phenomena. Lectures can provide a foundation of knowledge and facilitate understanding of complex topics. 2. Practical Laboratory Sessions: Practical laboratory sessions are crucial for reinforcing theoretical

concepts and developing hands-on skills. Students can engage in experiments and exercises that involve high voltage generation, measurement, and testing. This hands-on experience allows students to apply their knowledge in a controlled environment and gain practical insights into working with high voltages.

3. Case Studies and Real-World Examples: Integrating case studies and real-world examples into the teaching approach helps students understand how high voltage techniques are applied in practical situations. Analyzing actual cases and scenarios helps students develop problem-solving skills and enhances their ability to apply theoretical knowledge to real-life challenges.

4. Group Discussions and Debates: Organizing group discussions and debates encourages active participation and critical thinking. Students can discuss and debate topics related to high voltage techniques, share their perspectives, and engage in collaborative learning. This strategy promotes a deeper understanding of the subject matter and enhances communication and teamwork skills.

5. Interactive Demonstrations: Interactive demonstrations can be used to illustrate complex concepts and principles. This approach can involve using simulation software, interactive models, or physical demonstrations of high voltage phenomena. Interactive demonstrations help students visualize abstract concepts and foster a deeper understanding of the topic.

6. Guest Speakers and Industry Visits: Inviting guest speakers from relevant industries or arranging visits to high voltage facilities can provide students with insights into real-world applications and industry practices. Guest speakers can share their experiences, challenges, and advancements in high voltage techniques, providing valuable perspectives and enhancing students' understanding of the subject.

7. Self-Study and Research Assignments: Assigning self-study and research assignments encourages independent learning and allows students to explore specific aspects of high voltage techniques in depth. This strategy promotes critical thinking, research skills, and the ability to synthesize information from various sources.

Online Resources and Multimedia Materials: Utilizing online resources, multimedia materials, and interactive platforms can enhance engagement and provide additional learning opportunities. Students can access supplementary materials, video lectures, simulations, and online discussions to reinforce their understanding and explore high voltage techniques from different perspectives.

10. بنية المقرر الدراسي

الاسبوع	الساعات	مخرجات المتعلم المطلوبة	اسم الوحدات او الموضوع	طريقة التعلم	طريقة التقييم
Week 1	5	Lab Safety and Equipment Familiarization: Introduction to lab safety protocols when working with high voltages. Familiarization with high voltage equipment and their functions. Basic measurements using multimeters and oscilloscopes.	Introduction to High Voltage Techniques. Importance of high voltage generation and its applications. Overview of high voltage safety measures and regulations.	حضوري	اختبارات يومي
Week 2	5	DC High Voltage Generation and Measurement: Practical exercises on generating and measuring high DC voltages. Use of voltage dividers and multipliers. Measurement techniques	High Voltage Generation: DC Voltages. Principles and methods of generating high DC voltages. Voltage multipliers and voltage dividers. Practical considerations in DC high voltage generation.	حضوري	تقارير

			for DC voltages.		
واجبات	حضوري	Electrical Insulating Materials in High Voltage Functions and classification of insulating materials, Properties and characteristics of insulating materials. Conduction and Breakdown in Gases, Electrical conduction mechanisms in gases, Breakdown phenomena in gas insulation. Conduction and Breakdown in Liquid Dielectrics, Electrical conduction mechanisms in liquid dielectrics, Breakdown phenomena in liquid dielectrics. Breakdown in Solid Dielectrics, Breakdown mechanisms in solid dielectrics, Factors affecting breakdown strength in solid insulation. Insulation Coordination in Power Systems, Principles and importance of insulation coordination. Selection and compatibility of insulation systems in power systems. Insulation Materials Used in High Voltage Cables, Types of insulation materials used in high voltage cables, Properties and selection considerations for cable insulation.	AC High Voltage Generation and Measurement: Hands-on activities on generating and measuring high AC voltages. Transformer-based voltage multiplication experiments. Measurement techniques for AC voltages.	5	Week 3
اختبارات يومي	حضوري	High Voltage Generation: AC Voltages. Principles of high voltage AC generation. Transformer-based voltage multiplication. Resonant circuit methods for high voltage AC generation.	Impulse High Voltage Generation and Measurement: Practical experiments on generating and measuring impulse voltages. Use of Marx generators and pulse forming networks. Measurement techniques for impulse voltages and currents.	5	Week 4
تقارير	حضوري	High Voltage Generation: Impulse Voltages and Currents, Generation of impulse voltages and currents.	Partial Discharge Measurements on Cables: Techniques for measuring partial discharges in	5	Week 5

		Marx generators and pulse forming networks, Surge wave generators and their applications. High Voltage Measurement Techniques: DC Voltages and AC Voltages. Measurement principles and instruments for DC voltages and AC voltages. Calibration and accuracy considerations.	cables. Practical exercises on cable insulation testing. Analysis and interpretation of partial discharge measurement results.		
واجبات	حضوري	High Voltage Measurement Techniques: Impulse Voltages and Currents. Measurement principles and instruments for impulse voltages. Measurement principles and instruments for impulse currents. Introduction to cathode ray oscillographs for high voltage measurements.	Circuit Breaker Testing: Hands-on exercises on testing circuit breakers for interrupting capabilities. Timing and synchronization tests. Analysis and interpretation of circuit breaker test results.	5	Week 6
اختبارات يومي	حضوري	High Voltage Testing: Cables. Insulation testing methods for cables. Partial discharge measurements. Testing procedures and interpretation of results.	Transformer Testing: Practical exercises on testing transformer insulation and performance. Ratio and polarity tests. Load and temperature rise tests. Analysis and interpretation of transformer test results.	5	Week 7
تقارير	حضوري	Testing methods for circuit breaker performance. Interrupting capability tests. Timing and synchronization tests. High Voltage Testing: Circuit Breakers.	Surge Arrester Testing: Hands-on activities on testing surge arresters for performance. Protective characteristics testing. Leakage current and insulation coordination tests. Analysis and interpretation of surge arrester test results.	5	Week 8
واجبات	حضوري	High Voltage Testing: Transformers. Insulation testing methods for transformers. Transformer ratio and polarity tests.	Lightning Phenomena Simulation: Simulating lightning phenomena and their effects on power systems. Lightning protection measures and grounding	5	Week 9

		Load and temperature rise tests.	techniques.		
اختبارات يومي	حضوري	High Voltage Testing: Surge Arresters. Testing methods for surge arrester performance. Protective characteristics testing. Leakage current and insulation coordination tests.	Switching Surges and Fault Simulation: Simulating switching surges and faults in power systems. Investigating overvoltages resulting from system faults. Mitigation techniques and protective devices.	5	Week 10
تقارير	حضوري	Overvoltage Phenomena in Electric Power Systems: Lightning Phenomena. Causes and effects of lightning on power systems. Lightning protection measures and grounding techniques.	Parallel Discharges and Corona Discharge Experiments: Practical exercises on parallel discharges and corona discharges. Observing the consequences of parallel discharges. Investigating corona discharge effects and mitigation measures.	5	Week 11
واجبات	حضوري	Overvoltage Phenomena in Electric Power Systems: Switching Surges and Faults. Switching surge generation and effects. Overvoltages resulting from system faults. Mitigation techniques and protective devices.	Thermal Characteristics of High Voltage Cables: Hands-on experiments on thermal characteristics of cables. Heat transfer mechanisms in underground high voltage cables. Cooling techniques for managing cable temperatures.	5	Week 12
اختبارات يومي	حضوري	Overvoltage Phenomena in Electric Power Systems: Parallel Discharges and Corona Discharges. Causes and consequences of parallel discharges. Corona discharge effects and mitigation measures.	Case Study Analysis: Analyzing real-world case studies related to high voltage techniques. Identifying challenges and proposing solutions based on acquired knowledge.	5	Week 13
تقارير	حضوري	Thermal Characteristics and Cooling of High Voltage Cables. Thermal characteristics of cables and their implications. Heat transfer mechanisms in underground high voltage cables. Cooling techniques for managing cable temperatures.	Project Work: Collaborative project work related to high voltage techniques. Designing and conducting experiments, analyzing data, and presenting findings.	5	Week 14

واجبات	حضوري	Review and Revision. Summarizing key concepts and topics covered in the module. Reviewing important theories, techniques, and safety measures. Preparing for the final assessment.	Lab Review and Wrap-up: Reviewing key lab concepts and techniques. Summarizing lab experiments and project outcomes. Preparing lab reports and final assessments.	5	Week 15

11. تقييم المقرر

As		Time/ Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	10% (10)	5, 10	LO #1, 2, 8 and 9
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Projects / Lab.	14	10% (10)	Continuous	All
	Report	14	10% (10)	Continuous	All
Summative assessment	**Midterm Exam**	2 hours	10% (10)	7	LO # 1-7
	Final Exam	3 hours	50% (50)	16	All
Total assessment			100% (100 Marks)		

12. مصادر التعلم والتدريس

M. S. Naidu and V. Kamaraju, "High voltage engineering," Tata McGraw Hill, 2013.
C. L. Wadhwa, "High voltage Engineering," New Age International Publishers, 3rd ed., 2010.

J. Kuffel and P. Kuffel, "High voltage engineering fundamentals," Elsevier, 2000.
H. M. Ryan, Ed., "High voltage engineering and testing," IET, 2001.

نموذج وصف المقرر

13. أسم المقرر الدراسي:
Project 2
14. رمز المقرر:
EET4205
15. الفصل / السنة:
الفصل الأول 2024–2025/ مسار بولونيا
16. تاريخ اعداد هذا الوصف:
2025/7/16
17. حضوري / عبر الانترنت:
حضوري
18. عدد الساعات الدراسية (الكلي)/ عدد الوحدات/ (الكلي):
5 ساعات / 125 وحدة اوربية
19. أسم مسؤول المقرر الدراسي (اذا كان هناك اكثر من اسم يذكر ايضا):
20. أهداف المقرر
The Project 2 module has several aims that contribute to the overall learning outcomes of the final year project. Some of the key aims of this module include: 1. Application of knowledge: The module aims to provide students with an opportunity to apply the theoretical knowledge and skills they have acquired throughout their studies. By working on their final year project, students can demonstrate their ability to transfer theoretical concepts into practical solutions or outcomes. 2. Independent learning and problem-solving: The module encourages students to take ownership of their projects and work independently. It aims to develop students' abilities to identify and define problems, formulate research questions or hypotheses, and devise appropriate methodologies to investigate them. This promotes critical thinking and problem-solving skills. 3. Project management and execution: The module aims to equip students with project management skills. It involves planning and organizing their project activities, setting realistic timelines, and effectively managing resources and constraints. Students gain experience in executing a project from start to finish, which is valuable for future professional endeavors. 4. Data collection and analysis: The module aims to develop students' competence in collecting and analyzing data. Students will have the opportunity to apply appropriate research methods, gather relevant data, and utilize statistical or qualitative analysis techniques to derive meaningful insights from their findings. This enhances their research and analytical skills. 5. Documentation and report writing: The module emphasizes the importance of documenting project progress and outcomes in a comprehensive final report. Students are expected to write a well-

structured report that presents their research methodology, data analysis, results, and conclusions. This aims to enhance their technical writing skills and ability to communicate research findings effectively.

6. Presentation and communication skills: Students are required to prepare a presentation or demonstration to showcase their project outcomes. This aims to develop their communication skills and their ability to effectively present complex ideas or research findings to a wider audience. Students learn to convey their work in a clear, concise, and engaging manner.
7. Reflection and evaluation: The module encourages students to reflect on their project experience and evaluate their own performance. This promotes self-awareness, critical evaluation of their work, and identification of areas for improvement. Students can use this feedback and reflection to enhance their future projects or professional development.

21. استراتيجيات التعليم والتعلم

To facilitate effective learning and teaching in the Project 2 module on final year project execution and presentation in electrical engineering, a combination of various strategies can be employed. Here are some suggested learning and teaching strategies:

1. Lectures: Conduct interactive lectures to provide theoretical foundations, technical concepts, and best practices relevant to project execution and presentation. Encourage student engagement through discussions, questions, and real-world examples.
2. Practical Sessions: Organize hands-on practical sessions to allow students to apply their knowledge and skills in a simulated or real-world project environment. Provide guidance and supervision as they execute their projects, troubleshoot issues, and collect data.
3. Workshops and Seminars: Conduct workshops and seminars on topics such as data analysis techniques, effective presentation skills, research methodologies, and project management. Invite guest speakers or industry professionals to share their experiences and insights.
4. Group Discussions and Peer Learning: Encourage students to participate in group discussions and peer learning activities. Assign group projects or case studies where students can collaborate, share ideas, and learn from each other's experiences.
5. Mentorship and Guidance: Provide individual or group mentorship to students, where they can receive guidance and feedback on their project execution, data analysis, and presentation skills. Offer regular feedback and support to ensure their progress and address any challenges.
6. Research and Literature Review: Guide students in conducting literature reviews to identify research gaps, relevant studies, and existing knowledge in their project area. Teach them how to critically analyze research papers, extract useful information, and apply it to their projects.
7. Technology and Tools Integration: Introduce students to relevant software tools, simulation platforms, data analysis software, and presentation tools commonly used in the field of electrical engineering. Provide training and support to help students effectively utilize these tools for their projects.
8. Project Management and Time Allocation: Teach students project management skills, including time management, task prioritization, and resource allocation. Help them develop a project plan, set achievable milestones, and monitor their progress throughout the module.
9. Peer Evaluation and Feedback: Incorporate peer evaluation and feedback mechanisms, where students provide constructive criticism and suggestions to their peers' project progress, reports, or presentations. This encourages collaborative learning and allows students to refine their work.
10. Reflective Practice and Self-Assessment: Encourage students to engage in reflective practice by regularly reflecting on their project progress, challenges faced, and lessons learned. Provide opportunities for self-assessment, allowing students to evaluate their own performance and set goals for improvement.
11. Assessment Variety: Utilize a variety of assessment methods, such as project reports, presentations, demonstrations, quizzes, and peer evaluations. This provides a comprehensive evaluation of students' understanding, application of knowledge, and project outcomes.

12. Ethical Considerations: Emphasize ethical considerations in project execution, data collection, and reporting. Discuss the importance of integrity, confidentiality, and responsible conduct in engineering research and project work.

22. بنية المقرر الدراسي

الاسبوع	الساعات	مخرجات المتعلم المطلوبة	اسم الوحدات او الموضوع	طريقة التعلم	طريقة التقييم
Week 1	5	Introduction to the module objectives, learning outcomes, and assessment criteria. Overview of the final year project and its significance in the curriculum. Introduction to project topics and selection process.	Introduction to the module objectives, learning outcomes, and assessment criteria. Overview of the final year project and its significance in the curriculum. Introduction to project topics and selection process.	حضوري	اختبارات يومي
Week 2	5	Review of project proposals and topic selection by students. Guidance on refining project goals and methodologies based on feedback.	Review of project proposals and topic selection by students. Guidance on refining project goals and methodologies based on feedback.	حضوري	تقارير
Week 3	5	Lectures on project execution strategies and project management principles. Discussion on the importance of time management and resource allocation.	Lectures on project execution strategies and project management principles. Discussion on the importance of time management and resource allocation.	حضوري	واجبات
Week 4	5	Practical session on implementing project methodologies or experimental setups. Troubleshooting common issues and challenges during project execution.	Practical session on implementing project methodologies or experimental setups. Troubleshooting common issues and challenges during project execution.	حضوري	اختبارات يومي
Week 5	5	Workshop on data collection techniques and measurement principles. Practice in data collection using appropriate instrumentation or simulation tools.	Workshop on data collection techniques and measurement principles. Practice in data collection using appropriate instrumentation or simulation tools.	حضوري	تقارير
Week 6	5	Lectures on data analysis methods and statistical techniques. Application of data analysis to project datasets.	Lectures on data analysis methods and statistical techniques. Application of data analysis to project datasets.	حضوري	واجبات
Week 7	5	Discussion on the engineering and scientific implications of project findings.	Discussion on the engineering and scientific implications of project findings.	حضوري	اختبارات يومي

		Examination of potential applications and impact of the project outcomes.	Examination of potential applications and impact of the project outcomes.		
تقارير	حضوري	Practical session on project documentation and report writing. Guidance on proper citation and referencing using IEEE style.	Practical session on project documentation and report writing. Guidance on proper citation and referencing using IEEE style.	5	Week 8
واجبات	حضوري	Workshop on effective presentation skills and techniques. Preparation of project presentations and demonstrations.	Workshop on effective presentation skills and techniques. Preparation of project presentations and demonstrations.	5	Week 9
اختبارات يومي	حضوري	Presentation and demonstration sessions for students to showcase their projects. Peer evaluation and feedback on the presentations.	Presentation and demonstration sessions for students to showcase their projects. Peer evaluation and feedback on the presentations.	5	Week 10
تقارير	حضوري	Reflection and self-assessment activities on project progress and learning outcomes. Identification of areas for improvement and setting goals for the remaining weeks.	Reflection and self-assessment activities on project progress and learning outcomes. Identification of areas for improvement and setting goals for the remaining weeks.	5	Week 11
واجبات	حضوري	Continued execution of projects and data analysis, if necessary. Mentoring and guidance sessions to address individual project challenges.	Continued execution of projects and data analysis, if necessary. Mentoring and guidance sessions to address individual project challenges.	5	Week 12
اختبارات يومي	حضوري	Completion of project documentation and final report writing. Peer review of project reports to provide constructive feedback.	Completion of project documentation and final report writing. Peer review of project reports to provide constructive feedback.	5	Week 13
تقارير	حضوري	Final revisions and polishing of project reports and presentations. Practice sessions for final project presentations.	Final revisions and polishing of project reports and presentations. Practice sessions for final project presentations.	5	Week 14
واجبات	حضوري	Preparatory week before the final Exam.	Preparatory week before the final Exam.	5	Week 15
23. تقييم المقرر					

As		Time/ Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5, 10	LO #1, 2, 8 and 9
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	14	LO # 1-14
Summative assessment	Midterm Exam	1 hours	10% (10)	7	LO # 1-7
	Final Exam	3 hours	50% (50)	16	All
Total assessment			100% (100 Marks)		

24. مصادر التعلم والتدريس

C. L. Rethlefsen and R. E. Karper, "Engineering Research: Planning, Writing, and Presenting," 2nd ed. New York, NY, USA: Taylor & Francis, 2019.

D. S. Viswanath, "Research Methods for Engineers," 2nd ed. Boca Raton, FL, USA: CRC Press, 2018.