

MODULE DESCRIPTION FORM

Module Information			
Module Title	Thermodynamics		Module Delivery
Module Type	Core		<input checked="" type="checkbox"/> Theory <input checked="" type="checkbox"/> Lecture <input checked="" type="checkbox"/> Lab <input checked="" type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar
Module Code	EME111		
ECTS Credits	9		
SWL (hr/sem)	225		
Module Level	1 1	Semester of Delivery		1
Administering Department	EME	College	CENGS
Module Leader	Name: Omar M. Ahmed	e-mail	E-mail: omar.alzayat@uosamarra.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	M.Sc.
Module Tutor	Shaymaa Husham AbdllMalek	e-mail	E-mail: shaymaa.h.ab@uosamarra.edu.iq
Peer Reviewer Name	Reyad Azzawi Badr	e-mail	E-mail: revadh.azawi@uosamarra.edu.iq
Scientific Committee Approval Date	11/11/2023	Version Number	1.0

Relation with other Modules			
Prerequisite module	None	Semester	-
Co-requisites module	None	Semester	-

Module Aims, Learning Outcomes and Indicative Contents	
Module Objectives	<ol style="list-style-type: none"> To explain the thermodynamic science through the application of techniques. To understand the first law of thermodynamic, units and properties system. To understand the zeroth law of thermodynamic, properties system (Temperature, Pressure and density act.). To understand the pure substance, steam tables And charts To explain the ideal gas equation and real gas, gas tables and charts.

	<ol style="list-style-type: none"> 6. To understand the first law of thermodynamic, entropy, heat pump, reversible process and irreversible process. 7. To explain the nozzle, the diffuser, the turbine, the compressor and the throttling valve. 8. The vapor power cycle (Carnot cycle, Rankin cycle, reheat Rankin cycle and regenerative Rankin cycle). 9. The gas power cycle (Carnot cycle, Otto cycle, Diesel cycle and starling cycle and Ericson Rankin cycle). 10. The refrigeration cycle.
<p>Module Learning Outcomes</p>	<ol style="list-style-type: none"> 1. The student will know about the importance of thermodynamic science and its application areas. 2. Understanding the thermodynamic system and surroundings. 3. Explaining the difference between substance intensive and extensive properties. 4. Understanding the relationship between the zeroth law of thermodynamics and temperature measurement devices. 5. Identify the concept of energy and energy conservation law and explaining the energy forms. 6. Identify the steady flow energy equation and non-flow energy equation and their applications. 7. Learning about thermodynamic state and process and reversible and irreversible processes. 8. Define ideal gases and their relations and processes. 9. Learning how to use steam tables to get the precise properties of steam state. 10. Understanding the second law of thermodynamics and entropy. 11. Define the heat engine cycles and their applications. 12. Learning about gas mixture and their properties.
<p>Indicative Contents</p>	<p>Indicative content includes the following:</p> <ol style="list-style-type: none"> 1- Dimensions and units of physical quantities, primary dimensions and secondary dimensions. 2- International system units (Metric SI) and English system (British) units. 3- Thermodynamic system (closed and open system), boundary and surroundings. 4- System properties, intensive and extensive properties. 5- Thermodynamic equilibrium: thermal, mechanical, phase and chemical equilibriums. 6- Thermodynamic state, process and cycle. 7- Constant property processes: isothermal, isobaric, and isochoric processes. and their solutions. 8- Zeroth law of thermodynamics and temperature measurement. 9- Temperature scales: Celsius, Fahrenheit, Kelvin and Rankine. 10- Pressure measurement: absolute, gage and vacuum pressure. 11- Energy forms: microscopic and macroscopic energy forms 12- The first law of thermodynamics (the energy conservation law).

	<p>13- Steady flow energy equation (SFEE), steam boiler, turbine, compressor and nozzle.</p> <p>14- Non flow energy equation (NFEE).</p> <p>15- Ideal gas: Boyle's law, Charles's law, Gay-Lussac's law, Combined Gas Law and ideal gas law.</p> <p>16- Gas constant, specific heats (C_p and C_v) and adiabatic index (γ) of ideal gas.</p> <p>17- Reversible and irreversible process of ideal gas and P-V diagram.</p> <p>18- Steam formation: saturated water, wet steam, saturated steam and superheated steam.</p> <p>19- Steam properties: dry fraction, saturation temperature, enthalpy, specific volume, internal energy.</p> <p>20- Steam tables and interpolation.</p> <p>21- The second law of thermodynamics: Kelvin-Blank statement and Clausius statement.</p> <p>22- Entropy and T-S diagram.</p> <p>23- Heat engine cycles: Carnot, Brayton, Otto, Diesel and Dual combustion cycles.</p> <p>24- Steam cycles: Rankine, Rankine with superheat, reheat steam cycles.</p> <p>25- Vapor compression refrigeration system. 26- Gas mixing processes.</p>
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Learning and Teaching Strategies

Strategies	Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering types of simple experiments involving some sampling activities that are interesting to the students.
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Student Workload (SWL)

Structured SWL (h/sem)	135	Structured SWL (h/w)	9
Unstructured SWL (h/sem)	87	Unstructured SWL (h/w)	5.8
Total SWL (h/sem)	225		

Module Evaluation					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2 , #3 and #9, #10
	Assignments	4	12% (12)	3, 5, 10 , and 11	All
	Lab.	3	9% (9)	9 , 4 , and 13	All
	Report	1	9% (9)	11	All
Summative assessment	Midterm Exam	2hr	10% (10)	8	LO #1 - #7
	Final Exam	3hr	50% (50)	-	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
	Material Covered
Week 1	-Introduction -Basic concept of thermodynamics. - Thermodynamic system. - Substance thermodynamic properties (intensive and extensive properties).
Week 2	-Energy and energy transfer.
Week 3	- First law of thermodynamics.
Week 4	- Ideal and real gas.
Week 5	- Reversible and irreversible processes of ideal gas.
Week 6	- Steam formation and steam properties.

Week 7	- Steam tables and interpolation, nozzle – diffuser – turbine – compressor – throttling valve.
Week 8	- Mid exam.
Week 9	- The second law of thermodynamics.
Week 10	- Entropy and T-S chart.
Week 11	- Heat engine cycles (work and efficiency). - Carnot cycle
Week 12	- Rankin cycle. - Reheat Rankin cycle. - Regenerative Rankin cycle
Week 13	- Otto cycle - Diesel cycle.
Week 14	- Vapor compression refrigeration system.
Week 15	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)

	Material Covered
Week 1 & 2	Lab 1: Identify the types and uses of pressure devices, air flow meters and thermometers.
Week 3 & 4	Lab 2: Boyle's and Charles's experiments.
Week 5 & 6	Lab 3: Measuring the specific heats ratio (adiabatic index γ) for ideal gas.
Week 7 & 8	Lab 4: Heat pump.
Week 9 & 10	Lab 5: Evaluating the performance of simple vapor compression refrigeration cycle.
Week 11 & 12	Lab 6: The relationship between Saturated pressure and temperature of steam.

Learning and Teaching Resources

	Text	Available in the Library?
Required Texts	Thermodynamics: An engineering approach (9th edition), by Yunus A. Cengel Dr., Michael A. Boles, Mehmet Kanoglu, Published 2018	Yes
Recommended Texts	A Textbook of Thermal Engineering, by R. S. Khurmi & J. K Gupta, 2003.	No
Websites	https://www.youtube.com/watch?v=5rYEOdRNLA	

Grading Scheme

Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 - 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

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

MODULE DESCRIPTION FORM

Module Information			
Module Title	Mathematics		Module Delivery
Module Type	Supportive		<input checked="" type="checkbox"/> Theory <input checked="" type="checkbox"/> Lecture <input type="checkbox"/> Lab <input checked="" type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar
Module Code	EME112		
ECTS Credits	9		
SWL (hr/sem)	225		
Module Level	1	Semester of Delivery		1
Administering Department	EME	College	CENGS
Module Leader	Hadeel Abdulhadi Ibraheem	e-mail	hadeel.abddulhadi@uosamarra.edu.iq
Module Leader's Acad. Title	Assistant Lecturer	Module Leader's Qualification	M.Sc.
Module Tutor	Ehsan Ali Mustafa	e-mail	E-mail: ehsan.ali@uosamarra.edu.iq
Peer Reviewer Name	Muhammad Asmail Eleiwi	e-mail	E-mail: dr.muhammad@uosamarra.edu.iq
Scientific Committee Approval Date	11/11/2023	Version Number	1.0

Relation with other Modules			
Prerequisite module	None	Semester	-
Co-requisites module	None	Semester	-

Module Aims, Learning Outcomes and Indicative Contents	
Module Objectives	1.To develop problem solving skills and understanding of mathematic theory through the application of techniques. 2.Students learn about inverse functions 3.The student will be familiar with logarithms 4.The student will be familiar with the trigonometric functions 5.Understanding the engineering application of the studied specialization

Module Learning Outcomes	<ol style="list-style-type: none"> 1. Developing the student's ability to solve and discuss 2. Linking information to engineering reality
Indicative Contents	<p>The first years of all mathematics programmes are designed to give students a thorough grounding in a wide spectrum of mathematical ideas, techniques and tools in order to equip them for the later stages of their course. During first year, as well as consolidating, broadening and extending core material from pre-University study, we initiate a cultural transition to the rigorous development of mathematics which is characteristic at university. Students will develop both their knowledge of mathematics as a subject and their reasoning and communication skills, through lectures, tutorials, seminars, guided self-study, independent learning and project work. This development is addressed in all of our first-year modules, although different modules have a different emphasis. In addition to the above broad aims of the first year, this module focuses on ensuring that students have competence in a wide range of essential concepts, techniques and applications of differential and integral calculus, and differential equations.</p>

Learning and Teaching Strategies

Strategies	<p>Participation in the classroom during the lecture by asking questions by the teacher, taking short sudden exams, and participating in students sometimes to explain information from the subject matter. Guiding students to some sources, examples and exercises to benefit from.</p>
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Student Workload (SWL)

Structured SWL (h/sem)	123	Structured SWL (h/w)	8.2
Unstructured SWL (h/sem)	102	Unstructured SWL (h/w)	6.8
Total SWL (h/sem)	225		

Module Evaluation					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	5% (10)	3 and 4	LO #2 and #3
	Assignments	6	4% (24)	9, 10, 11, 12, and 13	LO #8, #9, #10 #11, #12, and #13
	Projects / Lab.	-	-	-	-
	Report	1	6% (6)	14	All
Summative assessment	Mid-term Exam	2hr	10% (10)	7	LO #1 - #6
	Final Exam	3hr	50% (50)	-	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
	Material Covered
Week 1	Functions and Trigonometric Functions.
Week 2	Limit , Continuity , and L' Hopital's Rule.
Week 3	Differentiation: Differentiation Rules , Implicit Differentiation , Chain Rule , and related rates.
Week 4	Applications of Derivatives : Extreme values of functions , Increasing and Decreasing functions , Concavity and curve Sketching , and Applied Optimization.
Week 5	Integration: Definite and Indefinite Integrals, and Area between Curves.
Week 6	Applications of Definite Integrals: Volumes of Revolution (Disk , Washer and Cylindrical Shell Methods) , Arc Length , and Area of Surfaces of Revolution.
Week 7	Mid-term Exam + Transcendental Functions: Inverse Functions
Week 8	Transcendental Functions: Natural Logarithms ,and Exponential Functions .

Week 9	Transcendental Functions: Inverse Trigonometric Functions , Derivative and Integral of Inverse trigonometric functions , Hyperbolic Functions , and Inverse Hyperbolic Functions.
Week 10	Techniques of Integration: Integration by Parts , Tabular Integration , Trigonometric Integrals.
Week 11	Techniques of Integration: Trigonometric substitutions , Integration by Partial Fractions.
Week 12	Numerical Integration (Midpoint ,Trapezoidal and Simpson methods).
Week 13	Polar Coordinates.
Week 14	Matrix.
Week 15	Preparatory week before the final Exam

Learning and Teaching Resources

	Text	Available in the Library?
Required Texts	Calculus, George B. Thomas. 12 th Edition	Yes
Recommended Texts	Calculus, Anton ,Bivens and Davis. 7 th Edition	No
Websites	https://www.khanacademy.org/math/calculus-1	

Grading Scheme

Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

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

MODULE DESCRIPTION FORM

Module Information			
Module Title	Computer Science		Module Delivery
Module Type	Basic		<input checked="" type="checkbox"/> Theory <input type="checkbox"/> Lecture <input checked="" type="checkbox"/> Lab <input checked="" type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar
Module Code	EME113		
ECTS Credits	4		
SWL (hr/sem)	100		
Module Level	1	Semester of Delivery		1
Administering Department	EME	College	CENGS
Module Leader	Riyadh Meteab Mahmood	e-mail	E-mail: reyadh.m@uosamarra.edu.iq
Module Leader's Acad. Title	Professor	Module Leader's Qualification	M.Sc.
Module Tutor	Eman Adel Mahmood	e-mail	E-mail: Eman.A.Mahmood00009@st.tu.edu.iq
Peer Reviewer Name	Younes Saud Alwan	e-mail	E-mail: Younes.s.al@uosamarra.edu.iq
Scientific Committee Approval Date	11/11/2023	Version Number	1.0

Relation with other Modules			
Prerequisite module	None	Semester	-
Co-requisites module	None	Semester	-

Module Aims, Learning Outcomes and Indicative Contents	
Module Objectives	<ol style="list-style-type: none"> 1. This course deals with the basic computer 2. Learn the basic computer components 3-Learn the Windows operating system, installation requirements, new features, and desktop components 4. To develop computer skills and understand programs through computer applications. 5. Broad understanding of word, Excel, PowerPoint and its applications.

	6.To understand Computer Safety & Software problems To understand the pure substance, steam tables And charts
Module Learning Outcomes	<ol style="list-style-type: none"> 1. Recognize how computer components. 2. Identify the Windows operating system, installation requirements, new features, and desktop components. 3. General description of Excel, Word and PowerPoint programs. 4. Understand the basic features of the Word program 5. Identify the basic features of the Excel program. 6. Identify the basic features of the PowerPoint program 7. Summarize what is meant by Microsoft Office program 8. The practical application of the Word program 9. Excel practical application 10. PowerPoint practical application
Indicative Contents	<p>Indicative content includes the following.</p> <p><u>Part A - Computer's components and Microsoft Word program (Theoretical and laboratory computer).</u></p> <p>Computer's components – The physical parts of a computer, software entities and Computer security, also Computer software licenses and it types, Intellectual property and electronic penetration. Definition of operating system, objectives, classification, Windows operating system, installation requirements, desktop components, Control panel, common settings in the computer, start menu, Taskbar. General introduction to Microsoft, Definition of Microsoft Word, Insert objects into Microsoft Word, Additional tasks in Microsoft Word. [60 hrs].</p> <p><u>Part B - Excel and power point Microsoft program (Theoretical and laboratory)</u></p> <p>Definition of Excel Microsoft program, Basic functions of Microsoft Excel, Components of Excel Microsoft program, Explanation of the command bar in Excel, Creating mathematical formulas in Microsoft Excel, Additional tasks in 21- The second law of thermodynamics: Kelvin-Blank statement and Clausius statement.</p> <p>Microsoft Excel Definition of power point program, PowerPoint Components, Explanation of the components of the home bar, Explanation of insert bar components, Explanation of animation in power point, Definition of a design bar in power point program, explain each the Slide show, review and View power point . [60 hrs].</p> <p>Exams and quizzes (3 hrs)</p> <p>Revision problem classes [27 hrs]</p>

Learning and Teaching Strategies

Strategies	Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering types of simple experiments involving some sampling activities that are interesting to the students.
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Student Workload (SWL)

Structured SWL (h/sem)	63	Structured SWL (h/w)	4.2
Unstructured SWL (h/sem)	37	Unstructured SWL (h/w)	2.46
Total SWL (h/sem)	100		

Module Evaluation

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	5% (10)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	5% (10)	5 and 10	All
	Lab.	3	5% (15)	4, 9, and 13	All
	Report	1	5% (5)	11	All
Summative assessment	Midterm Exam	2hr	10% (10)	6	LO #1 - #5
	Final Exam	3hr	50% (50)		All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

	Material Covered
Week 1	-Introduction - Difference Computer's components
Week 2	-The physical parts of a computer
Week 3	- Software entities.

Week 4	- Computer software licenses and it types.
Week 5	- Definition of operating system objectives, classification, Windows operating system.
Week 6	- Definition of Microsoft Office Word and mid exam.
Week 7	- Additional tasks in Microsoft Office Word, Insert objects into Microsoft Word.
Week 8	- Definition of Microsoft Office Excel program, Basic functions of Microsoft Office Excel.
Week 9	- Components of Excel Microsoft Office program, Explanation of the main bar in Excel.
Week 10	- Creating mathematical formulas in Microsoft Office Excel, Additional tasks in Microsoft Office Excel.
Week 11	- Definition of Microsoft Office power point program, Microsoft Office PowerPoint Components.
Week 12	- Explanation of the components of the home bar.
Week 13	-Explanation of insert bar components, Explanation of animation in power point.
Week 14	- Definition of a design bar in Microsoft Office power point program
Week 15	- Explain each the Slide show, review and View power point.
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)

	Material Covered
Week 1	Introduction to Computer's components.
Week 2	Recognize the physical parts of a computer.
Week 3	Recognize the operating system, Windows operating system.
Week 4	Historical development of computers
Week 5	Computer security and work ethics
Week 6	Definition of Microsoft Office Word & the components of Microsoft Office Word.
Week 7	Definition of Excel Microsoft program, Basic functions of Microsoft Excel.
Week 8	Recognize the Components of Microsoft Office Excel program.
Week 9	Explanation of the main bar in Microsoft Office Excel.
Week 10	Creating mathematical formulas in Microsoft Office Excel.
Week 11	Additional tasks in Microsoft Office Excel.
Week 12	Recognize the Microsoft Office power point program and Microsoft Office PowerPoint Components

Week 13	Recognize the components of the home bar, also animation in Microsoft Office power point.
Week 14	Application of insert bar components, design bar in Microsoft Office power point program.
Week 15	Recognize to the Slide show, review and View in the Microsoft Office power point.
Week 16	Preparatory week before the final Exam.

Learning and Teaching Resources

	Text	Available in the Library?
Required Texts	Fundamentals of Computer and Their Office Applications	Yes
Recommended Texts		
Websites		

Grading Scheme

Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
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	F – Fail	راسب	(0-44)	Considerable amount of work required

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MODULE DESCRIPTION FORM

Module Information			
Module Title	Engineering Physics		Module Delivery
Module Type	Supportive		<input checked="" type="checkbox"/> Theory <input checked="" type="checkbox"/> Lecture <input checked="" type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar
Module Code	EME114		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	1	Semester of Delivery		1
Administering Department	EME	College	CENGS
Module Leader	Marwa Majeed Juma	e-mail	E-mail: Marwa.majeed@uosamarra.edu.iq
Module Leader's Acad. Title	Assistant lecturer	Module Leader's Qualification	M.Sc.
Module Tutor	Ehsan Ali Mustafa	e-mail	E-mail: ehsan.ali@uosamarra.edu.iq
Peer Reviewer Name	Reyadh Azzawi Badr	e-mail	E-mail: reyadh.azawi@uosamarra.edu.iq
Scientific Committee Approval Date	11/11/2023	Version Number	1.0

Relation with other Modules			
Prerequisite module	None	Semester	-
Co-requisites module	None	Semester	-

Module Aims, Learning Outcomes and Indicative Contents	
Module Objectives	<p>1. Metallurgists develop different ways of processing metals and converting them into products which are useful for humans. They study the science of metals and also conduct various types of research in the respective field. They primarily work in the iron and steel industrial areas and research laboratories.</p> <p>2. The task of the metallurgist is to achieve balance between material</p>

	<p>properties, such as cost, weight, strength, toughness, hardness, corrosion, fatigue resistance and performance in temperature extremes. To achieve this goal, the operating environment must be carefully considered.</p> <p>3. Metallurgical engineers conduct testing to ensure the safety of materials, develop sustainable materials and processes for recycling existing materials, investigate material failures, and create testing</p>
<p>Module Learning Outcomes</p>	<p>Important: Write at least 6 Learning Outcomes, better to be equal to the number of study weeks.</p> <ol style="list-style-type: none"> 1. Atomic Structure: Atom, The Nucleus, The Protons, The Neutrons, The Electrons 2. The Bohr's Model 3. Periodic Table Element Groupings 4. Type of Bonding in Solids: Ionic Bonding, Covalent Bonding, Metallic Bonding, Hydrogen Bonding, Van Der Wall's Bonding 5. The Crystal Structure of Solids 6. Metallic Crystal Structures: Body-Centered Cubic (BCC), Face-Centered Cubic (FCC), Hexagonal Close-Packed (HCP) 7. Atomic Packing Factor 8. coordination number 9. Theoretical Density 10. ALLOYS 11. Structure of A Alloys : 12. Classification of Alloys Structure 13. Type of Alloys Structures (solid solution) : Substitutional alloy, Interstitial alloy, Substitutional / Interstitial alloy 14. Classification of Engineering Materials: Ferrous Metals, Non-Ferrous Metals: 15. Classification of Metals Alloys:

	<p>16. Phase Equilibrium Diagrams</p> <p>17. Types of Alloying Systems:</p> <p>18. DEFORMATION: Elastic deformation, Plastic deformation</p> <p>19. Recrystallization</p> <p>20. Mechanical Properties: STRENGTH, HARDNESS, TOUGHNESS, BRITTLENESS, DUCTILITY, MALLEABILITY, ELASTICITY, PLASTICITY, RIGIDITY, MACHINABILITY, HARDENABILITY, FATIGUE, CREEP</p> <p>21. Stress: Compressive strength, Tensile strength</p> <p>22. Types of Stress: Tensile Stress, Compressive Stress</p> <p>23. Strain:</p> <p>24. Types of Strain: Tensile Strain, Compressive Strain</p> <p>25. Modulus of elasticity, or Young's Modulus</p> <p>26. Stress-Strain Curve: (i) Proportional Limit, (ii) Elastic Limit, (iii) Yield Point, (iv) Ultimate Stress Point, (v) Fracture or Breaking Point</p> <p>27. Heat Treatments: Annealing, Normalizing, Hardening, Tempering, Carburization, Quenching</p> <p>28. Ferrous Metals(Alloys) : Pig Iron (Iron Ore), Wrought Iron, Cast Iron, Steel, Stainless Steels, Super alloys</p> <p>29. Iron Carbon phase Diagram</p> <p>30. Structures In Fe-C-Diagram: Austenite, Ferrite, Cementite, Pearlite, Austenite</p> <p>31. Transformation TTT Diagrams</p>
<p>Indicative Contents</p>	<p>Indicative content includes the following:</p> <ol style="list-style-type: none"> 1. Occupational safety instructions for laboratories and factories 2. Instructions for chemical, biological, radiological and nuclear safety and Security

Learning and Teaching Strategies

Strategies	<p>Type something like:.</p> <p>Teaching and learning strategies can include a range of whole class, group and individual activities to accommodate different abilities, skills, learning rates and styles that allow every student to participate and to achieve some degree of success.</p>
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Student Workload (SWL)

Structured SWL (h/sem)	78	Structured SWL (h/w)	5.2
Unstructured SWL (h/sem)	47	Unstructured SWL (h/w)	3.13
Total SWL (h/sem)	125		

Module Evaluation

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1 - #4, LO #8 - #9
	Assignments	4	20% (20)	4 and 10	LO #1 - #4, LO #8 - #9
	Report	1	10% (20)	11	All
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 - #6
	Final Exam	3hr	50% (50)		All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

Delivery Plan (Weekly Syllabus)	
	Material Covered
Week 1-4	Internal Structure of Metals Atom structure, The crystalline structure of metals, Defects in metal casting.
Week 5-7	Equilibrium states of binary system and mid exam. Constitution of alloys: Alloy structure and classification of alloys Equilibrium states of binary system and mid exam.
Week 8-9	Phases in alloy system Properties of Metals and Alloy : -Mechanical deformation and recrystallization Hot and cold working Physical and mechanical properties.
Week 10-13	Ferrous Alloy (Iron - Carbon) : Fe - C equilibrium diagram Carbon steel classification and applications Cast iron.
Week 14-15	Heat treatment of steels: Austenite transformation TTT diagrams Case hardening of steel the concept hardenability.

Learning and Teaching Resources

Learning and Teaching Resources		
	Text	Available in the Library?
Required Texts	Materials Science and Engineering by William D.callister,jr.David G.Rethwisch	No
Recommended Texts	-	-
Websites		

Grading Scheme				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 - 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required
<p>Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.</p>				

MODULE DESCRIPTION FORM

Module Information			
Module Title	Mechanical workshop		Module Delivery
Module Type	Supportive		<input checked="" type="checkbox"/> Theory <input type="checkbox"/> Lecture <input checked="" type="checkbox"/> Lab <input type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar
Module Code	EME115		
ECTS Credits	3		
SWL (hr/sem)	75		
Module Level	1	Semester of Delivery		1
Administering Department	EME	College	CENGS
Module Leader	Omar Mohammad Ahmed	e-mail	E-mail: omar.alzayat@uosamarra.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	
Module Tutor	Ehsan Ali Mustafa	e-mail	E-mail: ehsan.ali@uosamarra.edu.iq
Peer Reviewer Name	Reyad Azzawi Badr	e-mail	E-mail: reyadh.azawi@uosamarra.edu.iq
Scientific Committee Approval Date	11/11/2023	Version Number	1.0

Relation with other Modules			
Prerequisite module	None	Semester	-
Co-requisites module	None	Semester	-

Module Aims, Learning Outcomes and Indicative Contents	
Module Objective	<p>The module objectives of a mechanical workshop can vary depending on the specific context and level of education or training. However, here are some common objectives that may be associated with a mechanical workshop:</p> <ol style="list-style-type: none"> 1. Understanding Mechanical Systems: The objective is to provide participants with a comprehensive understanding of various mechanical systems, including their components, functions, and interactions.

	<ol style="list-style-type: none"> 2. Developing Technical Skills: The workshop aims to enhance participants' technical skills related to mechanical engineering, such as operating tools and equipment, performing measurements, and tools. 3. Safety Awareness: Safety is a crucial aspect of any mechanical workshop. The objective is to educate participants about safety protocols, risk assessment, proper handling of tools and equipment, and the importance of following safety guidelines to prevent accidents or injuries. 4. Critical Thinking and Innovation: The objective is to encourage participants to think critically and foster innovation in mechanical design, problem-solving, or process improvement. This may involve challenging participants to develop creative solutions, optimize existing designs, or propose new approaches to mechanical systems. 5. Critical Thinking and Innovation: The objective is to encourage participants to think critically and foster innovation in mechanical design, problem-solving, or process improvement. This may involve challenging participants to develop creative solutions, optimize existing designs, or propose new approaches to mechanical systems. 6. Familiarity with Industry Standards and Practices: The workshop may focus on familiarizing participants with relevant industry standards, regulations, and best practices in mechanical engineering. This includes topics such as quality control, material selection, manufacturing processes, and sustainability considerations. 								
<p>Module Learning Outcomes</p>	<p>The module learning outcomes of a mechanical workshop generally reflect the goals and objectives of the workshop. These outcomes describe the knowledge, skills, and abilities that participants are expected to acquire or demonstrate upon completing the workshop. Here are some possible learning outcomes for a mechanical workshop:</p> <ol style="list-style-type: none"> 1. Knowledge of Mechanical Systems: Participants will acquire a comprehensive understanding of mechanical systems, including their components, functions, and interactions. 2. Knowledge of Mechanical Systems: Participants will acquire a comprehensive understanding of mechanical systems, including their components, functions, and interactions. 3. Teamwork and Collaboration: Participants will demonstrate the ability to work effectively in teams, communicate ideas, delegate tasks, and collaborate to achieve common goals within a mechanical workshop setting. 4. Problem Solving: Participants will develop the ability to analyze mechanical problems, identify possible solutions, and apply appropriate troubleshooting techniques to resolve issues effectively. 5. Professional Development: Participants will gain insights into career opportunities in the field of mechanical engineering, including industry trends, networking strategies, and further education pathways for continued professional growth. 6. Documentation and Reporting: Participants will develop skills in maintaining accurate records, creating technical reports, and effectively communicating findings or project outcomes related to mechanical engineering. 								
<p>Indicative Contents</p>	<p>The indicative contents of a mechanical workshop can vary depending on the specific focus, duration, and level of the workshop. However, here are some common indicative contents that may be included in a mechanical workshop:</p> <table border="1" data-bbox="472 1644 1514 2065"> <tr> <td data-bbox="472 1644 560 1756">1.</td> <td data-bbox="560 1644 1514 1756"> Introduction to Mechanical Engineering: <ol style="list-style-type: none"> a. Overview of mechanical engineering and its applications b. Introduction to basic mechanical concepts and principles c. Role of mechanical engineering in various industries </td> </tr> <tr> <td data-bbox="472 1756 560 1912">2.</td> <td data-bbox="560 1756 1514 1912"> Tools and Equipment: <ol style="list-style-type: none"> a. Introduction to various hand tools and their uses in mechanical engineering b. Familiarity with power tools, such as drills, grinders, and saws c. Overview of specialized equipment, such as welding machines, CNC machines, etc. </td> </tr> <tr> <td data-bbox="472 1912 560 2036">3.</td> <td data-bbox="560 1912 1514 2036"> Measurement and Metrology: <ol style="list-style-type: none"> a. Principles of measurement and metrology in mechanical engineering b. Use of measuring instruments, such as calipers, micrometers, and gauges c. Techniques for accurate measurement and calibration </td> </tr> <tr> <td data-bbox="472 2036 560 2065">4.</td> <td data-bbox="560 2036 1514 2065"> Assembly and Disassembly: </td> </tr> </table>	1.	Introduction to Mechanical Engineering: <ol style="list-style-type: none"> a. Overview of mechanical engineering and its applications b. Introduction to basic mechanical concepts and principles c. Role of mechanical engineering in various industries 	2.	Tools and Equipment: <ol style="list-style-type: none"> a. Introduction to various hand tools and their uses in mechanical engineering b. Familiarity with power tools, such as drills, grinders, and saws c. Overview of specialized equipment, such as welding machines, CNC machines, etc. 	3.	Measurement and Metrology: <ol style="list-style-type: none"> a. Principles of measurement and metrology in mechanical engineering b. Use of measuring instruments, such as calipers, micrometers, and gauges c. Techniques for accurate measurement and calibration 	4.	Assembly and Disassembly:
1.	Introduction to Mechanical Engineering: <ol style="list-style-type: none"> a. Overview of mechanical engineering and its applications b. Introduction to basic mechanical concepts and principles c. Role of mechanical engineering in various industries 								
2.	Tools and Equipment: <ol style="list-style-type: none"> a. Introduction to various hand tools and their uses in mechanical engineering b. Familiarity with power tools, such as drills, grinders, and saws c. Overview of specialized equipment, such as welding machines, CNC machines, etc. 								
3.	Measurement and Metrology: <ol style="list-style-type: none"> a. Principles of measurement and metrology in mechanical engineering b. Use of measuring instruments, such as calipers, micrometers, and gauges c. Techniques for accurate measurement and calibration 								
4.	Assembly and Disassembly:								

	<ul style="list-style-type: none"> a. Techniques for assembling and disassembling mechanical components b. Proper handling and alignment of components during assembly c. Identification and troubleshooting of issues during disassembly
	<p>5. Project Work:</p> <ul style="list-style-type: none"> a. Undertaking practical projects related to mechanical engineering b. Applying theoretical knowledge and skills to real-world problems c. Collaborating in teams to design, build, or improve mechanical systems or prototypes

Learning and Teaching Strategies

Strategies	<p>Learning and teaching strategies in a mechanical workshop are designed to engage participants actively, promote hands-on learning, and facilitate the acquisition of practical skills and knowledge. Here are some common strategies used in a mechanical workshop:</p> <ol style="list-style-type: none"> 1. Demonstrations: The instructor or facilitator provides live demonstrations of mechanical concepts, techniques, or equipment operation. Participants observe and learn through visual and auditory stimuli. 2. Hands-on Practice: Participants are provided with opportunities for hands-on practice, allowing them to apply theoretical knowledge to real-world scenarios. They can engage in activities like assembling or disassembling mechanical components, operating tools and equipment, or conducting experiments. 3. Collaborative Learning: Participants work in teams or small groups to solve mechanical problems, complete projects, or perform tasks. This encourages collaboration, communication, and the sharing of knowledge and ideas among participants. <p>Case Studies: Case studies present real or hypothetical mechanical engineering scenarios for participants to analyze and solve. They promote critical thinking and decision-making skills by applying knowledge to practical situations.</p>
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Student Workload (SWL)

Structured SWL (h/sem)	48	Structured SWL (h/w)	3.2
Unstructured SWL (h/sem)	27	Unstructured SWL (h/w)	1.8
Total SWL (h/sem)	75		

Module Evaluation					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	#1 - #4, LO #8 - #9
	Assignments	2	10% (10)	5 and 10	#1 - #4, LO #8 - #9
	Lab.	3	15% (15)	4, 9, and 13	All
	Report	1	5% (5)	11	All
Summative assessment	Midterm Exam	2hr	10% (10)	6	LO #1 - #5
	Final Exam	3hr	50% (50)		All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
	Material Covered
Week 1	Welding
Week 2	
Week 3	Grinding
Week 4	Filings
Week 5	
Week 6	Polishing
Week 7	Measuring tools for mechanical systems
Week 8	
Week 9	Carpentry
Week 10	Lathing

Week 11	
Week 12	
Week 13	Milling
Week 14	
Week 15	Drilling

Learning and Teaching Resources

	Text	Available in the Library?
Required Texts	K. c. John, Mechanical Workshop Practice Paperback	No
Recommended Texts	Elements Of Workshop Technology Vol-1" by Choudhury H S K	No
Websites	-	

Grading Scheme

Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 - 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

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

MODULE DESCRIPTION FORM

Module Information			
Module Title	Fundamentals of Electrical Engineering		Module Delivery
Module Type	Core		<input checked="" type="checkbox"/> Theory <input checked="" type="checkbox"/> Lecture <input checked="" type="checkbox"/> Lab <input checked="" type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar
Module Code	EME121		
ECTS Credits	9		
SWL (hr/sem)	225		
Module Level	1	Semester of Delivery		2
Administering Department	EME	College	CENGS
Module Leader	Name: Baker Saed	e-mail	E-mail: bakrs1991@uosamarra.edu.iq
Module Leader's Acad. Title	Lec.	Module Leader's Qualification	M. Sc.
Module Tutor	Name (if available):	e-mail	E-mail:
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	1/03/2024	Version Number	1.0

Relation with other Modules			
Prerequisite module	None	Semester	
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents	
Module Objectives	1. Basics of electrical engineering. 2. System of units. 3. Electrical circuit elements. 4. Electrical circuit analyses. 5. Electrical circuit analysis methods. 6. Electrical circuit theories. 7. Power calculations. 8. Alternating and direct current circuits. 9. Resonance in alternating current circuits.

	<p>10. Theories of alternating current circuits analysis.</p> <p>11. Magnetic circuits.</p>
Module Learning Outcomes	<ol style="list-style-type: none"> 1. Recognize how electricity works in electrical circuits. 2. List the various terms associated with electrical circuits. 3. Summarize what is meant by a basic electric circuit. 4. Discuss the reaction and involvement of atoms in electric circuits. 5. Describe electrical power, charge, and current. 6. Define Ohm's law. 7. Identify the basic circuit elements and their applications. 8. Discuss the operations of sinusoid and phasors in an electric circuit. 9. Discuss the various properties of resistors, capacitors, and inductors. 10. Explain the two Kirchoff's laws used in circuit analysis. 11. Identify the capacitor and inductor phasor relationship with respect to voltage and current.
Indicative Contents	<p>Indicative content includes the following:</p> <p>DC circuits Basic principles, basic concepts and ideas of electrical circuits ,Ohm's and Kirchoff's laws and simplification of DC electrical circuits, Circuit analysis by the DC toroidal method[10 hrs]</p> <p>Circuit analysis by the direct current nodal method, Methods for analyzing electrical circuits: DC superposition grouping theory [10 hrs]</p> <p>Methods for analyzing electrical circuits: Thevenin's theory, Norton's direct current theory [10 hrs]</p> <p>Electrical Circuit Analysis Methods: Theory of Maximum DC Power Transfer[10 hrs]</p> <p>Methods of connecting Delta-Star resistors, review, monthly exam_[10 hrs]</p> <p>AC circuits – Time dependent signals, average and RMS values. Capacitance and inductance, energy storage elements, simple AC steady-state sinusoidal analysis. [15 hrs]</p> <p>AC Circuits II - Phasor diagrams, definition of complex impedance, AC circuit analysis with complex numbers. [10 hrs]</p> <p>RL, RC and RLC circuits - Frequency response of RLC circuits, simple filter and band-pass circuits, resonance and Q-factor. [10 hrs]</p> <p>behavior of resistance, coil and capacitance in alternating current circuits</p> <p>Linking and analyzing electrical circuits of alternating current with the influence of resistance, inductance and capacitance. [10 hrs]</p> <p>To analyze circuits in both the toroidal and nodal ways of alternating current</p> <p>Superposition grouping theory, Thevenin and Norton grouping theory for alternating current. [10 hrs]</p> <p>Methods of analyzing electrical circuits: the theory of maximum transfer of power, resonant circuits of alternating current, analysis of magnetic circuits and the operation of electrical transformers. [10 hrs]</p> <p>Public discussions and review, monthly exam. [5 hrs]</p>

Learning and Teaching Strategies

Strategies	Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes,
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	interactive tutorials and by considering types of simple experiments involving some sampling activities that are interesting to the students.
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Student Workload (SWL)			
Structured SWL (h/sem)	123	Structured SWL (h/w)	8.2
Unstructured SWL (h/sem)	102	Unstructured SWL (h/w)	6.8
Total SWL (h/sem)	225		

Module Evaluation					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	5% (10)	5 and 12	LO 1#2#3#4#5, LO 6#7#8#9#10
	Assignments	3	3% (9)	Continuous	All
	Projects / Lab.	3	5% (15)	4,9, and 13	LO1#2#3#4,5#6#7#8,9#10#11#12
	Report	1	6% (6)	13	All
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)		All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
	Material Covered
Week 1	Introduction - Basic principles, basic concepts and ideas of electrical circuits.
Week 2	Basics of Ohm's and Kirchhoff's laws and simplification of DC electrical circuits.
Week 3	Circuit analysis by the DC toroidal method.
Week 4	Review of Kirchhoff's Laws, Circuit Analysis - Nodal and Mesh

Week 5	Linearity and Superposition, Source Transformations.
Week 6	Methods for analyzing electrical circuits: Thevenin's theory, Norton's direct current theory
Week 7	Electrical Circuit Analysis Methods: Theory of Maximum DC Power Transfer and mid exam.
Week 8	Methods of connecting Delta-Star resistors, review.
Week 9	Approved and unapproved sources, review of complex numbers and their mathematical operations To analyze circuits in both the toroidal and nodal ways of alternating current.
Week 10	Behavior of resistance, coil and capacitance in alternating current circuits.
Week 11	Basic ideas of alternating current. Linking and analyzing electrical circuits of alternating current with the influence of resistance, inductance and capacitance.
Week 12	Superposition grouping theory, Thevenin and Norton grouping theory for alternating current.
Week 13	Methods of analyzing electrical circuits: the theory of maximum transfer of power, resonant circuits of alternating current.
Week 14	Frequency Response of Series/Parallel Resonances, High-Q Circuits.
Week 15	Analysis of magnetic circuits and the operation of electrical transformers.
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)

	Material Covered
Week 1	Introduction of electrical device, DC sources and metering .
Week 2	Calculation of resistor by resistor color code.
Week 3	Ohm's law.
Week 4	Series DC Circuit.
Week 5	Parallel DC Circuit.
Week 6	Series-Parallel DC Circuit.
Week 7	Potentiometer and Rheostats.

Week 8	Kirchhoff's laws
Week 9	Mid Exam.
Week 10	Superposition theorem's .
Week 11	Mesh and Nodal theorem's.
Week 12	Norton's theorem's.
Week 13	Thevenin's theorem.
Week 14	Maximum Power transfer.
Week 15	Final Exam.

Learning and Teaching Resources		
	Text	Available in the Library?
Required Texts	1- Boylestad, Robert L. "Introductory circuit analysis", 11th ed.	Yes
Recommended Texts	2- Allan H. Robbins and Wilhelm C. Miller, "Circuit Analysis: Theory and Practice", Fifth Edition. 3- Nilsson, James William." Electric circuits", Tenth edition.	No
Websites	-	

Grading Scheme				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 - 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required
<p>Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.</p>				

MODULE DESCRIPTION FORM

Module Information			
Module Title	Engineering Mechanics	Module Delivery	
Module Type	Core	<input checked="" type="checkbox"/> Theory <input type="checkbox"/> Lecture <input checked="" type="checkbox"/> Lab <input checked="" type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar	
Module Code	EME122		
ECTS Credits	8		
SWL (hr/sem)	200		
Module Level	1	Semester of Delivery	2
Administering Department	EME	College	CENGS
Module Leader	Name: Ihsan Ali Mustafa	e-mail	E-mail ehsan.ali@uosamarra.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	PhD
Module Tutor	Mohammed O. Attea	e-mail	E-mail: mohammedattea@uosamarra.edu.iq
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	1/03/2024	Version Number	1.0

Relation with other Modules			
Prerequisite module	None	Semester	
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents	
Module Objectives	1.To provide definitions of engineering mechanics, units , introduction of force and moment 2.To explain the concept of equilibrium of particles and rigid bodies in 2D space 3.To give information about support types and to give ability to calculate support reactions 4.To explain the equilibrium of structures and internal forces in trusses

	<p>5.To provide information on moment of inertia in 2D space</p> <p>6.To provide friction in 2D space</p> <p>7.Introducing the basic analysis methods of the particle dynamics.</p> <p>8.Analyzing the patterns and relationships of the given problems with practical examples</p> <p>9.Strengthen the basic mechanical sense of the student</p>
Module Learning Outcomes	<p>1.Use both conceptual and numerical techniques to solve engineering problems</p> <p>2.Understand and use the general ideas of force system resultants</p> <p>3.Determine the moment of a force about an arbitrary point and/or axes</p> <p>4.Analyze and develop free-body diagrams for any system of forces in two dimension</p> <p>5.Understand and use the general idea of equilibrium of a particle</p> <p>6.Analyze trusses and friction in two dimensional space</p> <p>7.Introduce the concept of truss structure</p> <p>8.Prepare and understand engineering mechanics – particle dynamics</p> <p>9.Master various problem solving for rectilinear and curvilinear motion</p> <p>10.Practice the problem solving of kinetics of particle.</p> <p>11.Analyze and develop free-body diagrams for a particle in non-equilibrium in two dimensional space</p> <p>12. The ability to apply Newton's second Law for many Engineering applications</p>
Indicative Contents	<p>Indicative content includes the following:</p> <ul style="list-style-type: none"> • Force system (7 hrs) • Moments of forces (7 hrs) • Force Couples (7 hrs) • Resultant of force-couple systems (7 hrs) • Equilibrium of rigid bodied (7 hrs) • Trusses (7 hrs) • Friction (7 hrs) • Introduction to dynamics & Mid-term exam (7 hrs) • Kinematics of particle (Rectilinear motion) (7 hrs) • Kinematics of particle (Curvilinear motion) (7 hrs) • Normal-tangential coordinates (Kinematics) (7 hrs) • Polar coordinates (Kinematics) (7 hrs) • Kinetics of particles (Rectilinear motion) (7 hrs) • Kinetics of particles (Curvilinear motion) (14 hrs) • Final exam (3hrs)
Course Description	<p>The course covers the following topics;</p> <ul style="list-style-type: none"> • statics of particles: In this course, the students will master; forces in plane moments, equilibrium, moment of a force, moment of a couple, equivalent systems of forces on rigid bodies, equilibrium in two dimensions. Also analysis of structures: trusses, friction will be introduced. • Dynamics of particles: In this course, the students will be introduced to the fundamentals of Dynamics of Engineering Mechanics. The topics will cover a wide range of applications that, collectively, form building blocks of the dynamics world for an everyday mechanical engineer. Typically, the course starts with the behavior and properties of particles and the fundamental relationships of distance, velocity, and acceleration. There is a broad spectrum to cover to accommodate most of the applications in more than one coordinate system.

Learning and Teaching Strategies

Strategies	The learning and teaching strategy is designed to: Carefully cover in lectures the necessary fundamental material and analytical techniques, and demonstrate concepts with appropriate (and where possible practical) examples Allow students adequate time to practice the techniques using a large number of carefully selected tutorial problems.
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Student Workload (SWL)

Structured SWL (h/sem)	108	Structured SWL (h/w)	7.2
Unstructured SWL (h/sem)	92	Unstructured SWL (h/w)	6.13
Total SWL (h/sem)	200		

Module Evaluation

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	5% (10)	4 and 11	LO #1,#2, #3, #4, #5 and #6,#7, #8, #9,#10
	Assignments	2	5% (10)	7 and 14	LO #1 - #4, LO #8 - #9
	Projects / Lab.	3	3% (9)	4,10, and 13	LO #1, #2,3 and 9 #10
	Report	1	11% (11)	13	All
Summative assessment	Midterm Exam	2hr	10% (10)	8	LO #1 - #7
	Final Exam	3hr	50% (50)		All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

	Material Covered
Week 1	force systems
Week 2	definition of moment,
Week 3	moment of a couple
Week 4	Resultant of force couple systems
Week 5	Equilibrium in 2-D, free body diagrams, equations of equilibrium
Week 6	Structure trusses
Week 7	Friction (dry friction)
Week 8	Mid-term exam , Introduction to dynamics(Rectilinear motion)
Week 9	Kinematic of particle – Curvilinear motion(Projectile)
Week 10	Kinematic of particle – Normal and tangential coordinate system
Week 11	Kinematic of particle – Polar coordinate system
Week 12	Kinetics of particles – Newton’s second law(Rectilinear motion)
Week 13	Kinetics of particles – Curvilinear motion (Normal and tangential coordinate system)
Week 14	Kinetics of particles –Curvilinear motion (Polar coordinate system)
Week 15	final Exam

Delivery Plan (Weekly Lab. Syllabus)

	Material Covered
Week 1,2	force resultant experiment
Week 3,4	moments experiment
Week 5,6	equilibrium experiment

Week 7,8	friction experiment
Week 9,10	Instantaneous and average velocity experiment
Week 11,12	Velocity of rolling body over inclined surface experiment
Week 13,14,15	Newton 2 nd law experiment & conservation of energy experiment

Learning and Teaching Resources

	Text	Available in the Library?
Required Texts	<ol style="list-style-type: none"> 1. Engineering Mechanics-Statics, J.L.Meriam, L.G.Kraige, Wiley, 7th Edition, 2012, ISBN: 978-0-470-61473-0 2. Engineering Mechanics: Dynamics 7th edition, by Meriam, J. L., Kraige, L. G. (2012) 	Yes Yes
Recommended Texts	<ol style="list-style-type: none"> 1. Engineering Mechanics-Statics, Hibbeler, R.C.13th Edition, Pearson Prentice Hall, 2016, ISBN 978-0-13-31892-2.” 2. Engineering Mechanics: Dynamics, by R. C. Hibbeler 2004. 	Yes No
Websites	N/A	

Grading Scheme

Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
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	F – Fail	راسب	(0-44)	Considerable amount of work required

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

MODULE DESCRIPTION FORM

Module Information			
Module Title	Engineering Drawing and Auto CAD		Module Delivery
Module Type	Supportive		<input checked="" type="checkbox"/> Theory <input type="checkbox"/> Lecture <input checked="" type="checkbox"/> Lab <input type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar
Module Code	EME123		
ECTS Credits	6		
SWL (hr/sem)	150		
Module Level	1	Semester of Delivery		2
Administering Department	EME	College	CENGS
Module Leader	Mohammed Fadil Hasan	e-mail	Albadry.mohamad55@uosamarra.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	M.S.C
Module Tutor	Name (if available):	e-mail	E-mail
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	1/03/2024	Version Number	1.0

Relation with other Modules			
Prerequisite module	None	Semester	
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents	
Module Objectives	<ol style="list-style-type: none"> 1- Understanding Engineering Drawings: The module should provide students with a comprehensive understanding of engineering drawings, including different types of views (orthographic, isometric, etc.), dimensioning, to learning, sectioning, and symbols commonly used in mechanical engineering 2- Drafting Standards and Conventions: Students should be familiarized with industry-standard drafting practices, including dimensioning standards, drawing scales, line types, and layer management. They should learn how to create drawings that adhere to these standards. 3- Familiarity with AutoCAD: The module should introduce students to AutoCAD, a widely used computer-aided design (CAD) software. Students should learn how to navigate the software interface, create and modify 2D drawings, and apply appropriate annotations.

<p>Module Learning Outcomes</p>	<p>Upon completion of the module on Engineering Drawing and AutoCAD, learners should be able to achieve the following learning outcomes:</p> <ol style="list-style-type: none"> 1. Interpret Engineering Drawings: Students should be able to interpret various types of engineering drawings, including orthographic projections, isometric views, section views, and assembly drawings. They should be able to understand the information conveyed in the drawings and extract relevant dimensions and specifications. 2. Create Accurate Engineering Drawings: Students should be able to create accurate engineering drawings using AutoCAD. They should demonstrate proficiency in using the software to create 2D drawings, apply appropriate annotations and symbols, and adhere to industry-standard drafting practices and conventions. 3. Apply Dimensioning and Tolerancing: 4. Utilize AutoCAD for 3D Modeling: Learners should demonstrate the ability to create basic 3D models using AutoCAD. They should be able to build 3D representations of mechanical components and assemblies, apply materials and textures, and generate visualizations and renderings. 5. Apply Design Standards and Conventions: Students should be able to apply design standards and conventions consistently throughout their drawings. They should understand industry-specific standards and practices related to line types, layer management, drawing scales, and documentation 6. Apply Design Standards and Conventions: Students should be able to apply design standards and conventions consistently throughout their drawings. They should understand industry-specific standards and practices related to line types, layer management, drawing scales, and documentation.
<p>Indicative Contents</p>	<p>The indicative contents of a module on Engineering Drawing and AutoCAD here are some common topics and areas that such a module may cover</p> <ol style="list-style-type: none"> 1. Introduction to Engineering Drawing: <ol style="list-style-type: none"> a. Importance and purpose of engineering drawings b. Types of engineering drawings: orthographic, isometric, section, assembly, etc. c. Drawing scales and sheet layouts d. Introduction to drawing tools and instruments 2. AutoCAD Fundamentals: <ol style="list-style-type: none"> a. Introduction to AutoCAD software and its user interface b. Basic commands and operations in AutoCAD c. Drawing setup and units d. Navigating and viewing drawings e. Introduction to layers and linetypes 3. Geometric Construction: <ol style="list-style-type: none"> a. Basic geometric constructions (lines, arcs, circles, etc.) b. Constructing polygons and ellipses c. Tangents and intersections d. Construction of common geometric features in engineering drawings 4. Introduction to 3D Modeling in AutoCAD: <ul style="list-style-type: none"> • Creating 3D models using basic solid modeling techniques Creating primitive shapes (box, cylinder, sphere, etc.) Modifying 3D objects (extruding, revolving, sweeping, etc.) • Applying materials and textures to 3D models Generating basic 3D renderings 5. Single simple and complex geometric objects

Learning and Teaching Strategies

Strategies	Planning a unit or lesson involves a number of instructional decisions. The teacher must identify the following: the content and processes to be addressed, the strengths, needs, and interests of students, the Common Essential Learnings that could be incorporated, and the most effective instructional approaches. Such decisions are critical and must be made consciously and purposefully. It begins with the student's interest in engineering tools and the drawing board. To reach the highest level of understanding in the application of all theoretical and laboratory lesson processes.
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Student Workload (SWL)

Structured SWL (h/sem)	93	Structured SWL (h/w)	6.2
Unstructured SWL (h/sem)	57	Unstructured SWL (h/w)	3.8
Total SWL (h/sem)	150		

Module Evaluation

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	5%(10)	5 and 12	All
	Home work	3	3% (9)	3,6, and 11	All
	Class work	3	5% (15)	3,8 and 11	All
	Projects/ Lab.	1	6%(6)	12	All
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1-#6
	Final Exam	3hr	50% (50)		All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

	Material Covered
Week 1	Introduction - Graphic Instruments and Their Use - Lettering - Graphic Geometry
Week 2	Intro to AutoCAD - Precision Drawing & Drawing Aids.
Week 3	Engineering Operations
Week 4	Basic Printing , Editing Tools by AutoCAD
Week 5	Graphic Geometry
Week 6	Geometric Shapes in AutoCAD
Week 7	Views and Mid exam.
Week 8	Annotating in AutoCAD with Text & Hatching
Week 9	Complex views
Week 10	Third View
Week 11	Layers
Week 12	Dimensions
Week 13	Dimensions by AutoCAD
Week 14	Section of Isometric Drawing Sectional View.
Week 15	Blocks, Drafting symbols, Attributes, Extracting data
Week 16	Exam

Learning and Teaching Resources

	Text	Available in the Library?
Required Texts	<p>Engineering Drawing , by Abdul-Rasool Abdul-Hussein AL-Khafaf</p> <p>Published by the Iraqi House of Books and Documents (1) 1990</p> <p>Mastering AutoCAD and AutoCAD LT / Omura / Sybex</p>	Yes
Recommended Texts	<p>Engineering Drawing, by A.W. Boundy, 3rd edition, 1987 McGraw-Hill book company Sydney.</p>	No
Websites	<p>https://www.youtube.com/watch?v=yhRDjplrl1U,</p> <p>https://www.youtube.com/watch?v=fQNwVo2hWU4</p> <p>https://www.youtube.com/watch?v=K8fQsse68Sc</p> <p>https://www.youtube.com/watch?v=BjROtC8rJkY&list=RDCMUCXtNIHrXwJSIsT6hRy9OUIg&start_radio=1&rv=BjROtC8rJkY&t=19</p>	

Grading Scheme

Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 - 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

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

MODULE DESCRIPTION FORM

Module Information			
Module Title	Electric Workshop		Module Delivery
Module Type	Supportive		<input checked="" type="checkbox"/> Theory <input type="checkbox"/> Lecture <input checked="" type="checkbox"/> Lab <input type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar
Module Code	EME124		
ECTS Credits	4		
SWL (hr/sem)	100		
Module Level	1	Semester of Delivery		2
Administering Department	EME	College	CENGS
Module Leader	Name: Riyadh Alsaleem	e-mail	E-mail: reyadh.m@uosamarra.edu.iq
Module Leader's Acad. Title	Professor	Module Leader's Qualification	M.Sc.
Module Tutor	Name (if available): Baker Saed	e-mail	E-mail: bakrs1991@uosamarra.edu.iq
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	1/03/2024	Version Number	1.0

Relation with other Modules			
Prerequisite module	None	Semester	
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents	
Module Objectives	1.To learn the residential wiring and various types of wiring. 2.To measure the various electrical quantities. 3.To gain knowledge about the fundamentals of various electrical gadgets and their working and trouble shooting of them 4.Acquire teamwork skills for working effectively in groups
Module Learning Outcomes	1. Demonstrate safety measures against electric shocks 2. Identify the tools used for electrical wiring, electrical accessories, wires, cables, batteries and standard symbols 3. Develop the connection diagram, identify the suitable accessories and materials necessary for wiring simple lighting circuits for domestic buildings . 4. Identify and test various electronic components. 5. Assemble and test electronic circuits on boards. 6. Work in a team with good interpersonal skills.

	7. The Student ability to develop and conduct appropriate design, analyze and interpret data, and use engineering judgment to draw conclusions.
Indicative Contents	<p>Indicative content includes the following.</p> <p>Safety: (3 h) Introduction to Electrical Safety, Home Safety, Outdoor Safety, Lab & Workshop Safety, Safety and Accident Prevention Signs, Identify and name the following safety equipment.</p> <p>Electrical Tools: (3 h) Introduction of tools, electrical materials, symbols and devices, etc.</p> <p>Cables and switching: (9 h)</p> <p>Exposure to different types of electrical accessories like types of switches, types of lamps, wires and cables Fuses, Circuit Breaker, and Neutral: (3 h)</p> <p>Types of fuses, Types of circuit breaker, Importance of Neutral and structure Grounding and exposure to various earthing schemes. Series, Parallel Electrical Circuit: (3 h)</p> <p>Types of fuses, Types of circuit breaker, Importance of Neutral and structure Grounding and exposure to various earthing schemes.</p> <p>Active and Passive Components: (3 h)</p> <p>Identify Active and passive components, Determining capacitor values, inductor values, Resistance Measurement.</p> <p>Batteries: (3 h) Identify different types of batteries with their specifications.</p> <p>Testing the Semiconductor Component: (3 h) Test the semiconductor diodes using digital multi-meter, Test the LEDs display using multi-meter, BJT transistor, FET Transistor.</p> <p>Soldering Practice (12 h) Build simple circuits using resistors, diode, switch and LED, Study circuit of a Simple power supply with regulation & filters, Soldering Practice and fabrication of Half Wave/ Full Wave rectifiers circuits on General Purpose PCB/bread board.</p>

Learning and Teaching Strategies	
Strategies	Classroom management strategies Summative assessment Formative assessment Active learning Differentiated instruction

Student Workload (SWL)			
Structured SWL (h/sem)	63	Structured SWL (h/w)	4.2
Unstructured SWL (h/sem)	37	Unstructured SWL (h/w)	2.46
Total SWL (h/sem)	100		

Module Evaluation					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	5% (10)	3 and 7	LO1#2#3#4, LO#5#6#7#8#9
	Assignments	2	5% (10)	3 and 8	All
	Projects / Lab.	3	5% (15)	3,5, and 8	All
	Report	1	5% (5)	11	All
Summative assessment	Midterm Exam	2hr	10% (10)	8	LO #1 - #7
	Final Exam	3hr	50% (50)	-	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
	Material Covered
Week 1	-Classroom management strategies -Summative assessment -Formative assessment -Active learning Differentiated instruction -Safe systems of working
Week 2	Basic electrotechnical units and theory
Week 3	Basic electrical circuits and cables
Week 4	-Tools and equipment used for electrotechnical applications
Week 5	-Alternating current theory and electrical machines
Week 6	-Cables and Cable Accessories
Week 7	-General Rules and Design Requirements for Electrical Installations
Week 8	-Electrical Circuit + Mid-term exam
Week 9	-Electrical installations and wiring systems
Week 10	-General Rules for Electrical Installations

Week 11	-General Rules and Design Requirements
Week 12	-Identify different types of batteries with their specifications
Week 13	- Electricity breakers, working methods, types
Week 14	-Light bulbs, power and light intensity
Week 15	-Using technical information
Week 16	Preparatory week before the final Exam.

Learning and Teaching Resources

	Text	Available in the Library?
Required Texts	Basic Electrical Installation Work Senior Lecturer ELECTRONIC WORKSHOP & PCB LAB MANUAL DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING	Yes
Recommended Texts	Uppal, S.L., “Electrical Wiring, Estimating and Costing”	No
Websites	http://home.howstuffworks.com/electrical-tools.htm http://www.kpsec.freeuk.com/components/switch.htm http://en.wikipedia.org/wiki/Electrical_wiring	

Grading Scheme

Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

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

MODULE DESCRIPTION FORM

Module Information				
Module Title	English Language I		Module Delivery	
Module Type	Basic		<input checked="" type="checkbox"/> Theory <input type="checkbox"/> Lecture <input type="checkbox"/> Lab <input type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input checked="" type="checkbox"/> Seminar	
Module Code	EME125			
ECTS Credits	3			
SWL (h/sem)	75			
Module Level	1	Semester of Delivery		2
Administering Department	EME	College	CENG	
Module Leader	Hadeel A. Ibraheem		e-mail	hadeel.abdulhadi@uosamarra.edu.iq
Module Leader's Acad. Title	Assistant Lecturer		Module Leader's Qualification	M.Sc.
Module Tutor	None		e-mail	None
Peer Reviewer Name	None		e-mail	None
Scientific Committee Approval Date	1/03/2024	Version Number	1.0	

Relation with other Modules			
Prerequisite module	None	Semester	-
Co-requisites module	None	Semester	-

Module Aims, Learning Outcomes and Indicative Contents	
Module Objectives	<ol style="list-style-type: none"> 1. Improve the ability of the students to understand, speak, read and write English as a second language with some technical texts. 2. Intended to teach them, how to use technical English effectively as a language of instruction, Lab. Experiments and Exercises, examples 3. Using Technical Terminologies as close as possible to the lectures they receive during their study. In addition to teach them how to give academic presentation, and how to write academically. 4. Engineering is the biggest field of study in the world. English is a tool that notably affect engineering students in academic life. While most of the assumptions in engineering are taught in English, it requires to have good English communication skill.

	<p>5. In academic life, engineering students have to deal with the countless lectures, tutorials, labs, project reports and papers in English. Generally engineering professors in various universities are also conducting lectures in English.</p>
Module Learning Outcomes	<ol style="list-style-type: none"> 1. Teaching the students how to characterize the different parts of speech. 2. Assisting the students to distinguish between verb tenses and relating forms of actions to the time of happening. 3. Teaching the student how to use questions words(what, where, which, how, who, when, whose) . 4. Learning the students the most commonly confusing words. 5. Improving pronunciation and spelling. 6. Teaching the students various phrases (not individual words only) to use it in many situations. 7. Increasing the student outcome of vocabulary especially engineering vocabulary. 8. Developing the student’s skills in reading, speaking, listening and writing .
Indicative Contents	<ol style="list-style-type: none"> 1.Introduction: Pronunciation and Phonetic Symbols (4.5hr) 2.Grammar: Tenses, Articles, Question forms, Part of Speech, Reflexive Pronouns, Contrasting Ideas and Intensifiers, Infinitive of Purpose, Relative Clauses, and Sentence Structure (25hr) 3.Vocabulary: Commonly used Words, Synonyms, Phrases, and Idioms (2hr) 4.Reading Skill: Improving Student Reading in Engineering Topics (2hr) 5.Writing Skill: Rules to write a comprehensive paragraphs (5hr) 6.Listening Skill: Listening to Audios and Answering questions about it (2hr) 7.Speaking and Communication: Pronunciation, Fluency, and Conversation (2.5hr) 8.Assessments: Quizzes, Onsite Assignment, and Report (2hr)

Learning and Teaching Strategies

Strategies	<p>The strategy focuses on the four key language skills: reading, writing, listening, and speaking. A balanced approach is adopted to develop these skills through a variety of engaging activities and authentic materials. Reading and writing activities include comprehension exercises, vocabulary expansion and guided writing tasks, while listening and speaking activities involve interactive discussions, and presentations.</p>
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Student Workload (SWL)			
Structured SWL (h/sem)	48	Structured SWL (h/w)	3.2
Unstructured SWL (h/sem)	27	Unstructured SWL (h/w)¹	1.8
Total SWL (h/sem)	75		

Module Evaluation					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	3	15% (15)	3, 5 and 9	LO #1, #4, and #8
	Assignments	3	15 % (15)	10, 11 and 12	LO #9, #10, and #11
	Projects / Lab.	-	-	-	-
	Report	1	10 % (10)	13	All
Summative assessment	Midterm Exam	1	10 % (10)	7	LO #1 - #6
	Final Exam	3 h	50 % (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
	Material Covered
Week 1	Pronunciation and Phonetic Symbols + Listening
Week 2	Pronunciation and Phonetic Symbols + Useful Vocabulary and Phrases + Reading + Listening
Week 3	Articles + Question forms + Reading + Listening

Week 4	Part of Speech + Reading
Week 5	Part of Speech + Reading
Week 6	Tenses + Useful Vocabulary and Idioms + Reflexive Pronouns
Week 7	Mid-Exam + Contrasting Ideas + Intensifiers + Listening
Week 8	Tenses + Useful Vocabulary and Phrases + Infinitive of Purpose
Week 9	Relative Clauses + Reading
Week 10	Tenses + Useful Vocabulary and Synonyms + Sentence Structure
Week 11	Rules of Writing + Listening
Week 12	Rules of Writing + Useful Vocabulary and Idioms
Week 13	Report Discussion
Week 14	Confusing Words + Listening
Week 15	Preparatory Week before the Final Exam

Learning and Teaching Resources

	Text	Available in the Library?
Required Texts	Head way Plus by John Liz Soars for Beginners	Yes
Recommended Texts	English Grammar in Use by Raymond Murphy	Yes
Websites	https://dictionary.cambridge.org	

Grading Scheme				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 - 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required
<p>Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.</p>				

MODULE DESCRIPTION FORM

Module Information				
Module Title	Electronics		Module Delivery	
Module Type	Core		<input checked="" type="checkbox"/> Theory <input checked="" type="checkbox"/> Lecture <input checked="" type="checkbox"/> Lab <input checked="" type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar	
Module Code	EME211			
ECTS Credits	8			
SWL (hr/sem)	200			
Module Level	2	Semester of Delivery		3
Administering Department	EME	College	CENG	
Module Leader	Ahmed M. Sana		e-mail	ahmed.sana@uosamarra.edu.iq
Module Leader's Acad. Title		Module Leader's Qualification		
Module Tutor	N/A		e-mail	N/A
Peer Reviewer Name		e-mail		
Scientific Committee Approval Date	12/08/2024	Version Number	1.0	

Relation with other Modules			
Prerequisite module	None	Semester	None
Co-requisites module	None	Semester	None

Module Aims, Learning Outcomes and Indicative Contents	
Module Objectives	To Study and analyze the architecture, operation, and characteristics of the analog electronic components (Semiconductor Diodes, BJT transistors, FET transistors, and Operational amplifiers) and use the gained knowledge to design electronic circuits that meets the requirements of various applications. this module also aims to study and analyze the digital electronic components (logic gates, combinational logic circuits, flip-flops) and use them to design and implement various digital circuits such as arithmetic logic circuits, comparators, counters, and shift registers.
Module Learning Outcomes	1. The ability to analyze the characteristics of general-purpose semiconductor diodes and use it design diode circuits necessary for various applications like rectification.

	<ol style="list-style-type: none"> 2. The ability to analyze the characteristics of Zener diodes and use it design Zener diode circuits necessary for various applications like voltage regulation. 3. The ability to study the characteristics and modes of operation for Bipolar Junction Transistors (BJTs) and perform the DC, and AC on different BJT configurations in order to meet the requirements of different applications like signal amplification, and switching. 4. The ability to study the characteristics and modes of operation for Field Effect Transistors (FETs) and perform the DC, and AC analysis on different FET configurations in order to meet the requirements of different applications like signal amplification, and switching. 5. The ability to study and analyze the operational amplifier characteristics, and operation in order to use it in various application that needs some certain properties like high input impedance, low output impedance, enhanced frequency response, and high open loop gain. 6. The ability to use the operational amplifier to design and implement various applications like amplifiers, summers, comparators, integrators, differentiators, and oscillators. 7. Understanding the binary numbers system, how to perform conversion and arithmetic operations on binary numbers and study the binary codes such as binary coded decimal (BCD) and gray codes. 8. Understanding the basic logic gates and their types, symbols, expressions, and truth tables. 9. The ability to use the logic gates in combinational logic circuits and use them in various applications such as arithmetic logic circuits, comparators, encoders, decoders. 10. Understanding the flip-flops and their types, symbols, architecture, and truth tables and the ability to use them to implement various sequential logic circuits such as counters and shift registers.
<p style="text-align: center;">Indicative Contents</p>	<p>Indicative content includes the following:</p> <p><u>Part A – Semiconductor Diodes</u></p> <p>Semiconductor Diodes – characteristics equation and curve for semiconductor diodes, semiconductor diodes DC circuits, and semiconductor diode as half wave and full wave rectifier. [3 hrs]</p> <p>Zener Diodes – characteristics of Zener Diodes, Zener Diodes as voltage regulator in fixed load circuits, variable load circuits, and variable input voltage circuits. [2 hrs]</p> <p><u>Part B – BJT transistors</u></p> <p>BJT DC Analysis – BJT architecture and operation principle, DC analysis of common emitter fixed bias, emitter bias, and voltage divider configurations. [4 hrs]</p> <p>BJT AC Analysis – re model of BJT, AC analysis of common emitter fixed bias, emitter bias, and voltage divider BJT amplifiers. [4 hrs]</p> <p>BJT As Switch – Introduction to BJT switching circuits, BJT as NOT logic gate, BJT as NOR, and NAND logic gates. [1 hrs]</p> <p><u>Part B – FET transistors</u></p>

	<p>FET DC Analysis – FET types, architecture and operation principle, DC analysis of Common source Fixed bias, self-bias, and voltage divider configurations.</p> <p style="text-align: right;">[5 hrs]</p>
	<p>FET AC Analysis – AC model of FET transistor, AC analysis of common source fixed bias, self-bias, and voltage divider FET amplifiers.</p> <p style="text-align: right;">[4 hrs]</p>
	<p>FET As Switch – Introduction to FET switching circuits, FET as inverting logic circuit.</p> <p style="text-align: right;">[1 hrs]</p>
	<p><u>Part C – Operational Amplifiers and Oscillators</u></p> <p>AC model and characteristics of operational amplifier, and operational amplifier applications circuits (inverting & non-inverting gain amplifiers, adders, comparators, integrators, differentiators, and oscillators.</p> <p style="text-align: right;">[11 hrs]</p>
	<p><u>Part D – Binary Number Systems and Logic Gates</u></p> <p>Binary Number System – Introduction to binary number systems, conversion and arithmetic operations on binary numbers, Binary codes (Binary coded decimal and Gray code).</p> <p style="text-align: right;">[5 hrs]</p>
	<p>Logic Gates – Introduction to the basic logic gates and their symbols, expressions, and truth tables.</p> <p style="text-align: right;">[5 hrs]</p>
	<p><u>Part E – Boolean Algebra and Logic Simplification</u></p> <p>Introduction to Boolean algebra and its laws and rules, expression and simplification of logic circuits using Boolean algebra.</p> <p style="text-align: right;">[5 hrs]</p>
	<p>Logic Gates – Introduction to the basic logic gates and their symbols, expressions, and truth tables.</p> <p style="text-align: right;">[5 hrs]</p>
	<p><u>Part F – Combinational logic analysis and its functions</u></p> <p>Analysis of combinational logic circuits and their applications as arithmetic logic circuits, comparators, encoders, and decoders.</p> <p style="text-align: right;">[10 hrs]</p>
	<p><u>Part G – Latches, Flip-Flops, and Flip-Flops Applications</u></p> <p>Introduction to latches & flip flops and their types, symbols, truth tables, and applications</p> <p style="text-align: right;">[10 hrs]</p>
	<p>hrs]</p>

Learning and Teaching Strategies	
Strategies	<p>The main strategies that will be adopted in delivering this module is summarized as follows:</p> <ol style="list-style-type: none"> 1- Encourage the students' participation in the lecture explanation and solving exercises by rewarding those who answer correctly by bonus marks. 2- Encourage the students to pay high attention to the lecture explanation provided via the lecturer by making intentional simple mistakes during the lecture and reward those who find those mistakes and correct them quickly by bonus marks. 3- Acquiring feedback from students by stopping the explanation every 15 minutes to ask if there is any question or obscure parts in the explanation. Then, ask a

	<p>random sample of the students to ensure that the explanation is understood and well received.</p> <p>4- Instilling the spirit of competition among students by giving them extra assignments and ask them to complete those assignments in a given time. Those who complete the assignments before the deadline will be discussed to ensure there is no cheating. If no cheating is spotted, the students will be rewarded handsomely by extra marks.</p>
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Student Workload (SWL)			
Structured SWL (h/sem)	108	Structured SWL (h/w)	7.2
Unstructured SWL (h/sem)	92	Unstructured SWL (h/w)	6.13
Total SWL (h/sem)	200		

Module Evaluation					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (20)	4 and 12	LO#1-#3 and LO#7- #9
	Assignments	1	5% (5)	Continuous	All
	Lab. Reports	1	5% (5)	Continuous	All
	Lab. Exam	1	10% (10)	Continuous	All
Summative assessment	Midterm Exam	2hr	10% (10)	8	LO #1 - #7
	Final Exam	3hr	50% (50)		All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
	Material Covered
Week 1	Semiconductor Diodes, Diode Approximate Equivalent Circuits, Diodes Applications, Zener Diodes, Zener Diodes Applications.
Week 2	Introduction to Bipolar Junction Transistors, DC Biasing of BJTs, DC analysis of Common Emitter Configurations, BJT AC Analysis, re Transistor equivalent Model.

Week 3	AC analysis for common emitter BJT configurations, BJT as Switch, Introduction to Field Effect transistors (FETs).
Week 4	DC Biasing of E-MOSFETs, DC Analysis of Common Source E-MOSFET Configurations, FET AC Analysis, FET AC Equivalent Circuit
Week 5	AC Analysis of Common Source E-MOSFET Configurations, E-MOSFET as Switch, Introduction to Operation Amplifiers (Op-Amps).
Week 6	Op-Amp applications
Week 7	Relaxation Oscillators, feedback oscillators
Week 8	Mid-term Exam
Week 9	Binary Number System, Binary Operations, Binary Codes
Week 10	Logic Gates
Week 11	Boolean Algebra & Logic Simplification
Week 12	Combinational Logic Analysis
Week 13	Functions of Combinational Logic
Week 14	Latches & Flip Flops
Week 15	Flip Flops Applications (Counters and Shift Registers)
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)

	Material Covered
Week 1	Lab 1: Introductory lecture on the electronics training board and the other Lab. Tools
Week 2	Lab 2: Diode rectifiers
Week 3	Lab 3: Zener diode as voltage regulator
Week 4	Lab 4: Common Emitter – Voltage Divider BJT Amplifier

Week 5	Lab 5: Enhancement MOSFET Characteristics.
Week 6	Lab 6: Common Source – Voltage Divider E-MOSFET Amplifier
Week 7	Lab 7: Operational Amplifier Application Circuits
Week 8	Lab 8: Relaxation Oscillators – 555 Timer Based Square Wave Generator
Week 9	Lab 9: Feedback Oscillators: Wien Bridge RC Oscillator
Week 10	Lab 10: Logic Gates and Combinational Logic Circuits
Week 11	Lab 11: Encoders and Decoders
Week 12	Lab 12: Flip Flops
Week 13	Lab 13: Digital Counters
Week 14	Lab 14: Shift Registers

Learning and Teaching Resources

	Text	Available in the Library?
Required Texts	Electronic Devices and Circuit Theory 12th Edition, Robert L. Boylestad, Louis Nashelsky	Yes
Recommended Texts	Electronic Devices 10th Edition, Thomas L. Floyd	No
Websites	https://www.coursera.org/learn/electronics	

Grading Scheme

Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 - 49)	FX – Fail	راسب (فيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

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

MODULE DESCRIPTION FORM

Module Information			
Module Title	Fluid Mechanics		Module Delivery
Module Type	Core		<input checked="" type="checkbox"/> Theory <input type="checkbox"/> Lecture <input checked="" type="checkbox"/> Lab <input checked="" type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar
Module Code	EME212		
ECTS Credits	8		
SWL (h/sem)	200		
Module Level	2	Semester of Delivery	3
Administering Department	EME	College	CENG
Module Leader	Prof. Dr. Muhammad A. Eleiwi		e-mail dr.muhammad@uosamarra.edu.iq
Module Leader's Acad. Title	Professor	Module Leader's Qualification	Ph.D.
Module Tutor	None		e-mail None
Peer Reviewer Name	None		e-mail None
Scientific Committee Approval Date	12 /08/2024	Version Number	1.0

Relation with other Modules			
Prerequisite module	None	Semester	-
Co-requisites module	None	Semester	-

Module Aims, Learning Outcomes and Indicative Contents	
Module Objectives	<p>This course aims to provide students with the physical and analytical foundations of fluid mechanics through an understanding of the principles of conservation of mass, energy and momentum. Students are expected to gain a deep and comprehensive understanding of the subject, enabling them to apply course content to new situations and evaluate industrial applications of fluid theory using physical analysis and mathematical calculations. This inductive and analytical approach will be taught through practical examples and</p>

	<p>homework assignments, and will be tested in exams. The course will also explain the importance of studying fluids in practical life by extracting the mathematical formulas that govern their movement. Through this study, students can consolidate and deeply understand the scientific material, which contributes to activating their active role in learning instead of just seeking grades. Thus, students can effectively invest their knowledge of fluid mechanics in their daily lives and in various fields.</p>
<p>Module Learning Outcomes</p>	<p>Upon successful completion of this course, students should be able to:</p> <ol style="list-style-type: none"> 1- Learning about the terms associated with fluid mechanics. 2- Using fluid properties correctly to solve problems. 3- Explaining how fluids resist forces such as gravity, momentum, and shear stresses. 4- Understanding the principles of flow rates and velocity measurement. 5- Interpreting experimental results and present them in an appropriate engineering report format. 6- Collaborating with others in a team project environment to conduct engineering investigations and produce reports. 7- Understanding and applying basic concepts of statics and fluid dynamics, including calculation of fluid forces on submerged and floating surfaces, and applications of fluid flow. 8- Understanding the concept of Mach number, and how it relates to the compressibility effect, typical flow properties, and wave propagation 9- Formulating and solving problems in one-dimensional steady compressible flow. 10- Determining the type of flow, whether it is stable or unstable, regular or irregular, laminar or turbulent for incompressible flow, and subsonic, sonic, and supersonic for compressible flow.
<p>Indicative Contents</p>	<ul style="list-style-type: none"> • Introduction of Fluid Mechanics Principles. • Units and Scales of Pressure Measurement Fluid Properties. • Pressure Variation in Static Fluid. • Hydrostatic Forces on Plane Surfaces and Curved Surface. • Buoyancy Force. • Continuity, Momentum e, Energy, and Bernoulli equation • Similarity Principles and Dynamic Simulated. • The steady flow between parallel plate • Minor and Major Losses. • Equation of steady one-Dimensional compressible flow • Mach number and type flow • One Dimensional Isentropic flow • Governing Equations of the Stationary Normal Shock Waves • Governing Equations of Oblique Shock Waves
<p>Course Description</p>	<p>The course begins with a study of the physical properties of fluids and then moves on to fluid statics including pressure measurement, hydrostatics, and buoyancy. The study also includes principles of fluid motion such as conservation of mass (continuity equation) and conservation of energy (Bernoulli's equation), in addition to the basic principles of fluid dynamics, introductory concepts to compressible fluid, isentropic flow, normal and oblique shock waves. The course description then provides a summary of its most important features and the learning outcomes the student is expected to achieve, which helps in assessing the extent to which he or she has benefited from the learning opportunities available. Course content is linked to</p>

	the program description and presented to engineering students with basic skills in fluid mechanics. The course provides a comprehensive presentation of the theory and application of hydrodynamics, and aerodynamic equations, and includes key concepts such as pressure, velocity, fluid flow, laminar or turbulent for incompressible flow, and subsonic, sonic, supersonic for compressible flow.
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Learning and Teaching Strategies

Strategies	<p>The model will rely on a variety of learning and teaching strategies, including:</p> <p>Lectures: Aiming to provide a comprehensive overview of the basic concepts and principles in fluid mechanics, through classroom lessons, reading from methodological and reference books, and using electronic resources for self-learning, as well as in-class discussions.</p> <p>Laboratory activities: Providing students with the opportunity to gain practical experience in fluid mechanics applications through practical experiments and testing of devices related to this field.</p> <p>Assignments and Quizzes: Aiming to enable students to apply what they have learned to real-life problems, and to ensure the extent of their understanding by conducting monthly and final tests, in addition to short tests, active participation in class, submitting scientific and theoretical reports, and evaluating students' performance in laboratory activities.</p>
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Student Workload (SWL)

Structured SWL (h/sem)	108	Structured SWL (h/w)	7.2
Unstructured SWL (h/sem)	92	Unstructured SWL (h/w)	6.13
Total SWL (h/sem)	200		

Module Evaluation

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

	Report	1	10% (10)	12	All
Summative assessment	Midterm Exam	2hr	10% (10)	8	LO # 1-7
	Final Exam	3hr	50% (50)	-	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

Delivery Plan (Weekly Syllabus)	
	Material Covered
Week 1	Introduction of Fluid Mechanics Principles
Week 2	Units and Scales of Pressure Measurement Fluid Properties
Week 3	Pressure Variation in Static Fluid
Week 4	Hydrostatic Forces on Plane Surfaces and Curved Surface
Week 5	Buoyancy Force
Week 6	Continuity, Momentum e, Energy, and Bernoulli equation
Week 7	Mid-term Exam
Week 8	Similarity Principles and Dynamic Simulated
Week 9	The steady flow between parallel plate
Week 10	Minor and Major Losses
Week 11	Equation of steady one-Dimensional compressible flow
Week 12	Mach number and type flow
Week 13	One Dimensional Isentropic flow
Week 14	Governing Equations of the Stationary Normal Shock Waves
Week 15	Governing Equations of Oblique Shock Waves

Delivery Plan (Weekly Lab. Syllabus)

	Material Covered
Week 1	Center of Pressure
Week 2	Center of Pressure
Week 3	Center of Pressure
Week 4	Center of Pressure
Week 5	Center of Pressure
Week 6	Determine the drag and lift coefficient of an aircraft wing for different values of impact angles
Week 7	Determine the drag and lift coefficient of an aircraft wing for different values of impact angles
Week 8	Determine the drag and lift coefficient of an aircraft wing for different values of impact angles
Week9	Determine the drag and lift coefficient of an aircraft wing for different values of impact angles
Week10	Final Exam of Lab tests

Learning and Teaching Resources

	Text	Available in the Library?
Required Texts	Fluid Mechanics Fundamentals and Applications, Yunus A. Cengel, John M. Cimbala.	No
Recommended Texts	1-Fluid Mechanics-Victor Lyle Streeter 2-FLUID MECHANICS WITH ENGINEERING APPLICATIONS BY ROBERT L DAUGHERTY	-
Websites	1.Fundamentals of Fluid Mechanics, Munson,Young, Okiishi. 2. Introduction to Fluid Mechanics, Fox, and McDonald. 3. https://www.youtube.com/watch?v=fa0zHI6nLUo&list=PLbMVogVj5nJTZJHsH6uLCO00I-ffGyBEm	

Grading Scheme				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 - 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required
<p>Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.</p>				

MODULE DESCRIPTION FORM

Module Information				
Module Title	Strength of Materials		Module Delivery	
Module Type	Core		<input checked="" type="checkbox"/> Theory <input type="checkbox"/> Lecture <input checked="" type="checkbox"/> Lab <input type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar	
Module Code	EME213			
ECTS Credits	5			
SWL (h/sem)	125			
Module Level	2	Semester of Delivery		3
Administering Department	EME	College	CENG	
Module Leader	Dr. Ihsan Ali		e-mail	Ehsan.ali@uosamarra.edu.iq
Module Leader's Acad. Title	Lecturer		Module Leader's Qualification	PhD
Module Tutor	Mohammed F. Hasan		e-mail	M.Sc.
Peer Reviewer Name	None		e-mail	albadry_mohamad55@uosamarra.edu.iq
Scientific Committee Approval Date	12/08/2024	Version Number	1.0	

Relation with other Modules			
Prerequisite module	None	Semester	-
Co-requisites module	None	Semester	-

Module Aims, Learning Outcomes and Indicative Contents	
Module Objectives	<p>Mechanics of materials is a basic engineering subject that, along with statics, must be understood by anyone concerned with the strength and physical performance of structures, whether those structures are man-made or natural. At the college level, statics is usually taught during the sophomore or junior year and is a prerequisite for the follow-on course in mechanics of materials. Both courses are required for most students majoring in mechanical, structural, civil, biomedical, petroleum, nuclear, aeronautical, and aerospace engineering. Furthermore, many students from such diverse fields as materials science, industrial engineering, architecture, and agricultural engineering also find it useful to study mechanics of materials.</p>
Module Learning Outcomes	<ul style="list-style-type: none"> • Statics review—A new section entitled Statics Review has been added to Chapter 1. New Section 1.2 includes four example problems which illustrate calculation of support reactions and internal stress resultants for truss, beam,

	<p>circular shaft and plane frame structures. Twenty six end-of-chapter problems on statics provide the student with two and three dimensional structures to be used as practice, review or homework assignment problems of varying difficulty.</p> <ul style="list-style-type: none"> • Expanded Chapter Overview and also Chapter Summary & Review sections—The Chapter Overview and Chapter Summary sections have been expanded and now include key equations presented in that chapter. These summary sections will serve as a convenient review for the student of key topics and equations presented in each chapter. • Increased emphasis on equilibrium, constitutive, and strain-displacement/compatibility equations in problem solutions—Example problem and end-of chapter problem solutions have been updated to emphasize an orderly process of explicitly writing out the equilibrium, constitutive and strain-displacement/compatibility equations before attempting a solution. • New/expanded topic coverage—The following topics have been added or have received expanded coverage: stress concentrations in axially loads bars (Sec. 2.10); torsion of noncircular shafts (Sec. 3.10); stress concentrations in bending (Sec. 5.13); and transformed section analysis for composite beams (Sec. 6.3). • New example and end-of-chapter problems—Forty-eight new example problems have been added to the eighth edition. In addition, close to 800 of the end-of chapter.
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Learning and Teaching Strategies	
Strategies	<p>Planning a unit or lesson involves a number of instructional decisions. The teacher must identify the following: the content and processes to be addressed, the strengths, needs, and interests of students, the Common Essential Learning that could be incorporated, and the most effective instructional approaches. Such decisions are critical and must be made consciously and purposefully. It begins with the student's interest in engineering tools and the drawing board. To reach the highest level of understanding in the application of all theoretical and laboratory lesson processes.</p>

Student Workload (SWL)			
Structured SWL (h/sem)	78	Structured SWL (h/w)	5.2
Unstructured SWL (h/sem)	47	Unstructured SWL (h/w)	3.13
Total SWL (h/sem)	125		

Module Evaluation

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

Delivery Plan (Weekly Syllabus)

	Material Covered
Week 1	Tension, compression and shear
Week 2	Axially loaded members
Week 3	Torsion
Week 4	Shear forces
Week 5	bending moments
Week 6	Stresses in beams
Week 7	Stresses in beams (advanced)
Week 8	Exam
Week 9	Analysis of stresses
Week 10	Analysis of strains
Week 11	Deflections of beams
Week 12	Combined loadings

Week 13	Pressure vessels
Week 14	Deflections
Week 15	Exams

Delivery Plan (Weekly Lab. Syllabus)

	Material Covered
Week 1	Tensile test
Week 2	Tensile test
Week 3	Tensile test
Week 4	Torsion test
Week 5	Torsion test
Week 6	Torsion test
Week 7	Exam
Week 8	Impact test
Week 9	Impact test
Week 10	Impact test
Week 11	Bending test
Week 12	Bending test
Week13	Deflection test
Week 14	Deflection test
Week 15	Exam

Learning and Teaching Resources

	Text	Available in the Library?
Required Texts	Mechanics of materials , James M. Gere, 8 TH edition Mechanics of Materials 10th Edition c2017	Yes
Recommended Texts		
Websites		

Grading Scheme				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required
<p>Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.</p>				

MODULE DESCRIPTION FORM

Module Information			
Module Title	C++ Language		Module Delivery
Module Type	Supportive		<input checked="" type="checkbox"/> Theory <input type="checkbox"/> Lecture <input checked="" type="checkbox"/> Lab <input type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar
Module Code	EME214		
ECTS Credits	4		
SWL (h/sem)	100		
Module Level	2	Semester of Delivery		3
Administering Department	EME	College	CENG
Module Leader	ORAS FADHIL KHALAF	e-mail	oras.fadil@uosamarra.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	M.Sc.
Module Tutor	None	e-mail	None
Peer Reviewer Name	None	e-mail	None
Scientific Committee Approval Date	12/08/2023	Version Number	1.0

Relation with other Modules			
Prerequisite module	None	Semester	-
Co-requisites module	None	Semester	-

Module Aims, Learning Outcomes and Indicative Contents	
Module Objectives	<ul style="list-style-type: none"> The student will gain an understanding of the basic principles, structure, grammar, and uses of the C++ programming language. Develop the ability and skill to write and compile C++ programs, including an understanding of the use of variables, data types, and operators. Learn how to use control structures, including if-else statements, loops (while, for, and do-while), and switch statements to control program flow.
Module Learning Outcomes	<p>After completing the course, students will be able to:</p> <ol style="list-style-type: none"> Be fully familiar with the basic concepts and features of C++. Write programs that solve problems they encounter. Effective use of the C++ standard template library. <p>Effective use of control structures.</p>
Indicative Contents	<ol style="list-style-type: none"> Introduction to computer programming Introduction to C++ Programming

	<ul style="list-style-type: none"> 3. C++ Standard Library 4. Control flow in C++ 5. Memory Management in C++ 6. C++ Application Development
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Learning and Teaching Strategies

Strategies	<p>Conceptual Understanding:</p> <p>Practical Practice</p> <p>Code Review and Feedback</p> <p>Problem Solving Exercises</p>
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Student Workload (SWL)

Structured SWL (h/sem)	48	Structured SWL (h/w)	3.2
Unstructured SWL (h/sem)	52	Unstructured SWL (h/w)	3.46
Total SWL (h/sem)	100		

Module Evaluation

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	5% (10)	5and10	LO #1 - #10
	Assignments	2	5% (10)	2and12	LO #1 - #12
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	All
Summative assessment	Midterm Exam	2 hr	10% (10)	7	LO #1 - #6
	Final Exam	3 hr	50 % (50)	-	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

	Material Covered
Week 1	Introduction to computer programming
Week 2	Introduction to programming languages and C++
Week 3	Variables
Week 4	C++ Libraries
Week 5	C++ User Input and Output
Week 6	C++ Operators (Arithmetic operators, Bitwise operators, logical operators, and Relational operators)
Week 7	Mid-term Exam
Week 8	C++ Strings & C++ Math
Week 9	C++ Booleans
Week 10	C++ conditions
Week 11	Switch statement
Week 12	While loop

Week 13	For loop
Week 14	Break and Continue statements
Week 15	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)	
	Material Covered
Week 1	C++ Libraries.
Week 2	C++ User Input.
Week 3	C++ Operators.
Week 4	If condition.
Week 5	Switch condition.
Week 6	Break and Continue.
Week 7	For loop.
Week 8	While loop C++.
Week 9	Do-while loop.
Week 10	Break and Continue statements.
Week 11	Solving exercises related to electromechanics
Week 12	Solving exercises related to electromechanics
Week13	Solving exercises related to electromechanics
Week 14	Solving exercises related to electromechanics
Week 15	Solving exercises related to electromechanics

Learning and Teaching Resources

	Text	Available in the Library?
Required Texts	The C++ Programming Language (4th Edition) by Bjarne Stroustrup	
Recommended Texts		
Websites	https://www.learncpp.com https://www.w3schools.com/Cpp/default.asp	

Grading Scheme				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 - 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

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

MODULE DESCRIPTION FORM

Module Information			
Module Title	English Language II		Module Delivery
Module Type	Basic		<input checked="" type="checkbox"/> Theory <input type="checkbox"/> Lecture <input type="checkbox"/> Lab <input type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input checked="" type="checkbox"/> Seminar
Module Code	EME 215		
ECTS Credits	3		
SWL (h/sem)	75		
Module Level	2	Semester of Delivery		3
Administering Department	EME	College	CENG
Module Leader	Hadeel A. Ibraheem	e-mail	hadeel.abdulhadi@uosamarra.edu.iq
Module Leader's Acad. Title	Assistant Lecturer	Module Leader's Qualification	M.Sc.
Module Tutor	None	e-mail	None
Peer Reviewer Name	None	e-mail	None
Scientific Committee Approval Date	12/08/2024	Version Number	1.0

Relation with other Modules			
Prerequisite module	None	Semester	-
Co-requisites module	None	Semester	-

Module Aims, Learning Outcomes and Indicative Contents	
Module Objectives	<ol style="list-style-type: none"> 1.Improve the ability of the students to understand, speak, read and write English as a second language with some technical texts. 2.Intended to teach them, how to use technical English effectively as a language of instruction, Lab. Experiments and Exercises, examples 3.Using Technical Terminologies as close as possible to the lectures they receive during their study. In addition to teach them how to give academic presentation, and how to write academically. 4.Engineering is the biggest field of study in the world. English is a tool that notably affect engineering students in academic life. While most of the assumptions in engineering are taught in English, it requires to have good English communication skill. 5.In academic life, engineering students have to deal with the countless lectures, tutorials, labs, project reports and papers in English. Generally

	engineering professors in various universities are also conducting lectures in English.
Module Learning Outcomes	<ol style="list-style-type: none"> 1. Teaching the students how to report what other people said. 2. Teaching the students how to form and use passive voice. 3. Students will be able to identify and use multi-word verbs (Phrasal verbs) in context instead of the single verbs. 4. Familiarize students with the purpose and usage of different punctuation marks. 5. Improving pronunciation and spelling. 6. Teaching the students various phrases (not single words only) to use it in many situations. 7. Increasing the student outcome of vocabulary especially engineering vocabulary. 8. Developing the student's skills in reading, speaking, listening and writing .
Indicative Contents	<ol style="list-style-type: none"> 1.Introduction: Review 2.Grammar: Passive, Reported speech, Phrasal verbs, Quantifiers, Superlatives, Either and Neither, Exclamation and Punctuation, Negation , Numbers. 3.Vocabulary: Commonly confused words, synonyms, phrases, and idioms. 4.Reading Skill: Improving student reading in engineering topics. 5.Writing Skill: writing a comprehensive paragraphs. 6.Listening Skill: Listening to audios and answering questions about it. 7.Speaking and Communication: Pronunciation, Fluency, and Conversation. 8.Assessments: Mid- term exam, Quizzes, Assignments, and Report.
Learning and Teaching Strategies	
Strategies	The strategy focuses on the four key language skills: reading, writing, listening, and speaking. A balanced approach is adopted to develop these skills through a variety of engaging activities and authentic materials. Reading and writing activities include comprehension exercises, vocabulary expansion and guided writing tasks, while listening and speaking activities involve interactive discussions, and presentations.

Student Workload (SWL)			
Structured SWL (h/sem)	48	Structured SWL (h/w)	3.2
Unstructured SWL (h/sem)	27	Unstructured SWL (h/w)	1.8

Total SWL (h/sem)	75		

Delivery Plan (Weekly Syllabus)	
	Material Covered
Week 1	Introduction + Useful Vocabulary and Synonyms
Week 2	Reported speech + Useful Vocabulary and Idioms
Week 3	Phrasal verbs + Useful Vocabulary and Phrases
Week 4	Passive voice+ Reading
Week 5	Quantifiers + Superlatives + Listening
Week 6	Exclamation + Punctuation + Reading
Week 7	Mid -Term Exam + Either-or and Neither-nor
Week 8	Writing
Week 9	Writing
Week 10	Report Discussion
Week 11	Frequently Confused Words and Expressions+ Listening + Reading
Week 12	Negation + Numbers + Listening + Useful Vocabulary and Antonyms
Week 13	Pronunciation and speaking + Reading
Week 14	Pronunciation and Speaking + Listening
Week 15	Preparatory Week before the Final Exam

Module Evaluation

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

Learning and Teaching Resources		
	Text	Available in the Library?
Required Texts	Head way Plus for pre-intermediate by John Liz Soars	Yes
Recommended Texts	English Grammar in Use by Raymond Murphy	Yes
Websites	https://dictionary.cambridge.org https://learnenglish.britishcouncil.org	

Grading Scheme				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 - 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

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

MODULE DESCRIPTION FORM

Module Information

Module Title	Crimes of Al Ba'ath Regime in Iraq		Module Delivery	
Module Type	Basic		<input checked="" type="checkbox"/> Theory <input type="checkbox"/> Lecture <input type="checkbox"/> Lab <input type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar	
Module Code	EME216			
ECTS Credits	2			
SWL (h/sem)	50			
Module Level	2	Semester of Delivery			3
Administering Department	EME	College	CENG	
Module Leader	Suhaib Kadhim		e-mail	
Module Leader's Acad. Title			Module Leader's Qualification	
Module Tutor	None		e-mail	None
Peer Reviewer Name	None		e-mail	None
Scientific Committee Approval Date	12/08/2024		Version Number	1.0

Relation with other Modules

Prerequisite module	None	Semester	-
Co-requisites module	None	Semester	-

Module Aims, Learning Outcomes and Indicative Contents

Module Objectives	This course aims to introduce students to the crimes committed by the Baath regime in Iraq.
Module Learning Outcomes	<p>The student will learn the following:</p> <ul style="list-style-type: none"> - Crimes of the Baath regime according to the Iraqi Supreme Criminal Court Law of 2005 -Definition of the crime and its divisions. 3Psychological and social crimes and their effects, and the most prominent violations of the Baath regime in Iraq. -Environmental crimes of the Baath regime in Iraq. - Mass grave crimes. -Violations of Iraqi laws.
Indicative Contents	-Crimes of the Baath regime according to the Iraqi Supreme Criminal Court Law of 2005. Crimes of the Baath regime according to the Iraqi Supreme Criminal Court Law of 2005. The concept of crimes and their types. Definition of crime in language and terminology. Types of crimes, crimes of the Baath regime according to the documentation of the Iraqi Supreme Criminal Court Law of

	<p>2005.. Types of international crimes., Decisions issued by the Supreme Criminal Court. (8 hours) - Psychological and social crimes and their effects and the most prominent violations of the Baath regime in psychological crimes. Mechanisms of psychological crimes Effects of psychological crimes. Social crimes Militarization of society The Baath regime's position on religion Violations of Iraqi laws Pictures of human rights violations and crimes of authority Some decisions of political and military violations of the Baath regime, places of prisons and detention of the Baath regime. (8 hours(</p> <p>-Environmental crimes of the Baath regime in Iraq. War and radioactive pollution and mine explosions. Destruction of cities and villages (scorched earth policy). Draining the marshes. Bulldozing palm groves, trees and crops. (5 hours(</p> <p>-Mass grave crimes. Events of the genocide graves in Iraq for the period 1963 AD - 2003 AD. Chronological classification of the genocide graves (5 hours(</p>
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Learning and Teaching Strategies	
Strategies	<ul style="list-style-type: none"> -Participating in the class during the lecture by asking questions from the instructor -Short surprise exams -Sometimes participating with students to explain information from the study material <p>Guiding students to some sources.</p>

Student Workload (SWL)			
Structured SWL (h/sem)	33	Structured SWL (h/w)	2.2
Unstructured SWL (h/sem)	17	Unstructured SWL (h/w)	1.13
Total SWL (h/sem)	50		

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

Formative assessment	Quizzes	1	10% (10)	Continuous	All
	Assignments	2	10% (20)	Continuous	All
	Project/Lab.	-	-	-	-
	Report	1	10% (10)	12	All
Summative assessment	Midterm Exam	2 hr	10% (10)	9	LO #1 - #8
	Final Exam	3 hr	50 % (50)	-	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

Delivery Plan (Weekly Syllabus)	
	Material Covered
Week 1	- Crimes of the Baath regime according to the Iraqi Supreme Criminal Court Law of 2005.
Week 2	- The concept of crimes and their divisions.
Week 3	- Definition of crime in language and terminology.
Week 4	- Divisions of crimes.
Week 5	- Crimes of the Baath regime according to the documentation of the Iraqi Supreme Criminal Court Law of 2005.
Week 6	- Types of international crimes.
Week 7	- Decisions issued by the Supreme Criminal Court.
Week 8	- Psychological and social crimes and their effects and the most prominent violations of the Baath regime in psychological crimes.
Week 9	- Mechanisms of psychological crimes.
Week 10	- Effects of psychological crimes
Week 11	- Social crimes.
Week 12	- Militarization of society

Week 13	- The Baath regime's position on religion
Week 14	- Violations of Iraqi laws
Week 15	- Images of human rights violations and crimes of power

Learning and Teaching Resources		
	Text	Available in the Library?
Required Texts	Crimes of the Baath regime in Iraq	No
Recommended Texts		
Websites		

Grading Scheme				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 - 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required
<p>Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.</p>				

MODULE DESCRIPTION FORM

Module Information		
Module Title	Electric circuits	Module Delivery

Module Type	Core		<input checked="" type="checkbox"/> Theory <input checked="" type="checkbox"/> Lecture <input checked="" type="checkbox"/> Lab <input checked="" type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar	
Module Code	EME221			
ECTS Credits	8			
SWL (h/sem)	200			
Module Level	2	Semester of Delivery	4	
Administering Department	EME	College	CENG	
Module Leader	Younes S. Alwan		e-mail	Younes.s.al@uosamarra.edu.iq
Module Leader's Acad. Title	Senior lecturer		Module Leader's Qualification	M.Sc.
Module Tutor	None		e-mail	None
Peer Reviewer Name	None		e-mail	None
Scientific Committee Approval Date	12/08/2024	Version Number	1.0	

Relation with other Modules

Prerequisite module	None	Semester	-
Co-requisites module	None	Semester	-

Module Aims, Learning Outcomes and Indicative Contents

Module Objectives	<ul style="list-style-type: none"> Understanding the basics of electric components in terms of interacting with each other. Being able to comprehend how the different parameters impact on the circuit behavior. Being able to interpret the results and compare it with the empirical outcomes. <p>Being able to design different circuits for different purposes.</p>
Module Learning Outcomes	<ul style="list-style-type: none"> The student should be able to solve different problems in electric circuits. The student has the ability to explain the different numbers of the elements and the quantities. The student has the ability to compare the theoretical and the experimental results and justify them. <p>The student can deal with computer software simulating electric circuits.</p>
Indicative Contents	<ul style="list-style-type: none"> Transient analysis (General) RL Transient analysis RC Transient analysis RLC Transient analysis (Parallel)

	<ul style="list-style-type: none"> • RLC Transient analysis (Series) • Three phase analysis • Connection types of the three phase circuits • Two-wattmeter method • Inductance (General) • Mutual inductance • Dot convention • Transformer • Equivalent circuit of transformer • Laplace transformation • Inverse Laplace transformation • Two-port circuits • Multi-stage two-port circuits • Passive filters • Types of filters: LPF/HPF/BPF/BRF • Transfer function of filter • Active filters
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Learning and Teaching Strategies

Strategies	<ul style="list-style-type: none"> <input type="checkbox"/> Lectures and Core Instruction <ul style="list-style-type: none"> • Basic Concepts: Start with essential principles and theories of electrical circuits. • Visual Tools: Employ diagrams, animations, and videos to explain intricate circuits. • Interactive Learning: Use quizzes and polls during lectures to engage students and instrument understanding. <input type="checkbox"/> Hands-On Demonstrations <ul style="list-style-type: none"> • Lab Work: Facilitate practical lab sessions where students can work with physical circuit components. • Working Models: Demonstrate concepts using real or simulated circuit models. • Simulations: Utilize virtual lab software for simulations when physical equipment is not accessible. <input type="checkbox"/> Problem-Based Learning (PBL) <ul style="list-style-type: none"> • Practical Problems: Introduce real-world circuit problems and case studies. • Team Projects: Encourage group activities to solve problems and enhance collaboration. • Case Study Analysis: Use detailed case studies to apply theoretical knowledge to practical scenarios. <input type="checkbox"/> Design Projects <ul style="list-style-type: none"> • Creative Challenges: Assign projects requiring the design and analysis of electrical systems or components.
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	<ul style="list-style-type: none"> • Prototype Construction: Encourage students to build and test prototypes of their designs. • Peer Feedback: Implement a peer review process for constructive criticism and learning enhancement. <p>☐ Evaluations and Feedback</p> <ul style="list-style-type: none"> • Regular Assessments: Conduct quizzes, labs, and problem sets for ongoing assessment and feedback. • Final Assessments: Use exams and comprehensive projects to evaluate overall understanding. • Reflective Learning: Encourage students to reflect on their learning journey and identify areas for improvement. <p>☐ Additional Resources</p> <ul style="list-style-type: none"> • Books and Journals: Provide access to essential textbooks and online resources for further study. • Online Discussions: Create forums for students to ask questions, share information, and collaborate outside of class. <p>☐ Industry Exposure</p> <ul style="list-style-type: none"> • Site Tours: Organize visits to electrical manufacturing plants or research labs to see real-world applications. <p>Practical Exposure: Allow students to interact with advanced electrical technologies and systems in action.</p>
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Student Workload (SWL)			
Structured SWL (h/sem)	123	Structured SWL (h/w)	8.2
Unstructured SWL (h/sem)	77	Unstructured SWL (h/w)	5.13
Total SWL (h/sem)	200		

Module Evaluation				
	Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Quizzes	2	5% (10)	Continuous	All

Formative assessment	Assignments	3	3% (9)	Continuous	All
	Projects / Lab.	5	3% (15)	Continuous	All
	Report	1	6% (6)	Continuous	All
Summative assessment	Midterm Exam	2 hr	10 % (10)	8	LO #1 - #8
	Final Exam	3 hr	50% (50)	-	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Lab. Syllabus)

	Material Covered
Week 1	Circuit analysis (Review)
Week 2	RL Transient analysis
Week 3	RC Transient analysis
Week 4	RLC Transient analysis (parallel)
Week 5	RLC Transient analysis (Series)
Week 6	Three phase circuits
Week 7	Two wattmeter method
Week 8	Inductance calculation
Week 9	Mutual inductance calculation
Week 10	Transformers
Week 11	Two port circuits (Simulation)
Week 12	Laplace transformation (Simulation)
Week13	Inverse Laplace transformation (Simulation)
Week 14	Passive filters

Week 15	Active filters
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Learning and Teaching Resources		
	Text	Available in the Library?
Required Texts	Electric circuits, 9 th edition, Nilsson and Riedel	Yes
Recommended Texts	Fundamentals of electric circuits, C. Alexander and M. Sadiku, 4 th edition.	No
Websites	Fundamentals of Electric Circuits (4th Edition) - Alexander & Sadiku.pdf - Google Drive	

Grading Scheme				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 - 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

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

MODULE DESCRIPTION FORM

Module Information		
Module Title	Theory of Machines	Module Delivery
Module Type	Core	<input checked="" type="checkbox"/> Theory <input type="checkbox"/> Lecture <input checked="" type="checkbox"/> Lab <input type="checkbox"/> Tutorial
Module Code	EME222	
ECTS Credits	7	

SWL (h/sem)	175		<input type="checkbox"/> Practical	
Module Level	2	Semester of Delivery		4
Administering Department	EME	College	CENG	
Module Leader	Amjed Saleh Mahmood		e-mail	dr.amjed.mahmood@uosamarra.edu.iq
Module Leader's Acad. Title	Asst. Prof.	Module Leader's Qualification		PhD
Module Tutor	Mustafa Abdul Munem Hameed		e-mail	engmustafaalabbsy@gmail.com
Peer Reviewer Name	None	e-mail	None	
Scientific Committee Approval Date	12/08/2024	Version Number	1.0	

Relation with other Modules

Prerequisite module	None	Semester	-
Co-requisites module	None	Semester	-

Module Aims, Learning Outcomes and Indicative Contents

Module Objectives	<ol style="list-style-type: none"> Understand Machine Components: To provide students with a comprehensive understanding of the fundamental components and mechanisms used in machines, including their functions and interactions. Apply Theoretical Concepts: To enable students to apply theoretical concepts and principles of kinematics and dynamics to analyze and design various mechanical systems and mechanisms. Problem-Solving Skills: To develop problem-solving skills in the context of mechanical systems, including the ability to model, analyze, and solve real-world mechanical engineering problems. Design and Optimization: To introduce students to the principles of design and optimization in mechanical systems, focusing on improving performance, efficiency, and reliability.
Module Learning Outcomes	<p>By the end of the module, students should be able to:</p> <ol style="list-style-type: none"> Describe and Classify Mechanisms: Accurately describe and classify different types of mechanical mechanisms and their components, including linkages, gears, cams, and belts. Analyze Kinematic Chains: Perform kinematic analysis of mechanical systems, including the determination of velocities and accelerations in various types of mechanisms. Apply Dynamics Principles: Apply principles of dynamics to analyze forces, moments, and the motion of components in mechanical systems, using both analytical and computational methods.

	<ol style="list-style-type: none"> 4. Design Mechanisms: Design and synthesize simple mechanical mechanisms to meet specific functional requirements, considering factors such as motion, force transmission, and mechanical advantage. 5. Use Simulation Tools: Utilize simulation and modeling tools to predict the behavior of mechanical systems and validate theoretical analyses. 6. Evaluate System Performance: Evaluate the performance of mechanical systems in terms of efficiency, reliability, and functionality, and propose improvements or optimizations as needed.
<p style="text-align: center;">Indicative Contents</p>	<ul style="list-style-type: none"> ○ Basic concepts and definitions ○ Classification of mechanisms ○ Velocity diagram of mechanism ○ Acceleration diagram of mechanism ○ Synthesis of four-bar mechanism ○ Synthesis of crank and connecting mechanism ○ Balancing of rotating systems in one plane ○ Balancing of rotating systems in different planes ○ Types of belt drives ○ Theory of belt drives ○ Velocity ratio of belt drives ○ Friction and power transmission in belts and chains ○ Introduction to Governors: Understanding what governors are and their role in regulating the speed of engines and machinery. ○ Types of Governors: Brief overview of different types, such as centrifugal, inertia ...etc. ○ Flyweights: Function and design considerations. ○ Spindle and Shaft: Interaction with flyweights and impact on speed regulation. ○ Spring Mechanism: How springs are used to control the governor mechanism. ○ Dynamic Analysis: Mathematical modeling and analysis of the governor's behavior under varying conditions. ○ Speed Regulation: Calculation of governor speed ranges and performance. ○ Governor Equations: Derivation and use of equations to determine the governor's characteristics and performance. ○ Types of Centrifugal Governors: ○ Simple Governor: Basic design and operation. ○ Watt Governor: Detailed analysis of its components, operation, and application. ○ Porter Governor: Detailed analysis of its components, operation, and application. ○ Proell Governor: Detailed analysis of its components, operation, and application. ○ Hartnell Governor: Features, working principle, and applications. ○ Wilson Hartnell Governor: Features, working principle, and applications. ○ Governor Characteristics: ○ Controlling Force: How governors control engine speed. ○ Stability: How governors maintain steady engine speed. ○ Sensitivity: The ability of the governor to react to changes in engine speed.

Learning and Teaching Strategies

Strategies

1. Lectures and Theoretical Instruction

- **Foundational Concepts:** Start with lectures that introduce core concepts, principles, and theories related to machines and mechanisms.
- **Visual Aids:** Use diagrams, animations, and videos to illustrate complex mechanisms and processes.
- **Interactive Presentations:** Incorporate interactive tools like quizzes and polls during lectures to assess understanding and keep students engaged.

2. Practical Demonstrations

- **Lab Sessions:** Conduct hands-on laboratory sessions where students can observe and interact with physical models of mechanisms and machinery.
- **Demonstration Models:** Use working models of belts, linkages, and governors to demonstrate theoretical concepts in action.
- **Virtual Labs:** Utilize simulation software for virtual lab sessions if physical models are not available.

3. Problem-Based Learning (PBL)

- **Real-World Problems:** Present students with real-world engineering problems and case studies related to mechanisms and machinery.
- **Group Work:** Encourage collaborative problem-solving and discussion in groups to foster teamwork and deeper understanding.
- **Case Studies:** Analyze case studies to apply theoretical knowledge to practical scenarios and develop critical thinking skills.

4. Design Projects

- **Design Challenges:** Assign projects where students design and analyze mechanical systems or components, applying principles learned in class.
- **Prototype Development:** Encourage students to build prototypes or models of their designs to test and refine their solutions.
- **Peer Review:** Implement peer review processes to provide constructive feedback and enhance learning.

5. Assessments and Feedback

- **Formative Assessments:** Use quizzes, lab, project design and problem sets to regularly assess understanding and provide timely feedback.
- **Summative Assessments:** Include exams and final projects to evaluate overall learning and application of the concepts.
- **Reflective Practices:** Encourage students to reflect on their learning experiences and identify areas for improvement.

6. Supplementary Resources

- **Textbooks and Journals:** Provide access to key textbooks and online resources for additional reading and research.

	<ul style="list-style-type: none"> • Online Forums: Use online discussion forums or platforms for students to ask questions, share resources, and collaborate outside of class. <p><i>7. Field Visits and Industry Tours</i></p> <ul style="list-style-type: none"> • Site Visits: Organize visits to factories, manufacturing plants, or research facilities where students can see real-world applications of mechanisms and machinery. • Hands-On Experience: Allow students to observe and interact with advanced machinery and technologies in action. <p>These strategies aim to create a dynamic and engaging learning environment, helping students grasp theoretical concepts, apply their knowledge practically, and develop essential skills for their future careers.</p>
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Student Workload (SWL)			
Structured SWL (h/sem)	78	Structured SWL (h/w)	5.2
Unstructured SWL (h/sem)	97	Unstructured SWL (h/w)	6.46
Total SWL (h/sem)	175		

Module Evaluation					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	1	10% (10)	Continuous	All
	Assignments	1	5% (5)	Continuous	All
	Projects/Lab.	3	5% (15)	Continuous	All
	Report	1	10% (10)	13	All
Summative assessment	Midterm Exam	2 hr	10% (10)	10	LO #1 - #10
	Final Exam	3 hr	50 % (50)	-	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

	Material Covered
Week 1	<ul style="list-style-type: none"> ○ Basic concepts and definitions <p>Classification of mechanism</p>
Week 2	<ul style="list-style-type: none"> ○ Velocity diagram of mechanism <p>Acceleration diagram of mechanism</p>
Week 3	<ul style="list-style-type: none"> ○ Synthesis of four-bar mechanism <p>Synthesis of crank and connecting mechanism</p>
Week 4	Balancing of rotating systems in one plane
Week 5	Balancing of rotating systems in different planes
Week 6	<ul style="list-style-type: none"> ○ Theory of belt drives <p>Types of belt drives</p>
Week 7	<ul style="list-style-type: none"> ○ Velocity ratio of belt drives <p>Friction and power transmission in belts and chains</p>
Week 8	<ul style="list-style-type: none"> ○ Introduction to Governors: Understanding what governors are and their role in regulating the speed of engines and machinery. <p>Types of Governors: Brief overview of different types, such as centrifugal, inertia ...etc.</p>
Week 9	<ul style="list-style-type: none"> ○ Flyweights: Function and design considerations. ○ Spindle and Shaft: Interaction with flyweights and impact on speed regulation. ○ Spring Mechanism: How springs are used to control the governor mechanism. ○ Dynamic Analysis: Mathematical modeling and analysis of the governor's behavior under varying conditions. <p>Speed Regulation: Calculation of governor speed ranges and performance.</p>
Week 10	<ul style="list-style-type: none"> ○ Types of Centrifugal Governors: ○ Simple Governor: Basic design and operation. <p>Mid – term Exam.</p>
Week 11	<ul style="list-style-type: none"> ○ Watt Governor: Detailed analysis of its components, operation, and application.

	<ul style="list-style-type: none"> Porter Governor: Detailed analysis of its components, operation, and application. <p>Proell Governor: Detailed analysis of its components, operation, and application.</p>
Week 12	<ul style="list-style-type: none"> Hartnell Governor: Features, working principle, and applications. <p>Wilson Hartnell Governor: Features, working principle, and applications.</p>
Week 13	<ul style="list-style-type: none"> Governor Characteristics: <p>Governor Equations: Derivation and use of equations to determine the governor's characteristics and performance.</p>
Week 14	Controlling Force: How governors control engine speed.
Week 15	<ul style="list-style-type: none"> Stability: How governors maintain steady engine speed. <p>Sensitivity: The ability of the governor to react to changes in engine speed</p>

Delivery Plan (Weekly Lab. Syllabus)

	Material Covered
Week 1	<ul style="list-style-type: none"> Basic concepts and definitions Classification of mechanism
Week 2	<ul style="list-style-type: none"> Velocity diagram of mechanism Acceleration diagram of mechanism
Week 3	<ul style="list-style-type: none"> Synthesis of four-bar mechanism Synthesis of crank and connecting mechanism
Week 4	<ul style="list-style-type: none"> Balancing of rotating systems in one plane
Week 5	<ul style="list-style-type: none"> Balancing of rotating systems in different planes
Week 6	<ul style="list-style-type: none"> Theory of belt drives Types of belt drives
Week 7	<ul style="list-style-type: none"> Velocity ratio of belt drives Friction and power transmission in belts and chains
Week 8	<ul style="list-style-type: none"> Introduction to Governors: Understanding what governors are and their role in regulating the speed of engines and machinery. Types of Governors: Brief overview of different types, such as centrifugal, inertia ...etc.
Week 9	<ul style="list-style-type: none"> Flyweights: Function and design considerations. Spindle and Shaft: Interaction with flyweights and impact on speed regulation. Spring Mechanism: How springs are used to control the governor mechanism. Dynamic Analysis: Mathematical modeling and analysis of the governor's behavior under varying conditions.

	<ul style="list-style-type: none"> Speed Regulation: Calculation of governor speed ranges and performance.
Week 10	<ul style="list-style-type: none"> Types of Centrifugal Governors: Simple Governor: Basic design and operation.
Week 11	<ul style="list-style-type: none"> Watt Governor: Detailed analysis of its components, operation, and application. Porter Governor: Detailed analysis of its components, operation, and application. Proell Governor: Detailed analysis of its components, operation, and application.
Week 12	<ul style="list-style-type: none"> Hartnell Governor: Features, working principle, and applications. Wilson Hartnell Governor: Features, working principle, and applications.
Week 13	<ul style="list-style-type: none"> Governor Characteristics: Governor Equations: Derivation and use of equations to determine the governor's characteristics and performance.
Week 14	<ul style="list-style-type: none"> Controlling Force: How governors control engine speed.
Week 15	<ul style="list-style-type: none"> Stability: How governors maintain steady engine speed. Sensitivity: The ability of the governor to react to changes in engine speed

Learning and Teaching Resources

	Text	Available in the Library?
Required Texts	Theory of machines by R S Khurmi	Yes
Recommended Texts	Theory of machines and Mechanisms by J E Shigley	
Websites	https://nptel.ac.in/ https://ocw.mit.edu/	

Grading Scheme

Group	Grade	التقدير	Marks %	Definition
	A - Excellent	امتياز	90 - 100	Outstanding Performance

Success Group (50 - 100)	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
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	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
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<p>Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.</p>				

MODULE DESCRIPTION FORM

Module Information

Module Title	Engineering Mathematics		Module Delivery	
Module Type	Supportive		<input checked="" type="checkbox"/> Theory <input type="checkbox"/> Lecture <input type="checkbox"/> Lab <input checked="" type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar	
Module Code	EME223			
ECTS Credits	6			
SWL (h/sem)	150			
Module Level	2	Semester of Delivery			4
Administering Department	EME	College	CENG	
Module Leader	Mohammed F. Hasan		e-mail	albadry_mohamad55@uosamarra.edu.iq
Module Leader's Acad. Title	Lecturer		Module Leader's Qualification	M.Sc.
Module Tutor	None		e-mail	None
Peer Reviewer Name	None		e-mail	None
Scientific Committee Approval Date	12/08/2024	Version Number	1.0	

Relation with other Modules

Prerequisite module	None	Semester	-
Co-requisites module	None	Semester	-

Module Aims, Learning Outcomes and Indicative Contents

Module Objectives	Understanding Engineering math.: The module should provide students with a comprehensive understanding of engineering math., including different types of functions and systems of infinite series or sequences , also introducing the techniques of partial derivatives to solve multi variables functions.
Module Learning Outcomes	<p>Upon completion of the module on Engineering Math. , learners should be able to achieve the following learning outcomes:</p> <ol style="list-style-type: none"> 1. Learning about polar coordinates and their relation with rectangular coordinates. 2. Drawing polar curves concluded by rectangular coordinates and vice versa.

	<ol style="list-style-type: none"> 3. Learning about infinite series and sequences with their applications on engineering calculations and analysis . 4. Finding the convergence and divergence of each method. 5. Learning and extend about the concept of calculus to functions with two or more variables by using the partial derivatives method. 6. Using first and second order derivatives in engineering analysis and calculations to find the exact solution. 7. Using the chain rule method to solve and find first and second order derivatives in engineering analysis and calculations.
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Learning and Teaching Strategies

Strategies	<p>Planning a unit or lesson involves a number of instructional decisions. The teacher must identify the following: the content and processes to be addressed, the strengths, needs, and interests of students, the Common Essential Learnings that could be incorporated, and the most effective instructional approaches. Such decisions are critical and must be made consciously and purposefully. It begins with the student's interest in engineering tools and the drawing board. To reach the highest level of understanding in the application of all theoretical and laboratory lesson processes</p>
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Student Workload (SWL)

Structured SWL (h/sem)	93	Structured SWL (h/w)	6.2
Unstructured SWL (h/sem)	57	Unstructured SWL (h/w)	3.8
Total SWL (h/sem)	150		

Module Evaluation

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

Learning and Teaching Resources

	Text	Available in the Library?
Required Texts	Thomas' Calculus: Early Transcendentals, Thirteenth Edition.	yes
Recommended Texts		
Websites		

MODULE DESCRIPTION FORM

Delivery Plan (Weekly Syllabus)	
	Material Covered
Week 1	Polar coordinates introduction
Week 2	Relationship between polar and rectangular coordinates
Week 3	Graph of polar coordinates
Week 4	families of circles and curves
Week 5	Area in polar coordinates
Week 6	Partial derivatives introduction
Week 7	Mid-term Exam
Week 8	Second order partial derivatives
Week 9	The chain rule for derivatives
Week 10	Implicit differentiation
Week 11	Directional derivatives
Week 12	Introduction to infinite series and sequences
Week 13	Geometric series
Week 14	Convergence and divergence tests
Week 15	Preparatory week before the exam

Module Information

Module Title	Programming (MATLAB)		Module Delivery
Module Type	Supportive		<input checked="" type="checkbox"/> Theory <input type="checkbox"/> Lecture <input checked="" type="checkbox"/> Lab <input type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar
Module Code	EME224		
ECTS Credits	4		
SWL (h/sem)	100		
Module Level	2	Semester of Delivery		4
Administering Department	EME	College	CENG
Module Leader	Oras Fadhil Khalaf		e-mail oras.fadil@uosamarra.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	M.Sc.
Module Tutor	None		e-mail None
Peer Reviewer Name	None		e-mail None
Scientific Committee Approval Date	12/08/2024	Version Number	1.0

Relation with other Modules			
Prerequisite module	None	Semester	-
Co-requisites module	None	Semester	-

Module Aims, Learning Outcomes and Indicative Contents	
Module Objectives	<ul style="list-style-type: none"> • Giving a general idea about the MATLAB program and its uses • Dealing with matrices and mathematical operations

	<ul style="list-style-type: none"> • How to deal with data processing • Processing two- and three-dimensional graphs
Module Learning Outcomes	<p>Cognitive objectives:</p> <ul style="list-style-type: none"> • Gain experience and knowledge in the basics of MATLAB. • How to process data. • Processing graphs. <p>Course Skill Objectives.</p> <ul style="list-style-type: none"> • How to Program Using MATLAB • Solving Mathematical Equations and Electromechanical Problems Using MATLAB
Indicative Contents	<ol style="list-style-type: none"> 1.Introduction to computer programming 2.Introduction to MATLAB Programming 3.MATLAB Standard Library 4.MATLAB Application Development

Learning and Teaching Strategies

Strategies	<ul style="list-style-type: none"> • Conceptual Understanding: • Practical Practice • Code Review and Feedback <p>Problem Solving Exercises</p>
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Student Workload (SWL)

Structured SWL (h/sem)	48	Structured SWL (h/w)	3.2
Unstructured SWL (h/sem)	52	Unstructured SWL (h/w)¹	3.46
Total SWL (h/sem)	100		

Module Evaluation

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	5% (10)	5and10	All
	Assignments	2	5% (10)	2and12	All
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	All
Summative assessment	Midterm Exam	2 hr	10% (10)	7	LO #1- #6
	Final Exam	3 hr	50 % (50)	-	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

	Material Covered
Week 1	Learn about the program, its features and uses.
Week 2	Basic commands.
Week 3	Matrices.
Week 4	Dealing with matrices.
Week 5	Dealing with matrices.
Week 6	logic gates.
Week 7	Mid-term Exam + Repeat methods.
Week 8	Repeat methods.
Week 9	Graphics processing.
Week 10	Graphics processing.

Week 11	3D drawing.
Week 12	3D drawing.
Week 13	Polynomial processing.
Week 14	Integration and differentiation.
Week 15	Dealing with mathematical functions.

Delivery Plan (Weekly Lab. Syllabus)

	Material Covered
Week 1	Program interface, mathematical functions
Week 2	Important commands in MATLAB, complex numbers, matrices
Week 3	Arithmetic operations on matrices
Week 4	Repeat, rotate and reshape matrices Applications on matrices
Week 5	Comparison operations and logic gates Some important commands
Week 6	Repetition
Week 7	Repetition
Week 8	Graph in MATLAB 2D
Week 9	Graph in MATLAB 2D
Week 10	The process of placing graphics in separate windows and naming the axes
Week 11	Graph in MATLAB 3D
Week 12	Graph in MATLAB 3D
Week13	Derivative of algebraic expressions
Week 14	Integration of algebraic expressions
Week 15	Mathematical functions.

Learning and Teaching Resources

	Text	Available in the Library?
Required Texts	MATLAB Programming for Engineers Sixth Edition Stephen J. Chapman BAE Systems Australia	Yes
Recommended Texts		
Websites	https://www.mathworks.com/support/learn-with-matlab-tutorials.html	

Grading Scheme

Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 - 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

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

MODULE DESCRIPTION FORM

Module Information

Module Information			
Module Title	Arabic Language		Module Delivery
Module Type	Basic		<input checked="" type="checkbox"/> Theory <input type="checkbox"/> Lecture <input type="checkbox"/> Lab <input type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar
Module Code	EME225		
ECTS Credits	3		
SWL (h/sem)	75		
Module Level	2	Semester of Delivery		4
Administering Department	EME	College	CENG
Module Leader	Mohanad Abduljabbar Hassan		e-mail mohanad.abduljabbar@uosamarra.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	PhD
Module Tutor	None		e-mail None
Peer Reviewer Name	None		e-mail None
Scientific Committee Approval Date	12/08/2024	Version Number	1.0

Relation with other Modules			
Prerequisite module	None	Semester	-
Co-requisites module	None	Semester	-

Module Aims, Learning Outcomes and Indicative Contents	
Module Objectives	<p>This semester aims to enable students to deal with a wide range of grammar, syntax, morphology, and spelling rules in reading and writing. It also aims to help them master the rules of the language and avoid making spelling and grammatical errors, whether in formal correspondence or social and cultural situations.</p>
Module Learning Outcomes	<p>1-Demonstrate knowledge and understanding of grammar, morphology and spelling rules in theory and practice and avoid making common mistakes.</p> <p>2-nderstand the language and distinguish between the subject and predicate, the verb and the agent and not confuse them.</p>

	<p>3-Know the methods of speaking, communicating and formal writing using eloquent language free of grammatical errors and mistakes.</p> <p>4-Write articles in correct language free of errors</p>
Indicative Contents	<p>Grammar rules: an introduction to the Arabic language, discussing the parts of speech (noun, verb, and particle), the nominal sentence and the verbal sentence, the additions to the nominal and verbal sentence, the quasi-sentence, the presentation and delay, the methods of writing the hamza, the number and the counted, morphology and what it includes in terms of chapters and the morphological scale.</p>

Learning and Teaching Strategies

Strategies	<p>The method that will be used in this course:</p> <ol style="list-style-type: none"> 1. Theoretical lectures. 2. Articles. 3. Discussions in the classroom.
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Student Workload (SWL)

Structured SWL (h/sem)	33	Structured SWL (h/w)	2.2
Unstructured SWL (h/sem)	42	Unstructured SWL (h/w)	2.8
Total SWL (h/sem)	75		

Module Evaluation

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (20)	Continuous	All
	Assignments	2	5% (10)	Continuous	All
	Projects / Lab.	-	-	-	-
	Report	1	10% (10)	11	All
Summative assessment	Midterm Exam	1 hr	10% (10)	8	LO #1-#8
	Final Exam	3 hr	50 % (50)	-	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

	Material Covered
Week 1	Speech and what it consists of, noun, verb and particle.
Week 2	Nominal sentence.
Week 3	Nominal sentence additions.
Week 4	Verbal sentence.
Week 5	Verbal sentence additions.
Week 6	Sentence styles.
.Week 7	Request and exclamation
Week 8	Quasi-sentence + mid-term exam
Week 9	Call and confirmation.
Week 10	Condition and oath.

Week 11	Arabic sentence complements.
Week 12	Exception, and meanings of prepositions.
Week 13	Number, writing the Hamza
Week 14	Writing the taa, and the letters that are pronounced but not written and writing the dad and the thaa
Week 15	The morphological scale and the verb chapters

Learning and Teaching Resources

	Text	Available in the Library?
Required Texts	Ibn Aqils Commentary On Ibn Maliks ALfiyyah .AL-Nahw AL-Wafi, and Jami AL-Durus AL-Arabiyyah	Yes
Recommended Texts		
Websites		

Grading Scheme

Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 - 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

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

MODULE DESCRIPTION FORM

Module Information			
Module Title	Human Rights and Democracy		Module Delivery
Module Type	Basic		<input checked="" type="checkbox"/> Theory <input type="checkbox"/> Lecture <input type="checkbox"/> Lab <input type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar
Module Code	EME226		
ECTS Credits	2		
SWL (h/sem)	50		
Module Level	2	Semester of Delivery		4
Administering Department	EME	College	CENG
Module Leader	Fateen TUMA KURDEE	e-mail	faten.tuma@uosamarra.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	M.Sc.
Module Tutor	None	e-mail	None
Peer Reviewer Name	None	e-mail	None
Scientific Committee Approval Date	12/08/2024	Version Number	1.0

Relation with other Modules			
Prerequisite module	None	Semester	-
Co-requisites module	None	Semester	-

Module Aims, Learning Outcomes and Indicative Contents	
Module Objectives	<p>Teaching the subject of Human Rights and Democracy in universities aims to achieve several main objectives: - Promoting awareness of human rights: Teaching this subject seeks to promote understanding and awareness of the basic human rights stipulated in the international charters and agreements to which Iraq is committed. This includes citizens' rights and economic, social and cultural rights. - Promoting the principles of democracy: The main objective of teaching this subject includes promoting the concept and values</p>

	<p>of democracy among students. This includes understanding the importance of civic engagement, voting rights and political participation, ensuring the rule of law and respecting minority rights.</p> <ul style="list-style-type: none"> - Developing critical thinking skills: The study of human rights and democracy enhances critical thinking skills among students, helping them to evaluate political and social issues in a logical manner based on ethical principles and human rights. - Promoting the values of justice and equality: Human rights lessons contribute to promoting the values of justice and equality in society, and encourage combating discrimination and achieving the rights of the individual regardless of his social or cultural background. - Stimulating community participation: Teaching human rights and democracy aims to motivate students to participate in civil and community life, and motivate them to take responsibility for building a society that respects human rights and relies on the principles of democracy. <p style="padding-left: 40px;">In general, teaching human rights and democracy in Iraqi universities seeks to prepare students to participate effectively in society and work to build a society based on justice and respect for human rights.</p>
<p>Module Learning Outcomes</p>	<p>Learning human rights and democracy in Iraqi universities can result in a range of important and valuable outcomes, including:</p> <p>A deep understanding of human rights: Students are expected to gain a deep understanding of the concept of human rights and the state’s obligations towards them, and to acquire the ability to analyze the challenges facing the realization and respect of human rights.</p> <p>An appreciation of democratic values: Students are expected to gain an understanding of the values and principles of democracy, including civic participation, respect for minority rights, and good governance.</p> <p>Developing critical thinking skills: Students are expected to develop critical thinking skills in dealing with issues related to human rights and democracy, enabling them to evaluate the situation logically and understand the potential implications of political decisions and transformations.</p> <p>The ability to participate effectively: Students are encouraged to participate effectively in society and political life, whether through participation in dialogues, public work, or even by engaging in discussions on human rights issues.</p> <p>Enhancing cultural awareness: Learning human rights and democracy can increase students’ awareness of cultural diversity and mutual respect between different cultures, which enhances understanding Global and international cooperation.</p> <p>Motivation for social interaction: Students are expected to be motivated to contribute to improving social and political conditions through collective action and social activism.</p>

	In general, learning about human rights and democracy is an opportunity for students to develop personally and socially, and to enable them to take responsibility for building a society based on the principles of justice and respect for human rights..
Indicative Contents	<p>Guiding Content for the Human Rights and Democracy Course,</p> <p>Some points that may be included:</p> <ol style="list-style-type: none"> 1. Basic concepts: Definitions and explanations of concepts such as human rights, democracy, fundamental freedoms, and social justice. 2. History: The development of human rights and democracy throughout history, including important international documents such as the Universal Declaration of Human Rights. 3. Legal frameworks: International agreements and treaties that deal with human rights and democracy, in addition to national constitutions and relevant laws. 4. Contemporary issues: Discussing issues such as discrimination, individual and collective freedoms, children’s rights, women’s rights, and social justice. 5. International and local mechanisms: Bodies and organizations concerned with human rights and the promotion of democracy, both within countries and at the international level. 6. Case studies: Analysis of the application of human rights and democracy in certain countries or regions, with a focus on challenges and achievements. 7. Social interaction: The role of civil society, the media, and academic institutions in promoting and protecting human rights and promoting democracy.

Learning and Teaching Strategies

Strategies	<p>Learning and teaching strategies that can be used in teaching human rights and democracy</p> <ul style="list-style-type: none"> . *Discussions and dialogues: Organizing group discussions on various topics related to human rights *Social media and technology: Using social media platforms and technology to encourage academic discussions and exchange of ideas among students outside the classroom.
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Student Workload (SWL)

Structured SWL (h/sem)	33	Structured SWL (h/w)	2.2
Unstructured SWL (h/sem)	17	Unstructured SWL (h/w)	1.13
Total SWL (h/sem)	50		

Module Evaluation					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	8% (16)	Continuous	All
	Assignments	2	6%(12)	Continuous	All
	Projects / Lab.	-	-	-	-
	Report	1	12% (12)	13	All
Summative assessment	Midterm Exam	1 hr	10 % (10)	9	LO #1-#8
	Final Exam	3 hr	50 % (50)	-	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
	Material Covered
Week 1	Human Rights (Human Rights in Ancient Civilizations)
Week 2	Human Rights in Divine Laws and Religions
Week 3	Sources of Human Rights / International Sources
Week 4	Sources of Human Rights / National Sources
Week 5	Human Rights Guarantees / Guarantees at the Domestic Level
Week 6	Human Rights Guarantees / Guarantees in Islam
Week 7	Human Rights Guarantees / Guarantees at the International Level
Week 8	The Role of Regional Organizations in Protecting Human Rights
Week 9	Mid-Term Exam
Week 10	The Future of Human Rights - Globalization and Human Rights

Week 11	Chapter Two Children's Rights (The Origin and Development of Children's Rights Rules)
Week 12	Children's Rights in Civilizations and Divine Religions
Week 13	International and Regional Agreements on Children's Rights
Week 14	Democracy, Human Rights Guarantees / Guarantees at the International Level
Week 15	Parliament, Elections and the Most Important Electoral Systems

Learning and Teaching Resources

	Text	Available in the Library?
Required Texts	Human Rights, Children and Democracy, authored by .Professor Dr. Maher Saleh Alawi and others	Yes
Recommended Texts		
Websites		

Grading Scheme

Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 - 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

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

Third year / First semester

Course Description From

1. Course Name:
Heat transfer I
2. Course Code:
EME 311
3. Semester / Year:
1 st semester /third year
4. Description Preparation Date:
2024 - 2025
5. Available Attendance Forms
Theoretical lectures + discussion lectures
6. Number of Credit House (Total) / Number of Units (Total)
hours 45 2.5 units
7. Course administrator's name (mention all , if more than one name)
Name: Zainab Abdulmaged Khalaf Email: Zainab.abd@uosamarra.edu.iq

8. Course Objectives	
Course Objectives	<p>The objective of the Heat Transfer course is to help engineering students' study and learn the principles of heat transfer media and their applications in various heat transfer situations. Upon completion of this course, the student will be able to:</p> <ol style="list-style-type: none">1 .Understand the principles of conductive, convective, and radiation heat transfer2 .Apply the above heat transfer principles to solve practical engineering problems3 .Integrate knowledge of mass, momentum, heat transfer, and thermodynamics4 .Apply the above integrated knowledge to solve practical engineering problems5 .Apply the fundamentals of heat transfer to engineering design

9. Teaching and Learning Strategies

Strategies	<ol style="list-style-type: none"> 1. During the course, the student will gain an understanding of heat transfer methods and the basic principles of heat transfer. 2. Learn and understand the convection heat transfer coefficient, the thermal conductivity of materials, and how to calculate thermal resistances. 3. Learn and understand the mechanisms of heat transfer and the advantages of each method. 4. Learn and understand the properties of radiation heat transfer and shape factor calculations. 5. Learn about the scientific and engineering applications of heat transfer. 6. Familiarize themselves with the classifications and types of heat transfer. 7. Familiarize themselves with the various methods for calculating the convection heat transfer coefficient, shape factor, and thermal conductivity of materials. 8. Familiarize themselves with the properties of thermal resistances. 9. Familiarize themselves with the practical applications of heat transfer.
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10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	3	The instructor explains basic concepts such as heat conduction, convection heat transfer, and thermal radiation.	Introduction -General concepts and definitions -Heat conduction -Convective heat transfer - Thermal radiation	lecture + brainstorming + application and innovation	Daily exams + monthly exam
2	3	Introduction to conduction heat transfer (general equation) - General heat conduction equation	- Conduction heat transfer (general equation)	lecture + brainstorming + application and innovation	Daily exams + monthly exam
3	3		- General heat conduction equation - One dimensional, steady state, conduction through plane wall	lecture + brainstorming + application and innovation	Daily exams + monthly exam

4	3	Introduction to conduction heat transfer (1-D, steady state - wall - spherical cylinder)	<ul style="list-style-type: none"> - Conduction heat transfer (1-D, steady State) - Composed wall 	lecture + brainstorming + application and innovation	Daily exams + monthly exam
5	3		<ul style="list-style-type: none"> - Cylinder, composed cylinder - Sphere, composed sphere 	lecture + brainstorming + application and innovation	Daily exams + monthly exam
6	3	Introduction to hollow cylinder - spherical body - Critical thickness of insulation	Hollow cylinder - Sphere	lecture + brainstorming + application and innovation	Daily exams + monthly exam
7	3		- Critical thickness of insulation	lecture + brainstorming + application and innovation	Daily exams + monthly exam
8	3	Introduction to heat transfer through extended surfaces (fins) - General equation for temperature distribution - Very long fin - Short fin	<ul style="list-style-type: none"> - Heat transfer through extended surfaces (fins) - General equation for temperature distribution 	lecture + brainstorming + application and innovation	Daily exams + monthly exam
9	3		<ul style="list-style-type: none"> - Very long fin Short fin 	lecture + brainstorming + application and innovation	Daily exams + monthly exam
10	3	Introduction to contact thermal layer	- Thermal contact resistance	lecture + brainstorming + application and innovation	Daily exams + monthly exam
11	3	Introduction to conduction heat transfer with time and its systems	Unsteady state conduction - Lumped heat capacity system	lecture + brainstorming + application and innovation	Daily exams + monthly exam
12	3		- Transient heat flow in semi-infinite solid	lecture + brainstorming + application and innovation	Daily exams + monthly exam
13	3	How to use Heisler charts and how to find temperatures with time	- Convection boundary condition (Heisler charts)	lecture + brainstorming + application and innovation	Daily exams + monthly exam

14	3		Convection boundary condition (Heisler charts)	lecture + brainstorming + application and innovation	Daily exams + monthly exam
15	3		Final exam		

11. Course Evaluation

Percentage %	Number	Tasks
%10	10	Attendance and Class Participation
%10	10	Homework
%10	10	Daily Exams
%20	20	Midterm Exam
%50	50	Final Exam
100		Overall

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Heat Transfer, by J. P. Holman, 10th Edition, McGraw-Hill, 2010
Main references (sources)	College library to obtain additional resources for the .curriculum
Recommended books and references (scientific journals, reports ...)	<ol style="list-style-type: none"> Heat Transfer: A Practical Approach by Y.A. Cengel, McGraw-Hill, 3rd Ed., 2007. Fundamentals of Heat and Mass Transfer by F.P. Incropera, D. P. Dewitt, T.L. Bergman, and A.S. Lavine, John Wiley, 6th Ed., 2007.
Electronic References, Websites	<ol style="list-style-type: none"> Heat Transfer-Professional Version by L. C. Thomas, Capstone PC, 2nd Ed., 1999. Heat Transfer: A Practical Approach, by Yunus A. Cengel. 2nd Edition, McGraw-Hill, 2002 <p>https://www.youtube.com/@AlMohandesAcademy</p>

م. اوراس فاضل خلف
رئيس قسم الهندسة الكهروميكانيكية
2025/7/



Course Description From

1. Course Name:	
DC machines III	
Course Code:	
EME312	
3. Semester / Year:	
1 st semester /third year	
4. Description Preparation Date:	
2024/2025	
5. Available Attendance Forms	
Theoretical lectures + discussion lectures + laboratory	
6. Number of Credit House (Total) / Number of Units (Total)	
2.5unit 60 hours	
7. Course administrator's name (mention all, if more than one name)	
Name: Yahya Tareq Hussein Email: yahya.t.husseini@uosamarra.edu.iq	

8. Course Objectives	
Course Objectives	<p>This course aims to enable students to</p> <ol style="list-style-type: none"> 1. Understand the basic principles of rotating electrical machines, especially DC machines. 2. Analyze the components of a DC generator and motor and understand the functions of each component, such as the starter, armature, and carbon brushes. 3. Calculate basic electrical variables, such as electromotive force (EMF), torque, power, and speed, in DC machines. 4. Distinguish between the different types of excitation in DC generators and motors (self-excited, externally excited, and superimposed). 5. Understand the effect of armature interactions and current switching on machine performance and methods for improving them.

	<p>6. Analyze the operating characteristics of DC generators and motors under various load conditions.</p> <p>7. Implement speed control and electrical shutdown methods for DC motors.</p> <p>8. Apply techniques for parallel generator operation and load balancing.</p> <p>9. Evaluate losses in machines and calculate operating efficiency using experimental or theoretical data.</p> <p>10. Perform practical tests on DC motors and generators and analyze their results.</p> <p>11. Acquire skills to solve technical problems related to the operation and maintenance of DC machines.</p>
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9. Teaching and Learning Strategies

<p>Strategies</p> <p>General Goals of the Strategy</p>	<p>1: Theoretical Aspect .</p> <ul style="list-style-type: none"> <input type="checkbox"/> Interactive lectures and interactive visual presentations using multiple educational media <input type="checkbox"/> Guided brainstorming - to connect theoretical concepts to daily life <input type="checkbox"/> Flipped learning approach - students are assigned to watch an educational video before the lecture, then discuss and clarify questions .during the lecture <input type="checkbox"/> Group discussion and mini-projects - dividing students into groups <p>2. Practical Aspect</p> <ul style="list-style-type: none"> <input type="checkbox"/> Laboratory Experiments - Practical application of the theoretical .aspect using laboratory equipment for DC motors <input type="checkbox"/> Student performance in the laboratory is evaluated through .practical reports and short tests after each topic <input type="checkbox"/> Mini-projects to measure understanding of applied concepts <input type="checkbox"/> Conducting live laboratory experiments on a DC motor <p>Summary of the teaching and learning strategy.</p>																		
	<table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">Axis</th> <th style="text-align: left;">Means</th> <th style="text-align: left;">Goal</th> </tr> </thead> <tbody> <tr> <td>Theoretical</td> <td>lectures + illustrations build</td> <td>understanding</td> </tr> <tr> <td>Practical</td> <td>labs + application</td> <td>analysis projects</td> </tr> <tr> <td>Technology</td> <td>Simulation Programs for Interaction</td> <td>Deep Understanding</td> </tr> <tr> <td>Collaborative</td> <td>discussion groups</td> <td>promote critical thinking.</td> </tr> <tr> <td>My assessment</td> <td>short tests + projects</td> <td>check understanding</td> </tr> </tbody> </table>	Axis	Means	Goal	Theoretical	lectures + illustrations build	understanding	Practical	labs + application	analysis projects	Technology	Simulation Programs for Interaction	Deep Understanding	Collaborative	discussion groups	promote critical thinking.	My assessment	short tests + projects	check understanding
Axis	Means	Goal																	
Theoretical	lectures + illustrations build	understanding																	
Practical	labs + application	analysis projects																	
Technology	Simulation Programs for Interaction	Deep Understanding																	
Collaborative	discussion groups	promote critical thinking.																	
My assessment	short tests + projects	check understanding																	

10. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	3theoretical + 1 practical	Know the basic components Build a strong understanding of the physical principles of DC machines	Introduction to electrical machines and their types. Knowing the main parts of direct current machines	Interactive lectures + practical lab + video presentation	
2	3theoretical + 1 practical	Understand the basic working principle of DC electrical machines	General principles of DC generators	Lectures + solved examples + practical lab	Homework + Lab Report
3	3theoretical + 1 practical	General principles of calculation for DC generators	Calculating EMF, torque, and power in generators. Studying the electrical and mechanical properties of machines. •Using performance analysis equations such as: o Torque Equation	Lectures + Group Activities + Practical Lab	Homework + Lab Report
4	3theoretical + 1 practical	How do DC generators work	Types of excitation: self, external, superposition DC machine construction and starter function	Lectures +solved examples + laboratory experiments	Practical quiz + lab report
5	3theoretical + 1 practical	Types of DC Generator	1.Shunt Generator. 2, Series Generator 3, Compound Generator •Cumulative Compound: Voltage. •Differential Compound: Voltage	Lectures + solved examples + practical lab	Homework + Lab Report + Theory Test
6	3theoretical + 1 practical	Evaluation of theoretical knowledge from previous chapters	Theoretical exam (1(	Practical lab	First monthly exam (theoretical(
7	3theoretical + 1 practical	Performance Analysis and Design	Armature Reaction •Parallel operation of DC generators. •Losses and Efficiency Power	Interactive lectures + solving examples + practical lab	Practical quiz + lab report

8	3theoretical + 1 practical	Assessment of acquired practical skills	Monthly exam (practical lab(	group discussion	Monthly exam (practical lab) + theoretical exam
9	3theoretical + 1 practical	Learn about operating and control methods	DC motor operation principle with application of Faraday's first and second laws with analysis of the laws and using mathematical equations	Lectures + solved examples + practical lab	Lab report + practical assessment + homework
10	3theoretical + 1 practical	Performance Analysis and Design	Calculating 1.speed 2.starting torque method Mechanical and Electrical Structure and Construction •Operating Principle •Internal Voltage Equation •Equivalent Circuit Diagrams •Characteristic Curves (O.C.C & S.C.C(•Voltage Regulation and Control	Lectures + solved examples + practical lab	Laboratory report + theoretical quiz
11	3theoretical + 1 practical	Ability to maintain and diagnose	•Analyze common machine faults. •Inspect components such as: o Operating coils o Rotor o Insulation	Lectures +Applied Projects + Practical Lab	Homework + Practical Assessment + Lab Reports
12	3theoretical + 1 practical	Characteristics of DC motors and their types (parallel, series, compound.(	• Speed Control. •Electric Braking. •DC Motor Testing	Group problem solving + laboratory discussion	Practical evaluation + reports
13	3theoretical + 1 practical	Assessment of theoretical knowledge for modern classes	Second monthly exam (theoretical(		Discussing micro- projects and evaluating performance
14	3theoretical + 1 practical	Comprehensive assessment of theoretical knowledge and applied skills	Discussion of micro- projects and performance evaluation + practical exam covering all experiences		Practical exam covering all experiments
15	theoretical 3 + 1 practical		Final Exam (Theoretical + (Practical		

11. Course Evaluation

%ratio	number	Tasks
%5	Continuous weekly	Attendance and class participation
%5	assignment 4	homework
%5	short 4 quizzes	Daily exams
%20	2	Midterm exam ((theoretical
%15	Includes several tasks	Laboratory reports, practical tests, and monthly practical exam
%35 %15	1 1	Final Exam ((Theoretical (Final Exam (Practical
%100	Total	

The grade is distributed out of 100 based on the tasks assigned to the student, such as daily preparation, daily, oral, monthly and written exams, reports, etc

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Electric Machinery Fundamentals ❖ Stephen j.chapman
Main references (sources)	Electrical Technology B.L.Theraja
Recommended books and references (scientific journals, reports ...)	Electrical Technology B.L.Theraja
Electronic References, Websites	Electrical Technology B.L.Theraja

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2025/7/



Course Description From

1. Course Name:	
Vibration	
2. Course Code:	
EME 313	
3. Semester / Year :	
1 st semester /third year	
4. Description Preparation Date:	
2025/7/15	
5. Available Attendance Forms	
Theory and tutorial	
6. Number of Credit House (Total) / Number of Units (Total)	
60hr 2.5 units	
7. Course administrator's name (mention all , if more than one name)	
Name: Mohammed O. Atteaa Email: Mohammedatteaa@uosamarra.edu.iq	

8. Course Objectives	
Course Objectives	Teaching students the basics of mechanical vibrations and their applications in electromechanical engineering.

9. Teaching and Learning Strategies

Strategies

1. Interactive lectures - combining theoretical foundations with practical demonstrations.
2. Case study analysis - examining real-world engineering problems to illustrate practical applications of vibrations.
3. Collaborative Problem Solving - Implement group projects where students work together to develop solutions to complex engineering scenarios.
4. Flipped Classroom Approach - Students independently study theoretical concepts before class, allowing more time for practical problem-solving during sessions.
5. Continuous Assessment - Use of periodic tests and practical assignments.

10. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	Introduction to the basic principles of mechanical vibrations.	basic principles of mechanical vibrations.	presence	
2	4	The spring element in the vibrating system and methods for calculating its equivalents in simple and complex systems.	element in the vibrating system	presence	
3	4	Mass and damping elements in a vibrating system and methods for calculating their equivalents in simple and complex systems	element in the vibrating system	presence	
4	4	Harmonic motion analysis and applications	Harmonic motion	presence	
5	4	Undamped free vibration, translational system, free body diagram, equation of motion, response	Undamped free vibration, translational system	presence	
6	4	Rotational system, free body diagram, equation of motion, response	Undamped free vibration, Rotational system	presence	
7	4	Analysis of a free-moving system using the energy equation	energy equation	presence	
8	4	Review, monthly exam	monthly exam	presence	

9	4	Damped free vibration in translational systems	Damped free vibration	presence	
10	4	Damped free vibration in rotary systems	Damped free vibration	presence	
11	4	Undamped forced vibration under the influence of an external reciprocating force or displacement	Undamped forced vibration	presence	
12	4	Damped forced vibration in translational and rotational systems: analysis and applications	Damped forced vibration	presence	
13	4	Systems with two degrees of freedom, translational and rotational	two degrees of freedom	presence	
14	4	Applications of dual-degree-of-freedom systems	two degrees of freedom	presence	
15	4	General discussions, review, and monthly exams.	monthly exams.	presence	

11. course elauation

Degree distribution

Task	degree
Attendance and class participation	2
Homework	3
Quiz	3
Lab	7
Mid exam	35
Finale exam	50
Total	100

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Mechanical vibration 5 th ed by S.S.Rao
Main references (sources)	Engineering Mechanics Dynamics by Meriam
Recommended books and references (scientific journals, reports ...)	
Electronic References, Websites	

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Course Description From

1. Course Name:	
Combustion / Third Year	
2. Course Code:	
EME 314	
3. Semester / Year:	
1 st semester /third year	
4. Description Preparation Date:	
Academic Year 2024–2025	
5. Available Attendance Forms	
Theoretical Lectures + Discussion Sessions	
6. Number of Credit House (Total) / Number of Units (Total)	
60 Hours / 2.5 Units	
7. Course administrator's name (mention all , if more than one name)	
Name: Prof. Dr. Riyadh A. Badr Email: reyadh.azawi@uosamarra.edu.iq	

8. Course Objectives	
Course Objectives	<p>Understand the concepts and types of combustion in engineering systems.</p> <p>Study the thermodynamic principles related to combustion.</p> <p>Analyze complete and incomplete combustion processes.</p> <p>Understand the design and analysis of internal combustion engines.</p> <p>Develop the ability to evaluate the environmental performance of combustion engines.</p>

9. Teaching and Learning Strategies

Strategies	<input type="checkbox"/> Theoretical explanation of combustion principles in engines. <input type="checkbox"/> Analysis of graphs and thermal operating cycles. <input type="checkbox"/> Study of thermal and combustion system components. <input type="checkbox"/> Discussions on the environmental impact of combustion and emissions. <input type="checkbox"/> Use of practical problems to understand combustion applications.
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10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4		Introduction to combustion science and its types.		
2	4		Introduction to combustion science and its types.		
3	4		Thermodynamic principles and their relation to combustion.		
4	4		Thermodynamic principles and their relation to combustion.		
5	4		Complete and incomplete combustion – theoretical analysis.		
6	4		Complete and incomplete combustion – theoretical analysis.		
7	4		Internal combustion engine components and fuel systems.		
8	4		Internal combustion engine components and fuel systems.		
9	4		Engine efficiency and environmental emissions.		
10	4		Engine efficiency and environmental emissions.		
11	4		Cooling and lubrication systems and their relation to combustion.		
12	4		Cooling and lubrication systems and their relation to combustion.		
13	4		Practical applications and case studies of combustion engines.		

14	4		Practical applications and case studies of combustion engines.		
15	4		Review and final exam.		

11. Course Evaluation	
Task	Percentage
Attendance and Participation	5%
Assignments	10%
Quizzes	
Midterm Exam	35%
Final Exam	50%
Total	100%

12. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	Internal Combustion Engine Fundamentals by John B. Heywood Introduction to Internal Combustion Engines by Richard Stone
Main references (sources)	Peer-reviewed scientific sources in energy and combustion Academic lectures from international universities
Recommended books and references (scientific journals, reports ...)	
Electronic References, Websites	Academic websites such as ScienceDirect and SpringerLink Journals specialized in engine and combustion technologies

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Course Description From

1. Course Name:	
Fluid Machinery	
2. Course Code:	
EME 315	
3. Semester / Year : 1st semester /third year	
4. Description Preparation Date: September	
5. Available Attendance Forms Theoretical	
6. Number of Credit House (Total) / Number of Units (Total):	
45hr 2unit	
7. Course administrator's name (mention all , if more than one name)	
Name: Dr. Shaymaa Husham	
Email: shaymaa.h.ab@uosamarra.edu.iq	

8. Course Objectives	
Course Objectives	<ol style="list-style-type: none"> 1. Apply the laws of similarity in fluid machinery and interpret related performance outcomes. 2. Analyze water flow behavior within impulse turbines. 3. 4. Identify the functions of reaction turbine components, analyze flow according to turbine types, and calculate performance. 5. 6. Study cavitation phenomena in reaction turbines and propose appropriate prevention methods.

	<p>7. Describe the components of centrifugal pumps and analyze the internal flow characteristics.</p> <p>8. Detect cavitation in pumps, identify its causes, and recommend methods to avoid it.</p> <p>9.</p> <p>10. Evaluate the performance of gas turbines and analyze gas flow through turbine blades.</p> <p>11. Analyze gas flow in centrifugal compressors and calculate their efficiency.</p>
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9. Teaching and Learning Strategies

Strategies	<ul style="list-style-type: none"> • Delivery of lectures • Presentation of educational videos • Encouraging students to engage in self-learning through textbooks, references, and online resources • Classroom discussions and Q&A sessions • Use of visual aids during lectures • Assignment of homework and problem sets • Practical application through laboratory experiments
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10. Course Structure

Week	Evaluation	Method	Learning Outcome	Topic	Week
1	Instant questions, homework, short/oral/monthly exams	Lecture	Predict performance of real machines using lab models based on similarity laws	Similarity Laws in Turbines and Pumps	1
2	Instant questions, homework, short/oral/monthly exams	Lecture	Understand the working principle of impulse turbines	Impulse Turbine (Pelton)	2
3	Instant questions, homework, short/oral/monthly exams	Lecture	Understand and distinguish types of efficiencies in impulse turbines and	Efficiencies in Impulse Turbines	3

			their relationships		
4	Instant questions, homework, short/oral/monthly exams	Lecture	Identify components of reaction turbines and understand their types	Reaction Turbines – Types and Components	4
5	Instant questions, homework, short/oral/monthly exams	Lecture	Analyze water flow in radial flow reaction turbines	Radial Flow Reaction Turbines (Francis)	5
6	Instant questions, homework, short/oral/monthly exams	Lecture	Understand flow through axial turbines and pressure changes across components	Axial Flow Reaction Turbines	6
7	Instant questions, homework, short/oral/monthly exams	Lecture	Understand losses and calculate flow rate in different types of reaction turbines	Efficiencies and Flow in Reaction Turbines	7
8	Instant questions, homework, short/oral/monthly exams	Lecture	Understand cavitation causes and suggest preventive measures	Cavitation in Reaction Turbines	8
9	Instant questions, homework, short/oral/monthly exams	Lecture	Calculate the work done by the pump and the discharge in centrifugal pumps	Work and Flow Rate in Pumps	9
10	Instant questions, homework, short/oral/monthly exams	Lecture	Understand how pressure increases through pump stages and identify internal components	Pressure and Components in Pumps	10
11	Instant questions, homework, short/oral/monthly exams	Lecture	Identify different types of losses and efficiencies in pumps	Losses and Efficiencies in Pumps	11
12	Instant questions, homework, short/oral/monthly exams	Lecture	Understand causes of cavitation and	Cavitation in Pumps	12

			methods to prevent it		
13	Instant questions, homework, short/oral/monthly exams	Lecture	Analyze how changing pump diameter or speed affects performance parameters	Effects of Diameter and Speed on Pumps	13

11. Course Evaluation

- Participation & Attendance – 2%
- Homework & Quizzes – 3%
 - Test one – 15%
 - Test two – 15%
 - Final Exam – 60%
- Presentations / Projects – 5%

Total: 100%

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	A text book of hydraulic machines, R. S. Khurmi
Main references (sources)	Turbomachinery Design and Theory, Rama S. R Gorla & Aijaz A. Khan. Thermal and Hydraulic machines, R. K. Singal & Rishi Singal
Recommended books and references (scientific journals, reports ...)	
Electronic References, Websites	https://www.youtube.com/channel/UC_ig2ffbXLnG4-U2rg4_0sA

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2025/7/



Course Description From

1. Course Name
: Communications I
2. Course Code:
EME 316
3. Semester / Year :
1 st semester /third year
4. Description Preparation Date:
2024/2025
5. Available Attendance Forms
Lecture + Theoretical Discussions + Laboratory
6. Number of Credit House (Total) / Number of Units (Total):
75 hours / 3 units
7. Course administrator's name (mention all , if more than one name)
Name: Name: Asst. Lecturer Eman Adel Mahmood Email: eman.a.m@uosamarra.edu.iq

8. Course Objectives	
Course Objectives	<ol style="list-style-type: none"> 1. of communication engineering systems, including the communication model and its components. 2. Develop a comprehensive understanding of signal analysis techniques, including the use of Fourier series and Fourier transforms, to effectively classify and interpret both periodic and non-periodic signals. 3. Acquire in-depth knowledge of modulation techniques such as amplitude modulation (AM), frequency modulation (FM), and phase modulation (PM), including the design, operation, and performance analysis of transmitters and receivers. 4. Analyze and classify systems based on their characteristics using concepts such as power spectral density and correlations to assess the performance and efficiency of various communication systems. 5. Strengthen theoretical knowledge through practical implementation of scientific experiments.

9. Teaching and Learning Strategies

Strategies	<p>Theoretical Component:</p> <ul style="list-style-type: none"> - Interactive lectures with multimedia presentations. - Guided brainstorming sessions to link theoretical concepts to practical applications. - Flipped classroom: Assign students to watch educational videos before class, followed by discussion and clarification. - Group discussions and mini-projects, dividing students into teams. <p>Practical Component:</p> <ul style="list-style-type: none"> - Hands-on experiments and practical applications using laboratory equipment and software (e.g., MATLAB) for communication systems analysis and design. - Student performance evaluated through lab reports and short quizzes after each topic. - Mini-projects to assess comprehension of applied concepts.
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10. Course Structure

Assessment	Teaching Method	Learning Outcomes	Topic	Learning Hours (Theory + Lab)	Week
Lab report + Practical quiz	Interactive lectures, practical lab, video presentations	Explain basic communication system concepts and proper use of lab equipment.	Introduction to Communication Systems: Definition, Engineering Model, and System Elements	3 + 2	1
Assignment + Lab report	Lectures, solved examples, lab experiments	Classify signals and apply Fourier transforms practically.	Signal Classification (Periodic & Non-Periodic), Fourier Series & Transforms	3 + 2	2
Lab report + Theoretical quiz	Group activity, lab experiments	Analyze systems and compute PSD using MATLAB, link results to theory.	System Classification, Power Spectral Density & Correlations	3 + 2	3
Lab report + Practical quiz	Lectures, lab experiments	Explain AM concepts and apply practically.	Amplitude Modulation (AM) – DSB: Modulation and Demodulation	3 + 2	4
Lab report + Assignment	Lectures, solved	Apply and analyze AM applications.	Continuation of AM: DSB-SC,	3 + 2	5

	examples, lab work		SSB, VSB Applications		
Midterm assessment	Written exam, lab performance	Evaluate theoretical knowledge and practical skills from previous topics.	First Midterm Exam (Theory & Practical)	3 + 2	6
Lab report + Practical quiz	Interactive lectures, lab experiments	Compare AM and FM both theoretically and practically.	Frequency Modulation (FM) – Basic Concepts: Modulation and Demodulation	3 + 2	7
Lab performance + Lab report	Group discussion, lab work	Evaluate acquired practical skills and review theory.	Review of AM & FM, Practical and Theoretical Evaluation	3 + 2	8
Lab report + Theoretical quiz	Lectures, lab experiments	Design and test FM transmitter and receiver systems.	Type FM, Power & Bandwidth of FM	3 + 2	9
Assignment + Practical evaluation	Lectures, lab experiments	Apply PM concepts practically and link with theory.	Phase Modulation (PM), Power & Bandwidth of PM	3 + 2	10
Mini-project evaluation + Lab report	Project-based learning	Implement practical projects and document results.	Mini Projects (AM/FM/PM Modulation Techniques)	3 + 2	11
Practical evaluation + Assignment	Group work, lab discussion	Solve advanced problems and connect theory with practice.	Advanced Problem Solving and General Review	3 + 2	12
Midterm assessment	Written exam, lab work	Evaluate understanding of updated theoretical knowledge.	Second Midterm Exam (Theory & Practical)	3 + 2	13
Final practical assessment	Oral presentations, lab work	Comprehensive evaluation of theoretical knowledge and practical skills.	Final Project Presentations and Practical Assessment	3 + 2	14
Final assessment	Written exam, lab performance	Comprehensive course evaluation.	Final Exam (Theory + Practical)	3 + 2	15
Assessment	Teaching Method	Learning Outcomes	Topic	Learning Hours (Theory + Lab)	Week

11. Course Evaluation

Attendance & Class Participation: 5%
Assignments (4 total): 5%
Short Quizzes (4 total): 5%
Midterm Exam (Theory): 20%
Lab Reports, Practical Quizzes, Monthly Lab Exams: 15%
Final Exam (Theory): 35%
Final Exam (Practical): 15%
Total: 100%

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	- Communication Systems – Carlson & Crilly
Main references (sources)	Introduction to Communication Systems – F.G. Stremter - Communication Systems – A. Bruce Carlson
Recommended books and references (scientific journals, reports ...)	-
Electronic References, Websites	1- https://pdfcoffee.com/principles-of-communication-systems-by-herbert-taub-amp-donald-schilling-pdf-2-pdf-free.html 2- https://pdfcoffee.com/communication-system-bruce-carlson-4ed-pdf-free.html

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2025/7/



Course Description From

1. Course Name:	
Engineering Analysis	
2. Course Code:	
EME 317	
3. Semester / Year :	
1 st semester /third year	
4. Description Preparation Date:	
2025/2024	
5. Available Attendance Forms	
Theoretical lectures + discussion lectures	
6. Number of Credit House (Total) / Number of Units (Total)	
45 hours / 2 units	
7. Course administrator's name (mention all , if more than one name)	
Name:Prof.Dr.Muhammad Asmail Eleiwi Email:dr.muhammad@uosamarra.edu.iq	

8. Course Objectives	
Course Objectives	<ul style="list-style-type: none"> 1 -Understanding complex functions and their solution methods 2 -The student learns the types of differential equations: ordinary and partial. 3 -Solving problems related to electromechanical engineering applications using ordinary and partial differential equations. 4 -Describe and understand the Laplace transform and its use in solving differential equations. 5 -Describe and understand Fourier series. 6 -The student learns to choose the optimal method for solving problems in electromechanical engineering .

9. Teaching and Learning Strategies

Strategies	<p>The teaching and learning strategy aims to: Introducing engineering analysis concepts through the theoretical aspect supported by practical examples implemented by students</p> <p>This is carefully delivered through: 1 .Lectures that include question-and-answer sessions. 2 .Presentation of pre-recorded and pre-prepared content. 3 .Sessions devoted to problem-solving. 4 .Practical lessons and classroom exercises</p>
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10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or Subject Name	Learning Method	Evaluation Method
1	3	Definition of complex functions	Complex functions	Lecture and discussion	Instant questions, homework, quizzes, and monthly exams
2	3	Student's knowledge of continuity and derivatives of complex functions	Continuity and derivatives of complex functions	Lecture and discussion	Instant questions, homework, quizzes, and monthly exams
3	3	Understanding Cauchy's theorem and its applications	Cauchy's theorem	Lecture and discussion	Instant questions, homework, quizzes, and monthly exams
4	3	Identifying types of complex functions (exponential, hyperbolic, logarithmic)	Complex functions (exponential, hyperbolic, logarithmic)	Lecture and discussion	Instant questions, homework, quizzes, and monthly exams
5	3	Student's knowledge of integration of complex functions	Integration of complex functions	Lecture and discussion	Instant questions, homework, quizzes, and monthly exams
6	3	Student's knowledge of Gamma and Beta functions and their applications	Gamma and Beta functions	Lecture and discussion	Instant questions, homework, quizzes, and monthly exams
7	3	Definition of Laplace transform	Laplace transform	Lecture and discussion	Instant questions, homework, quizzes, and monthly exams
8	3	Student's knowledge of solving differential equations using Laplace transform	Solving differential equations using Laplace transform	Lecture and discussion	Instant questions, homework, quizzes, and monthly exams

9	3	Definition of Fourier series	Fourier series	Lecture and discussion	Instant questions, homework, quizzes, and monthly exams
10	3	Student's knowledge of even and odd Fourier series and half-range series	Even and odd Fourier series and half-range series	Lecture and discussion	Instant questions, homework, quizzes, and monthly exams
11	3	Student's knowledge of determining the half-range of Fourier series	Determining the half-range of Fourier series	Lecture and discussion	Instant questions, homework, quizzes, and monthly exams
12	3	Introduction to complex Fourier series and their applications	Complex Fourier series	Lecture and discussion	Instant questions, homework, quizzes, and monthly exams
13	3	Solving differential equations using separation of variables	Solving differential equations using separation of variables	Lecture and discussion	Instant questions, homework, quizzes, and monthly exams
14	3	Understanding the solution of wave and heat equations in one and two dimensions	Solution of wave and heat equations in one and two dimensions	Lecture and discussion	Instant questions, homework, quizzes, and monthly exams
15	3	Understanding the solution of wave and heat equations in one and two dimensions	Solution of wave and heat equations in one and two dimensions	Lecture and discussion	Instant questions, homework, quizzes, and monthly exams

11. Course Evaluation

The grade is distributed out of 100 based on the tasks assigned to the student, such as daily preparation, quizzes, oral, monthly and written exams, reports, etc.

Task	Count	Percentage (%)
Attendance and class participation	----	5
Assignments	----	----
Daily quizzes	2	10
Midterm exam	2	25
Final exam	1	60
Total		100

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Advanced Engineering Analysis C. Ray Wylie
Main references (sources)	Number theory and discrete mathematics / A.K. Agarwal ... [et al.].
Recommended books and references (scientific journals, reports ...)	Advanced Engineering Mathematics, Kreyszig Kreyszig, 10th Edition, John Wiley & Sons, Inc
Electronic References, Websites	https://www.thriftbooks.com/w/advanced-engineering-mathematics_clarence-raymond-wylie/327947/#edition=3546946&idq=4215961

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2025/7/



Course Description From

1. Course Name:
Power Systems
2. Course Code
EME 318
3. Semester / Year
1 st semester /third year
4. Description Preparation Date:
2024/2025
5. Available Attendance Forms
: Lecture + Theoretical Discussions
6. Number of Credit House (Total) / Number of Units (Total):
45 hours / 2 units
7. Course administrator's name (mention all , if more than one name)
Name: Name: Asst. Lecturer Eman Adel Mahmood Email: eman.a.m@uosamarra.edu.iq

8. Course Objectives	
Course Objectives	<ul style="list-style-type: none"> • To describe the structure and components of electric power systems, including generating stations, transmission lines, and distribution networks. • To explain different sources of electrical energy and the operation of various types of power plants, covering AC and DC transmission systems in single- and three-phase configurations. • To analyze electrical load curves and power factor in generating stations and evaluate their impact on system performance. • To understand the design and operation of overhead transmission lines and underground cables, including key engineering considerations. • To identify the function of electrical insulators and the corona effect, assess their impact on system reliability, and apply methods to mitigate their effects.

9. Teaching and Learning Strategies

Strategies	<ul style="list-style-type: none"> - Interactive lectures with multimedia presentations. - Guided brainstorming sessions to link theoretical concepts to practical applications. - Flipped classroom: Assign students to watch educational videos before class, followed by discussion and clarification. - Group discussions and mini-projects, dividing students into teams.
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10. Course Structure

Week	Learning Hours (Theory + Lab)	Topic	Learning Outcomes	Teaching Method	Assessment
1	3	Identify the structure and basic components of the electrical power system	Structures of Electric Power System: Generation stations, transmission lines, distribution systems	Interactive lectures + practical examples	Assignment 1
2	3	Understand basic energy sources and operation of various generation plants	Sources of Electrical Energy (Part 1): Hydropower, gas turbines, steam turbines	Lectures + problem-solving	Assignment 2
3	3	Describe modern and renewable energy systems	Sources of Electrical Energy (Part 2): Nuclear energy, renewable energy (solar, wind)	Lectures + exercises	Quiz 1
4	3	Analyze AC & DC transmission types and understand their applications	AC & DC Transmission: Single-phase and three-phase transmission	Interactive lectures + practical examples	Assignment 3 + Quiz 2
5	-	Evaluate knowledge acquired in previous topics	First Midterm Exam (Theoretical)	Written Exam	Monthly Exam
6	3	Analyze the history and development of the electrical grid	Load Curves	Lectures + discussions + multimedia presentations	Quiz 3

7	3	Draw and analyze load curves and improve power factor	Power Factor	Interactive lectures + applied exercises	Assignment 4
8	3	Understand overhead transmission line designs and safety considerations	Overhead Transmission Lines	Interactive lectures	Quiz 4
9	3	Describe and design underground cables and their applications	Underground Cables	Lectures + applied exercises	Mini-Project 1
10	3	Evaluate knowledge acquired in recent topics	Second Midterm Exam	Written Exam	Monthly Exam
11	3	Analyze transmission line parameters (L, C, R) and their potential effects	Parameters of Transmission Lines—L, C, R Elements	Group projects + lectures + applied exercises	Preliminary Presentation
12	3	Understand insulator design and corona effect mitigation	Insulators and Corona	Group discussion sessions	Mini-Project 2
13	3	Develop teamwork and apply course concepts in practical projects	Mini Projects (Group Work): Applications in electrical power systems	Group discussion sessions	Final Presentation + Evaluation
14	3	Discuss and analyze mini-project results, propose practical solutions	Group Discussion	Group discussion	Project Discussion and Evaluation
15	-	Final comprehensive evaluation	Final Exam	Written Exam	Final Exam

11. Course Evaluation

Attendance and class participation	Weekly	5%
Assignments	4 assignments	5%
Quizzes	4 short quizzes	5%

Midterm Exams (Theoretical)	2 exams	25%
Final Exam	1 comprehensive exam	60%
Total		100%

12. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	Element of Power System Analysis by W. Stevenson
Main references (sources)	Element of Power System Analysis by W. Stevenson Principles of Power System by Mehta
Recommended books and references (scientific journals, reports ...)	-
Electronic References, Websites	

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 2025/7/



Third year / Second semester

Course Description From

1. Course Name:
Heat transfer II
2. Course Code:
EME 321
3. Semester / Year :
2 nd semester /third year
4. Description Preparation Date:
2024 - 2025
5. Available Attendance Forms
Theoretical lectures + discussion lectures
6. Number of Credit House (Total) / Number of Units (Total)
hours 60 2.5 units
7. Course administrator's name (mention all , if more than one name)
Name: Zainab Abdulmaged Khalaf Email: Zainab.abd@uosamarra.edu.iq

8. Course Objectives	
Course Objectives	<p>The objective of the Heat Transfer course is to help engineering students' study and learn the principles of heat transfer media and their applications in various heat transfer situations. Upon completion of this course, the student will be able to:</p> <ol style="list-style-type: none">1 .Understand the principles of conductive, convective, and radiation heat transfer2 .Apply the above heat transfer principles to solve practical engineering problems3 .Integrate knowledge of mass, momentum, heat transfer, and thermodynamics4 .Apply the above integrated knowledge to solve practical engineering problems5 .Apply the fundamentals of heat transfer to engineering design

9. Teaching and Learning Strategies

Strategies	<p>1. During the course, the student will gain an understanding of heat transfer methods and the basic principles of heat transfer.</p> <p>2. Learn and understand the convection heat transfer coefficient, the thermal conductivity of materials, and how to calculate thermal resistances.</p> <p>3. Learn and understand the mechanisms of heat transfer and the advantages of each method.</p> <p>4. Learn and understand the properties of radiation heat transfer and shape factor calculations.</p> <p>5. Learn about the scientific and engineering applications of heat transfer.</p> <p>6. Familiarize themselves with the classifications and types of heat transfer.</p> <p>7. Familiarize themselves with the various methods for calculating the convection heat transfer coefficient, shape factor, and thermal conductivity of materials.</p> <p>8. Familiarize themselves with the properties of thermal resistances.</p> <p>9. Familiarize themselves with the practical applications of heat transfer.</p>
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10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	The instructor explains basic concepts such as heat conduction, convection heat transfer, and thermal radiation.	Introduction -General concepts and definitions -Heat conduction -Convective heat transfer - Thermal radiation	lecture + brainstorming + application and innovation	Daily exams + monthly exam
2	4	Introduction to conduction heat transfer (general equation) - General heat conduction equation	Conduction heat transfer (general equation)	lecture + brainstorming + application and innovation	Daily exams + monthly exam
3	4		- General heat conduction equation - One-dimensional, steady state, conduction through plane wall	lecture + brainstorming + application and innovation	Daily exams + monthly exam

4	4	Introduction to conduction heat transfer (1-D, steady state - wall - spherical cylinder)	Conduction heat transfer (1-D, steady State) -Composed wall	lecture + brainstorming + application and innovation	Daily exams + monthly exam
5	4		-Cylinder, composed cylinder - Sphere, composed sphere	lecture + brainstorming + application and innovation	Daily exams + monthly exam
6	4	Introduction to hollow cylinder - spherical body - Critical thickness of insulation	Hollow cylinder - Sphere	lecture + brainstorming + application and innovation	Daily exams + monthly exam
7	4		- Critical thickness of insulation	lecture + brainstorming + application and innovation	Daily exams + monthly exam
8	4	Introduction to heat transfer through extended surfaces (fins) - General equation for temperature distribution - Very long fin - Short fin	Heat transfer through extended surfaces (fins) - General equation for temperature distribution	lecture + brainstorming + application and innovation	Daily exams + monthly exam
9	4		- Very long fin - Short fin	lecture + brainstorming + application and innovation	Daily exams + monthly exam
10	4	Introduction to contact thermal layer	- Thermal contact resistance	lecture + brainstorming + application and innovation	Daily exams + monthly exam
11	4	Introduction to conduction heat transfer with time and its systems	Unsteady state conduction - Lumped heat capacity system	lecture + brainstorming + application and innovation	Daily exams + monthly exam
12	4		- Transient heat flow in semi-infinite solid	lecture + brainstorming + application and innovation	Daily exams + monthly exam
13	4	How to use Heisler charts and how to find temperatures with time	- Convection boundary condition (Heisler charts)	lecture + brainstorming + application and innovation	Daily exams + monthly exam

14	4		- Convection boundary condition (Heisler charts)	lecture + brainstorming + application and innovation	Daily exams + monthly exam
15	4		Final exam		

11. Course Evaluation

Tasks	Number	Percentage %
Attendance and Class Participation	10	%10
Homework	10	%10
Daily Exams	10	%10
Midterm Exam	20	%20
Final Exam	50	%50
Overall		100

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Heat Transfer, by J. P. Holman, 10th Edition, McGraw-Hill, 2010
Main references (sources)	College library to obtain additional resources for the .curriculum
Recommended books and references (scientific journals, reports ...)	1.Heat Transfer: A Practical Approach by Y.A. Cengel, McGraw-Hill, 3rd Ed., 2007. 2.Fundamentals of Heat and Mass Transfer by F.P. Incropera, D. P. Dewitt, T.L. Bergman, and A.S. Lavine, John Wiley, 6th Ed., 2007.
Electronic References, Websites	3.Heat Transfer-Professional Version by L. C. Thomas, Capstone PC, 2nd Ed., 1999. 4.Heat Transfer: A Practical Approach, by Yunus A. Cengel. 2nd Edition, McGraw-Hill, 2002 https://www.youtube.com/@AlMohandesAcademy

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2025/7/



Course Description From

1. Course Name:	
Electrical Machines (AC)	
Course Code:	
EME 322	
3. Semester / Year :	
2 nd semester /third year	
4. Description Preparation Date:	
2026/2025	
5. Available Attendance Forms	
Theoretical lectures + discussion lectures + laboratory	
6. Number of Credit House (Total) / Number of Units (Total)	
60 hours 2.5 units	
7. Course administrator's name (mention all , if more than one name)	
Name: Yahya Tareq Hussein	
Email: yahya.t.hussein@uosamarra.edu.iq	

8. Course Objectives	
Course Objectives	<ol style="list-style-type: none"> 1. Understand the basic operating principle of electrical machines (IM(2. Distinguish between three-phase and single-phase AC electrical machines Performance analysis and design 3. Identify operating and control methods (IM(4. 4. Practical and industrial applications (IM(5. 5. Ability to maintain and diagnose (IM(6. 6. Support renewable energy projects 7. Synchronous Generator 8. A, Mechanical and electrical construction and structure <ul style="list-style-type: none"> • Operating principle • Internal voltage equation

	<ul style="list-style-type: none"> • Equivalent circuit diagrams • Characteristic curves (O.C.C & S.C.C) • Voltage regulation and control <p>9. Parallelization of synchronous generators</p>
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9. Teaching and Learning Strategies

<p>Strategies</p> <p>General Goals of the Strategy</p>	<p>1:Theoretical Aspect .</p> <ul style="list-style-type: none"> <input type="checkbox"/> Interactive lectures and interactive visual presentations using multiple educational media <input type="checkbox"/> Guided brainstorming - to connect theoretical concepts to daily life <input type="checkbox"/> Flipped learning approach - students are assigned to watch an educational video before the lecture, then discuss and clarify questions .during the lecture <input type="checkbox"/> Group discussion and mini-projects - dividing students into groups <p>2:Practical Aspect .</p> <ul style="list-style-type: none"> <input type="checkbox"/> Laboratory experiments - practical application of the theoretical aspect using laboratory equipment for AC machines <input type="checkbox"/> Evaluating student performance in the laboratory through practical reports and short tests after each topic <input type="checkbox"/> Mini-projects to measure understanding of applied concepts <input type="checkbox"/> Conducting live laboratory experiments on an engine <p> Summary Table: Strategy Overview</p> <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left; border-bottom: 1px solid black;">Component</th> <th style="text-align: left; border-bottom: 1px solid black;">DC Machines</th> <th style="text-align: left; border-bottom: 1px solid black;">AC Machines</th> </tr> </thead> <tbody> <tr> <td style="border-bottom: 1px solid black;">Theoretical Learning</td> <td style="border-bottom: 1px solid black;">EMF, torque, speed control, types</td> <td style="border-bottom: 1px solid black;">Rotating field, slip, sync vs async</td> </tr> <tr> <td style="border-bottom: 1px solid black;">Lab Work</td> <td style="border-bottom: 1px solid black;">Voltage control, load test, commutation</td> <td style="border-bottom: 1px solid black;">Star-delta start, VFD use, alternator test</td> </tr> <tr> <td style="border-bottom: 1px solid black;">Simulation</td> <td style="border-bottom: 1px solid black;">DC drive modeling, PWM control</td> <td style="border-bottom: 1px solid black;">3-phase motor simulation, power factor analysis</td> </tr> <tr> <td style="border-bottom: 1px solid black;">Applications</td> <td style="border-bottom: 1px solid black;">Robotics, traction systems</td> <td style="border-bottom: 1px solid black;">HVAC, pumps, generators</td> </tr> <tr> <td style="border-bottom: 1px solid black;">Control Focus</td> <td style="border-bottom: 1px solid black;">Precise speed and torque control</td> <td style="border-bottom: 1px solid black;">Efficient operation and automation</td> </tr> </tbody> </table>	Component	DC Machines	AC Machines	Theoretical Learning	EMF, torque, speed control, types	Rotating field, slip, sync vs async	Lab Work	Voltage control, load test, commutation	Star-delta start, VFD use, alternator test	Simulation	DC drive modeling, PWM control	3-phase motor simulation, power factor analysis	Applications	Robotics, traction systems	HVAC, pumps, generators	Control Focus	Precise speed and torque control	Efficient operation and automation
Component	DC Machines	AC Machines																	
Theoretical Learning	EMF, torque, speed control, types	Rotating field, slip, sync vs async																	
Lab Work	Voltage control, load test, commutation	Star-delta start, VFD use, alternator test																	
Simulation	DC drive modeling, PWM control	3-phase motor simulation, power factor analysis																	
Applications	Robotics, traction systems	HVAC, pumps, generators																	
Control Focus	Precise speed and torque control	Efficient operation and automation																	

10. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	3 theoretical + 1 practical	Know the basic components Build a strong understanding of the physical principles of AC machines	Distinguish between the characteristics and behavior of (1 phase and 3 phase / AC) machines	Interactive lectures + practical lab + video presentation	
2	3 theoretical + 1 practical	Understand the basic working principle of electrical machines	<ul style="list-style-type: none"> •Know how AC motors and generators work. •Understand the relationship between magnetic fields and electromotive force (EMF.) 	Lectures + solved examples + practical lab	Homework + Lab Report
3	3 theoretical + 1 practical	Distinguish between types of AC electrical machines	Induction Motors: The most common in industry. <ul style="list-style-type: none"> •Synchronous Motors. •Alternators. •Understand the advantages and disadvantages of each type and its applications 	Lectures + Group Activities + Practical Lab	Homework + Lab Report
4	3 theoretical + 1 practical	Induction Motor IM Equivalent Circuit	Basic design of induction motor with specifications for this type 3 phase and single phase	Lectures +solved examples + laboratory experiments	Practical quiz + lab report
5	3 theoretical + 1 practical	Performance analysis and design .	<ul style="list-style-type: none"> •Study the electrical and mechanical properties of machines. •Use performance analysis equations such as: <ul style="list-style-type: none"> o Torque equation 	Lectures + solved examples + practical lab	Homework + Lab Report + Theory Test
6	3 theoretical + 1 practical	Evaluation of theoretical knowledge from previous chapters	Theoretical exam (1(	Practical lab	First monthly exam (theoretical(
7	3 theoretical + 1 practical	Performance Analysis and Design	Speed-torque curves Machine efficiency <ul style="list-style-type: none"> •Understanding the effects of impedance and slip in induction motors 	Interactive lectures + solving examples + practical lab	Practical quiz + lab report

8	3 theoretical + 1 practical	Assessment of acquired practical skills	Monthly exam (practical lab)	group discussion	Monthly exam (practical lab) + theoretical exam
9	3 theoretical + 1 practical	Learn about operating and control methods	<ul style="list-style-type: none"> •Motor starting methods (Star-Delta, Soft Starter, VFD.) •Speed and torque control 	Lectures + solved examples + practical lab	Lab report + practical assessment + homework
10	3 theoretical + 1 practical	Practical and industrial applications	<ul style="list-style-type: none"> •Operating engines in: <ul style="list-style-type: none"> o Factories o Power plants o Refrigeration and air conditioning systems o Elevators and cranes 	Lectures + solved examples + practical lab	Laboratory report + theoretical quiz
11	3 theoretical + 1 practical	Ability to maintain and diagnose	<ul style="list-style-type: none"> •Analyze common machine faults. •Inspect components such as: <ul style="list-style-type: none"> o Operating coils o Rotor o Insulation 	Lectures + Applied Projects + Practical Lab	Homework + Practical Assessment + Lab Reports
12	3 theoretical + 1 practical	synchronous generators	<p>Generator Specifications Method of Connecting Generators in Parallel with a Bass Bar Synchronous Generator</p> <ul style="list-style-type: none"> •Mechanical and Electrical Structure and Construction •Operating Principle Internal Voltage Equation •Equivalent Circuit Diagrams 	Group problem solving + laboratory discussion	Practical evaluation + reports
13	3 theoretical + 1 practical	Assessment of theoretical knowledge for modern classes	Second monthly exam (theoretical)		Discussing micro-projects and evaluating performance
14	3 theoretical + 1 practical	Comprehensive assessment of theoretical knowledge and applied skills	Discussion of micro-projects and performance evaluation + practical exam covering all experiences		Practical exam covering all experiments
15	3 theoretical + 1 practical		Final Exam (Theoretical + Practical)		

11. Course Evaluation

The grade is distributed out of 100 based on the tasks assigned to the student, such as daily preparation, daily, oral, monthly and written exams, reports, etc.

%ratio	number	Tasks
%5	Continuous weekly	Attendance and class participation
%5	assignment 4	homework
%5	short 4 quizzes	Daily exams
%20	2	Midterm exam ((theoretical
%15	Includes several tasks	Laboratory reports, practical tests, and monthly practical exam
%35 %15	1 1	Final Exam ((Theoretical (Final Exam (Practical
%100		Total

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Electric Machinery Fundamentals ❖ Stephen j.chapman
Main references (sources)	Electrical Technology B.LTheraja
Recommended books and references (scientific journals, reports ...)	Electrical Technology B.LTheraja
Electronic References, Websites	Electrical Technology B.LTheraja

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2025/7/



Course Description From

1. Course Name:	
Air Conditioning / Third Year	
2. Course Code:	
EME 323	
3. Semester / Year :	
2 nd semester /third year	
4. Description Preparation Date:	
2025/2024	
5. Available Attendance Forms	
Theoretical Lectures + Discussion Lecture	
6. Number of Credit House (Total) / Number of Units (Total)	
45 hours / 2 units	
7. Course administrator's name (mention all , if more than one name)	
Name: Lecturer: Omar Mohammed Ahmed Email: omar.alzayat@uosamarra.edu.iq	

8. Course Objectives	
Course Objectives	<ol style="list-style-type: none">1. Understand the fundamental principles of air conditioning.2. Identify concepts of humidity and air mixing.3. Calculate heating and cooling loads.4. Analyze thermal comfort systems.5. Design air ducts and air distribution.6. Determine pressure drop and fan selection.7. Apply theoretical knowledge in the lab using measurement tools.8. Analyze real-life systems in buildings.

9. Teaching and Learning Strategies

Strategies	<ul style="list-style-type: none"> · Interactive lectures with presentations. · Small projects for load calculations. · In-class discussions and problem-solving exercises. · Field visits if possible. · Continuous assessment – using periodic quizzes, practical assignments, and mini-projects to monitor understanding and provide immediate feedback.
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10. Course Structure

Week	Hours	Unit or subject name	Required Learning Outcomes	Learning method	Evaluation method
1	3	Understand air and humidity properties	Introduction to Air Conditioning	Lecture	Class participation
2	3	Understand psychrometric processes	Psychrometric Processes	Lecture + Exercises	Homework
3	3	Calculate cooling load components	Cooling Load Calculation (Part 1)	Lecture + Exercises	Quiz
4	3	Analyze internal and external heat gains	Cooling Load Calculation (Part 2)	Lecture + Exercises	Exercise
5	3	Use tools to estimate load and apply simple design	Cooling Load Calculation (Part 3)	Lecture + Exercises	Test
6	3	Identify thermal comfort requirements	Comfort Air Conditioning	Lecture	Homework
7	3	Sketch and define duct dimensions	Duct Design	Lecture + Lab	Practical test
8	3	Analyze pressure drop and fan selection	Pressure Drop and Fan Selection	Lecture + Exercises	Homework
9	3	Evaluate energy consumption and design impact	System Efficiency	Lecture + Review	Oral Evaluation
10	3	Evaluate real-life AC designs	Design Case Study	Workshop + Presentation	Group Evaluation
11	3	Review and solve key problems	General Review	Lecture	Discussion
12	3	Final examination	Final Exam	Exam	Final Exam

11. Course Evaluation

Tasks	Points Percentage (%)
Attendance and class participation	10%
Assignments	10%
Quizzes	10%
Midterm Exam	20%
Final Exam	50%
Total	100%

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Air Conditioning Principles and Systems, Edward Gupta .
Main references (sources)	Modern Refrigeration and Air Conditioning, Althouse
Recommended books and references (scientific journals, reports ...)	
Electronic References, Websites	www.ashrae.org , www.engineeringtoolbox.co

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2025/7/



Course Description From

1. Course Name:
Measurements and Devices
2. Course Code:
EME324
3. Semester / Year :
2 nd semester /third year
4. Description Preparation Date:
2024/2025
5. Available Attendance Forms
Theoretical
6. Number of Credit House (Total) / Number of Units (Total)
30 hours / 2 units
7. Course administrator's name (mention all , if more than one name)
Name: Asst. Lecturer Sayf Waleed Majeed Email: sayfwaleed@uosamarra.edu.iq

8. Course Objectives	
Course Objectives <ul style="list-style-type: none"> • Identify types of electrical measuring instruments. • Understand the physical principles behind measurement devices. • Apply instruments to measure various electrical quantities. • Analyze experimental data and calculate error percentages. 	<p>This course aims to provide students with essential concepts in electrical measuring instruments, focusing on types of instruments, their operating principles, and their use in engineering applications. It also seeks to develop students' skills in performing and interpreting electrical measurements accurately and analyzing associated errors.</p>

9. Teaching and Learning Strategies

Strategies	<ol style="list-style-type: none"> 1. Interactive lectures to explain theoretical principles. 2. Practical lab experiments using different measuring instruments. 3. Problem-solving and exercises to apply theoretical knowledge. 4. Group learning through discussions and evaluations of experimental results. 5. Use of multimedia (instructional videos, slides) to aid understanding. 6. Small projects involving electrical variable measurement and analysis. 7. Individual assignments including lab reports and research tasks. 8. Self-learning through manuals and online technical courses. 9. Ongoing formative assessment through short quizzes and feedback. 10. Use of software such as Multisim for simulating measurement devices.
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10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	Understand the importance of electrical measurements	Introduction to Measuring Instruments	Interactive Lecture	Short oral questions
2	2	Distinguish between various measurement units	Units and Measurement Systems	Group explanation	Exercise
3	2	Learn the components and operation of analog instruments	Analog Measuring Instruments	Lecture + illustrations	Short quiz
4	2	Recognize advantages and differences	Digital Measuring Instruments	Group work	Practical exercise
5	2	Apply instruments in electrical circuits	Current and Voltage Measurement	Lab experiment	Lab report
6	2	Use various types of ohmmeters	Resistance Measurement	Lecture + experiment	Lab report
7	2	Summarize previous concepts	Midterm Review	Group discussion	Review
8	2	Assess knowledge level	Midterm Exam	Written exam	Exam
9	2	Measure real and reactive power	Power and Energy Measurement	Lecture + experiment	Lab report
10	2	Understand internal operation mechanisms	Instrument Operating Principles	Video analysis	Analytical questions
11	2	Safety precautions and measurement techniques	High Voltage Measurements	Interactive lecture	Theoretical exam

12	2	Calculate and analyze types of error	Measurement Errors	Exercise + discussion	Written exercise
13	2	Prepare scientific reports	Lab Reporting	Applied writing	Descriptive assessment
14	2	Apply knowledge in a comprehensive experiment	Mini Practical Project	Group project	Presentation
15	2	Comprehensive review of course	Final Review and Exam Preparation	Interactive lecture	Practice test

11. Course Evaluation

Task	Count	Weight %
Attendance and class participation	Continuous	5%
Assignments	2	5%
Daily Exams	3	10%
Midterm Exam	1	20%
Final Exam	1	60%
Total		100%

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	N/A
Main references (sources)	Electrical Measurements and Measuring Instruments by E.W. Golding & F.C. Widdis
Recommended books and references (scientific journals, reports ...)	Online learning platforms such as Coursera
Electronic References, Websites	https://www.allaboutcircuits.com https://nptel.ac.in/courses/108105153/

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2025/7/



Course Description From

1. Course Name:
English language III
2. Course Code:
C 325
3. Semester / Year :
2 nd semester /third year
4. Description Preparation Date:
2024/2025
5. Available Attendance Forms
Theoretical Lectures
6. Number of Credit House (Total) / Number of Units (Total)
30 Hours/ 2 unit
7. Course administrator's name (mention all , if more than one name)
Name: talha jasim ali Email: talha.ja.a@uosamarra.edu.iq

8. Course Objectives	
Course Objectives	<ol style="list-style-type: none">1. Apply 1. Improve listening, grammar, and reading skills in English.2. Use English effectively in everyday and academic situations.3. Participate in class discussions and lectures using English.4. Understanding academic terms and subject-specific vocabulary.

9. Teaching and Learning Strategies

Strategies	<p>Employing a combination of interactive lectures and classroom exercises, focusing on completing authentic language tasks (e.g., preparing a presentation, conducting an interview, writing a report).</p> <p>Making the student the center of the learning process through interactive tasks.</p> <p>Discussing social, cultural, or scientific issues in English.</p>
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10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	Reading and understanding texts	Academic/Scientific Articles	Interactive Lecture + Discussion	Classroom Participation
2	2	Reading and understanding texts	Academic/Scientific Articles	Interactive Lecture + Discussion	Classroom Participation
3	2	Writing	Paragraphs and Essays	Lecture	Exercises, Peer Review
4	2	Writing	Paragraphs and Essays	Lecture	Exercises, Peer Review
5	2	Listening	Short Lectures	Lecture	Comprehension Questions, Note Taking
6	2	Listening	Short Lectures	Lecture	Comprehension Questions, Note Taking
7	2	Speaking	Discussions of General Topics	Lecture	Presentations, Debates
8	2	Speaking	Discussions of General Topics	Lecture + Group Discussion	Presentations, Debates
9	2	Vocabulary and Grammar	Specialized Terminology and Grammar	Lecture	Practice Exercise
10	2	Vocabulary and Grammar	Specialized Terminology and Grammar	Lecture	Practice Exercise
11	2	Academic Writing	Summaries, Short Reports	Lecture + numeric example	Written Project
12	2	Academic Writing	Summaries, Short Reports	Workshop	Written Project

11. Course Evaluation

Tak	Count	Percentage %
Class Attendance and Participation	Continuous	5%
Assignments	4	10%
Quizzes	2	10%
Midterm Exam	1	15%
Final Exam	1	60%
Total		100%

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Headway plus
Main references (sources)	
Electronic References, Websites	

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Course Description From

1. Course Name	
: Communications II	
2. Course Code:	
EME 326	
3. Semester / Year :	
2 nd semester /third year	
4. Description Preparation Date:	
2024/2025	
5. Available Attendance Forms	
Lecture + Theoretical Discussions + Laboratory	
6. Number of Credit House (Total) / Number of Units (Total):	
75 hours / 3 units	
7. Course administrator's name (mention all , if more than one name)	
Name: Name: Asst. Lecturer Eman Adel Mahmood Email: eman.a.m@uosamarra.edu.iq	

8. Course Objectives	
Course Objectives	<ol style="list-style-type: none"> 1. of communication engineering systems, including the communication model and its components. 2. Develop a comprehensive understanding of signal analysis techniques, including the use of Fourier series and Fourier transforms, to effectively classify and interpret both periodic and non-periodic signals. 3.Acquire in-depth knowledge of modulation techniques such as amplitude modulation (AM), frequency modulation (FM), and phase modulation (PM), including the design, operation, and performance analysis of transmitters and receivers. 4.Analyze and classify systems based on their characteristics using concepts such as power spectral density and correlations to assess the performance and efficiency of various communication systems. 5.Strengthen theoretical knowledge through practical implementation of scientific experiments.

9. Teaching and Learning Strategies

Strategies	<p>Theoretical Component:</p> <ul style="list-style-type: none"> - Interactive lectures with multimedia presentations. - Guided brainstorming sessions to link theoretical concepts to practical applications. - Flipped classroom: Assign students to watch educational videos before class, followed by discussion and clarification. - Group discussions and mini-projects, dividing students into teams. <p>Practical Component:</p> <ul style="list-style-type: none"> - Hands-on experiments and practical applications using laboratory equipment and software (e.g., MATLAB) for communication systems analysis and design. - Student performance evaluated through lab reports and short quizzes after each topic. - Mini-projects to assess comprehension of applied concepts.
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10. Course Structure

Week	Learning Hours (Theory + Lab)	Topic	Learning Outcomes	Teaching Method	Assessment
1	3 + 2	Introduction to Communication Systems: Definition, Engineering Model, and System Elements	Explain basic communication system concepts and proper use of lab equipment.	Interactive lectures, practical lab, video presentations	Lab report + Practical quiz
2	3 + 2	Signal Classification (Periodic & Non-Periodic), Fourier Series & Transforms	Classify signals and apply Fourier transforms practically.	Lectures, solved examples, lab experiments	Assignment + Lab report
3	3 + 2	System Classification, Power Spectral Density & Correlations	Analyze systems and compute PSD using MATLAB, link results to theory.	Group activity, lab experiments	Lab report + Theoretical quiz
4	3 + 2	Amplitude Modulation (AM) – DSB: Modulation and Demodulation	Explain AM concepts and apply practically.	Lectures, lab experiments	Lab report + Practical quiz
5	3 + 2	Continuation of AM: DSB-SC, SSB, VSB Applications	Apply and analyze AM applications.	Lectures, solved examples, lab work	Lab report + Assignment

6	3 + 2	First Midterm Exam (Theory & Practical)	Evaluate theoretical knowledge and practical skills from previous topics.	Written exam, lab performance	Midterm assessment
7	3 + 2	Frequency Modulation (FM) – Basic Concepts: Modulation and Demodulation	Compare AM and FM both theoretically and practically.	Interactive lectures, lab experiments	Lab report + Practical quiz
8	3 + 2	Review of AM & FM, Practical and Theoretical Evaluation	Evaluate acquired practical skills and review theory.	Group discussion, lab work	Lab performance + Lab report
9	3 + 2	Type FM, Power & Bandwidth of FM	Design and test FM transmitter and receiver systems.	Lectures, lab experiments	Lab report + Theoretical quiz
10	3 + 2	Phase Modulation (PM), Power & Bandwidth of PM	Apply PM concepts practically and link with theory.	Lectures, lab experiments	Assignment + Practical evaluation
11	3 + 2	Mini Projects (AM/FM/PM Modulation Techniques)	Implement practical projects and document results.	Project-based learning	Mini-project evaluation + Lab report
12	3 + 2	Advanced Problem Solving and General Review	Solve advanced problems and connect theory with practice.	Group work, lab discussion	Practical evaluation + Assignment
13	3 + 2	Second Midterm Exam (Theory & Practical)	Evaluate understanding of updated theoretical knowledge.	Written exam, lab work	Midterm assessment
14	3 + 2	Final Project Presentations and Practical Assessment	Comprehensive evaluation of theoretical knowledge and practical skills.	Oral presentations, lab work	Final practical assessment
15	3 + 2	Final Exam (Theory + Practical)	Comprehensive course evaluation.	Written exam, lab performance	Final assessment
Week	Learning Hours (Theory + Lab)	Topic	Learning Outcomes	Teaching Method	Assessment

11. Course Evaluation

Attendance & Class Participation: 5%
Assignments (4 total): 5%
Short Quizzes (4 total): 5%
Midterm Exam (Theory): 20%
Lab Reports, Practical Quizzes, Monthly Lab Exams: 15%
Final Exam (Theory): 35%
Final Exam (Practical): 15%
Total: 100%

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	- Communication Systems – Carlson & Crilly
Main references (sources)	Introduction to Communication Systems – F.G. Stremter - Communication Systems – A. Bruce Carlson
Recommended books and references (scientific journals, reports ...)	-
Electronic References, Websites	1- https://pdfcoffee.com/principles-of-communication-systems-by-herbert-taub-amp-donald-schilling-pdf-2-pdf-free.html 2- https://pdfcoffee.com/communication-system-bruce-carlson-4ed-pdf-free.html

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2025/7/1



Course Description From

1. Course Name:
Numerical Analysis
2. Course Code:
EME 327
3. Semester / Year :
2 nd semester /third year
4. Description Preparation Date:
2025/2024
5. Available Attendance Forms
Theoretical lectures + discussion lectures
6. Number of Credit House (Total) / Number of Units (Total)
45 hours / 2 units
7. Course administrator's name (mention all , if more than one name)
Name:Prof.Dr.Muhammad Asmail Eleiwi Email:dr.muhammad@uosamarra.edu.iq

8. Course Objectives	
Course Objectives	<ol style="list-style-type: none">1. The student learns to solve linear and nonlinear equations using numerical methods.2. The student learns to solve ordinary and partial differential equations using numerical methods and using computers to solve them.3. The student learns to study and solve numerical integration.4. Understanding the study of the finite difference method.5. The student learns methods for solving problems related to electromechanical engineering using differential equations.6. The student learns to choose the optimal method to solve problems in electromechanical engineering.

9. Teaching and Learning Strategies

Strategies	<p>The teaching and learning strategy aims to:</p> <ol style="list-style-type: none"> 1- Introduce numerical methods and machine learning 2- Through theoretical aspects with practical examples implemented by students <p>This is carefully delivered through:</p> <ol style="list-style-type: none"> 1- Lectures that include question-and-answer sessions 2- Presentation of recorded content 3- Problem solving 4- Tutorials
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10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or Subject Name	Learning Method	Evaluation Method
1	3	Introduction to numerical methods	Numerical methods	Lecture and discussion	In-class questions, homework, quizzes, monthly exams
2	3	Introduction to numerical methods for solving nonlinear equations	Nonlinear equations	Lecture and discussion	In-class questions, homework, quizzes, monthly exams
3	3	Introduction to numerical methods for solving linear equations	System of linear equations	Lecture and discussion	In-class questions, homework, quizzes, monthly exams
4	3	Continuation: Numerical methods for solving linear equations	System of linear equations	Lecture and discussion	In-class questions, homework, quizzes, monthly exams
5	3	Continuation: Numerical methods for solving linear equations	System of linear equations	Lecture and discussion	In-class questions, homework, quizzes, monthly exams
6	3	Introduction to finite differences in solving ODEs and PDEs	Solving ODEs and PDEs	Lecture and discussion	In-class questions, homework, quizzes, monthly exams
7	3	Explicit finite difference methods for solving ODEs and PDEs	Solving ODEs and PDEs	Lecture and discussion	In-class questions, homework, quizzes, monthly exams
8	3	Implicit finite difference methods for solving ODEs and PDEs	Solving ODEs and PDEs	Lecture and discussion	In-class questions, homework, quizzes, monthly exams
9	3	Continuation	Continuation	Lecture and discussion	In-class questions, homework, quizzes, monthly exams
10	3	Teaching students numerical integration methods	Numerical integration	Lecture and discussion	In-class questions, homework, quizzes, monthly exams
11	3	Teaching students the trapezoidal rule	Numerical integration	Lecture and discussion	In-class questions, homework, quizzes, monthly exams

12	3	Teaching students Simpson's rule	Numerical integration	Lecture and discussion	In-class questions, homework, quizzes, monthly exams
13	3	Continuation: Simpson's rule	Numerical integration	Lecture and discussion	In-class questions, homework, quizzes, monthly exams
14	3	Teaching methods for solving ordinary differential equations	Solving ODEs	Lecture and discussion	In-class questions, homework, quizzes, monthly exams
15	3	Continuation: Solving ordinary differential equations	Solving ODEs	Lecture and discussion	In-class questions, homework, quizzes, monthly exams

11. Course Evaluation

The grade is distributed out of 100 based on the tasks assigned to the student, such as daily preparation, quizzes, oral, monthly and written exams, reports, etc.

Task	Count	Percentage (%)
Attendance and class participation	----	5
Assignments	----	----
Daily quizzes	2	10
Midterm exam	2	25
Final exam	1	60
Total		100

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Numerical Methods for Engineers. By Stephen Chapra
Main references (sources)	Numerical Methods for Engineers and Scientists by Joe D. Hoffmam
Recommended books and references (scientific journals, reports ...)	Advanced Engineering Mathematics, Kreyszig Kreyszig, 10th Edition, John Wiley & Sons, Inc
Electronic References, Websites	http://umich.edu/~elements/5e/lectures/index.html

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2025/7/



Course Description Form

University: Samarra University **College:** Engineering **Department:** Electromechanical Engineering

1. Course Name
Protection Systems
2. Course Code
EME 328
3. Year / Semester
2 nd semester /third year
4. Date
12/1/2025
5. Available Attendance Forms
Theory Lectures and Tutorial Lectures
6. Total Hours / Total Units
45 Hours/2 unit
7. Name(s) of the Course Instructor(s) (if more than one, list all) and Academic Title.
Name: Lect. Ahmed M. Sana Email: ahmed.sana@uosamarra.edu.iq

8. Course Goals

Goals

1- Fault Analysis Mastery:

Develop analytical skills to perform both symmetrical and unsymmetrical fault analysis using tools like the per unit system, sequence components, and bus impedance matrices (Z-bus).

2- Understanding Protection Components:

Gain in-depth knowledge of protection system elements, including various types of circuit breakers (LVCB, MVCB, HVCB) and instrument transformers.

3- Relay Protection Techniques:

Learn the principles of relay operation, protection zones, and the implementation of primary and backup protection using overcurrent, directional, and distance relays.

4- Transmission Line and Feeder Protection:

Understand discrimination methods for protecting different power system configurations such as radial feeders, parallel feeders, and ring main systems.

9. Teaching and Learning Strategies

Strategies

The main strategies that will be adopted in delivering this module is summarized as follows:

- 1- Encourage the students' participation in the lecture explanation and solving exercises by rewarding those who answer correctly by bonus marks.
- 2- Encourage the students to pay high attention to the lecture explanation provided via the lecturer by making intentional simple mistakes during the lecture and reward those who find those mistakes and correct them quickly by bonus marks.
- 3- Acquiring feedback from students by stopping the explanation every 15 minutes to ask if there is any question or obscure parts in the explanation. Then, ask a random sample of the students to ensure that the explanation is understood and well received.

Instilling the spirit of competition among students by giving them extra assignments and ask them to complete those assignments in a given time. Those who complete the assignments before the deadline will be discussed to ensure there is no cheating. If no cheating is spotted, the students will be rewarded handsomely by extra marks.

10. Course Structure					
Week	Hours	ILOs	Unit / Module or Topic Title	Teaching Method	Assessment Method
1	3	Introduction to per unit system, symmetrical fault analysis	Introduction, Symmetrical Fault Analysis	Explanation, Solving Examples, and Discussion	Questions and Daily Quizzes
2	3	Symmetrical fault analysis, symmetrical components,	Symmetrical fault Analysis, Unsymmetrical Fault Analysis	Explanation, Solving Examples, and Discussion	Questions and Daily Quizzes
3	3	sequence impedances for power system elements	Unsymmetrical Fault Analysis	Explanation, Solving Examples, and Discussion	Questions and Daily Quizzes
4	3	Positive, negative, and zero equivalent circuits, Unsymmetrical faults types	Unsymmetrical Fault Analysis	Explanation, Solving Examples, and Discussion	Questions and Daily Quizzes
5	3	L-G faults, L-L-G Faults, L-L faults	Unsymmetrical Fault Analysis	Explanation, Solving Examples, and Discussion	Questions and Daily Quizzes
6	3	L-G faults, L-L-G Faults, L-L faults	Unsymmetrical Fault Analysis	Explanation, Solving Examples, and Discussion	Questions and Daily Quizzes
7	3	Y-bus and Z-bus matrices, Symmetrical fault analysis using Z-bus	Fault analysis using Z-Bus matrix	Explanation, Solving Examples, and Discussion	Questions and Daily Quizzes
8	3	Unsymmetrical fault analysis using Z-bus	Fault analysis using Z-Bus matrix	Explanation, Solving Examples, and Discussion	Questions and Daily Quizzes
9	3	Unsymmetrical fault analysis using Z-bus	Fault analysis using Z-Bus matrix	Explanation, Solving Examples, and Discussion	Questions and Daily Quizzes
10	3	Low, medium, and high voltage circuit breakers,	Circuit Breakers,	Explanation, Solving Examples, and Discussion	Questions and Daily Quizzes
11	3	Current Transformers, Voltage Transformers	Instrument Transformers	Explanation, Solving Examples, and Discussion	Questions and Daily Quizzes
12	3	Introduction to Relays, Protection zones, Primary and backup protection	Relays	Explanation, Solving Examples, and Discussion	Questions and Daily Quizzes
13	3	Overcurrent Relays, Setting rules for inverse time overcurrent relays,	Relays	Explanation, Solving Examples, and Discussion	Questions and Daily Quizzes
14	3	Introduction to transmission lines protection, Discrimination methods in Radial feeder protection, Introduction to directional protection	Transmission lines Protection	Explanation, Solving Examples, and Discussion	Questions and Daily Quizzes
15	3	Protection of parallel feeders, double sources, ring main feeders	Transmission lines Protection	Explanation, Solving Examples,	Questions and Daily Quizzes

				and Discussion	
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11. Course Evaluation and Grade Breakdown

Grade distribution out of 100 based on the tasks assigned to the student, such as daily preparation, quizzes, oral and monthly exams, written tests, reports, ..., etc.

Tasks	Number	Percentage (%)
Assignments	2	10%
Monthly Exams	2	30%
Final Exam	1	60%
Total		100%

12. References

1. Books Required reading:	- Fundamentals of Power System Protection 2nd edition by Y.G. Paithankar and S.R. Bhide - Power systems Analysis 3 rd Edition by Hadi Sadaat
2. Main references (sources)	Power System Analysis by John J. Grainer and William D. Stevenson, Jr.
3. Recommended books and references (scientific journals, reports...).	
4. Electronic references, Internet sites...	Switchgear and Protection Course for Dr. Ahmed Al-Subhi

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2025/71



Fourth year / First semester

Course Description From

1. Course Name:	
Power Plants	
2. Course Code:	
EME 411	
3. Semester / Year :	
1 st Semester / Fourth Year	
4. Description Preparation Date:	
September	
5. Available Attendance Forms	
Theoretical	
6. Number of Credit House (Total) / Number of Units (Total):	
45 hours / 2 units	
7. Course administrator's name (mention all , if more than one name)	
Name: Dr. Shaymaa Husham	
Email: shaymaa.h.ab@uosamarra.edu.iq	

8. Course Objectives	
Course Objectives	<ol style="list-style-type: none">1. Introduce the principles and classifications of thermal and renewable power plants.2. Explain thermodynamic cycles used in power generation (Rankine, Brayton, Combined).3. Analyze the performance and efficiency of various power plant systems.4. Examine mechanical and electrical components used in power plants.5. Explore instrumentation and control systems applied in power generation.6. Study environmental and economic aspects of energy production.7. Prepare students for careers in the energy and power industries.

9. Teaching and Learning Strategies

Strategies	<ul style="list-style-type: none"> • Interactive lectures and class discussions • Multimedia presentations and visual aids • Assignments and problem-solving exercises • Site visits to power facilities (when available) • Group projects and case studies • Use of simulation software and digital tools
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10. Course Structure

Week	Evaluation	Method	Learning Outcome	Topic	Week
1	Quiz	Lecture	Identify types and applications of power plants	Introduction to Power Plants	1
2	Homework	Lecture + Discussion	Distinguish fuel types and plant categories	Energy Resources & Classifications	2
3	Assignment	Lecture + Problems	Understand basic steam cycle operation	Steam Power Plants (Rankine Cycle)	3
4	Quiz	Lecture + Video	Learn turbine, condenser, boiler functions	Components of Steam Plants	4
5	Class Test	Lecture	Describe gas turbine cycle and efficiency	Gas Turbine Power Plants (Brayton Cycle)	5
6	Assignment	Lecture + Group Work	Compare Rankine and Brayton in combined systems	Combined Cycle Plants	6
7	Midterm	Lecture + Video	Identify core systems and safety aspects	Nuclear Power Plants	7
8	Presentation	Case Study + Discussion	Explain solar, wind, and hybrid systems	Renewable Energy Power Systems	8
9	Homework	Lecture	Understand environmental regulations and pollution control	Emission and Environmental Considerations	9
10	Quiz	Lecture + Problems	Analyze fuel usage and combustion efficiency	Fuels and Combustion Techniques	11
11	Assignment	Lecture	Perform basic cost-benefit and efficiency analysis	Economic Evaluation of Power Plants	12

12	Group Project	Simulation + Design Task	Understand safety, layout, and design criteria	Design and Layout of Power Plants	14
13	Presentation	Class Discussion	Discuss practical examples from real-life power stations	Case Studies and Industrial Examples	15

11. Course Evaluation

- Participation & Attendance – 2%
 - Homework & Quizzes – 3%
 - Test one – 15%
 - Test two – 15%
 - Final Exam – 60%
 - Presentations / Projects – 5%
- Total: 100%**

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	<input type="checkbox"/> <i>Power Plant Engineering</i> – P.K. Nag <input type="checkbox"/> <i>Thermal Engineering</i> – R.K. Rajput
Main references (sources)	<input type="checkbox"/> <i>Steam and Gas Turbines</i> – Rudy Zahirovic <input type="checkbox"/> <i>Fundamentals of Power Plant Engineering</i> – D. Yogi Goswami
Recommended books and references (scientific journals, reports ...)	<ul style="list-style-type: none"> • ASME Power Engineering Journal • IEEE Transactions on Energy Conversion • NREL and DOE reports
Electronic References, Websites	<ul style="list-style-type: none"> • www.energy.gov • www.asme.org • www.nrel.gov • YouTube technical simulations • Software: ThermoFlow, MATLAB, EES

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2025/7/



Course Description From

1. Course Name:
Machine Elements Design
2. Course Code:
EME 412
3. Semester / Year:
1 st semester /fourth year
4. Description Preparation Date:
2025/2024
5. Available Attendance Forms
Theoretical Lectures + Discussion Lectures
6. Number of Credit House (Total) / Number of Units (Total)
45 Hours / 2 Units
7. Course administrator's name (mention all , if more than one name)
Name: Asst. Prof. Amjed Saleh Mahmood Email: dr.amjed.mahmood@uosamarra.edu.iq

8. Course Objectives
This course helps students to understand the principles of the complete design process. The process with an identification of the need and the decision to do something about it. After much iteration, the process ends with the presentation of the plans for satisfying the needs.

9. Teaching and Learning Strategies

Strategies	<p><i>1- Lectures and Theoretical Instruction</i></p> <p>Foundational Concepts: Start with lectures that introduce core concepts, principles, and theories related to machines and mechanisms.</p> <p>Visual Aids: Use diagrams, animations, and videos to illustrate complex mechanisms and processes.</p> <p>Interactive Presentations: Incorporate interactive tools like quizzes and polls during lectures to assess understanding and keep students engaged.</p> <p><i>2- Problem-Based Learning (PBL)</i></p> <p>Real-World Problems: Present students with real-world engineering problems and case studies related to mechanisms and machinery.</p> <p>Group Work: Encourage collaborative problem-solving and discussion in groups to foster teamwork and deeper understanding.</p> <p>Case Studies: Analyze case studies to apply theoretical knowledge to practical scenarios and develop critical thinking skills.</p>
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10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	3		Introduction to Machine design	Lecture, Tutorial	Assignment
2	3		Problem formulation & calculation	Lecture, Problem Solving	Assignment
3	3		The engineering model	Lecture, Problem Solving	Assignment
4	3		Simple stresses and strains	Lecture, Problem Solving	Assignment
5	3		Factor of Safety, Design codes	Lecture, Problem Solving	Assignment
6	3		2D & 3D static load analysis	Lecture, Problem Solving	Assignment
7	3		Impact loading, Beam loading	Lecture, Problem Solving	Assignment
8	3		Static failure criteria	Lecture, Problem Solving	Assignment
9	3		Shaft design	Lecture, Problem Solving	Assignment
10	3		Stress, strain , shear stress	Lecture, Problem Solving	Assignment
11	3		Fatigue design	Lecture, Problem Solving	Assignment

12	3		Spring design	Lecture, Problem Solving	Assignment
13	3		Bolt design	Lecture, Problem Solving	Assignment
14	3		Welding design	Lecture, Problem Solving	Assignment
15	3		Bearings design	Lecture, Problem Solving	Assignment

11. Course Evaluation

The grade is distributed out of 100 based on the tasks assigned to the student, such as daily preparation, quizzes, oral, monthly and written exams, reports, etc.

Task	No.	Percentage (%)
Attendance and class participation		5%
Assignments		----
Daily quizzes	3	10%
Midterm exam	2	25%
Final exam	1	60%
Total		100

12. Learning and Teaching Resources

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

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2025/7/



Course Description From

1. Course Name:	
CONTROL I	
2. Course Code:	
EME 413	
3. Semester / Year :	
1 st semester /fourth year	
4. Description Preparation Date:	
2025/7/15	
5. Available Attendance Forms	
Theory and tutorial	
6. Number of Credit House (Total) / Number of Units (Total)	
75 hours /3 units	
7. Course administrator's name (mention all , if more than one name)	
Name: Mohammed O. Attea	
Email: Mohammedattea@uosamarra.edu.iq	

8. Course Objectives	
Course Objectives	Teaching students the basics of control systems and their applications in electromechanical engineering.

9. Teaching and Learning Strategies

Strategies	<p>1. Interactive lectures - combining theoretical foundations with practical demonstrations.</p> <p>2. Case study analysis - examining real-world engineering problems to illustrate practical applications of vibrations.</p> <p>3. Collaborative Problem Solving - Implement group projects where students work together to develop solutions to complex engineering scenarios.</p> <p>4. Flipped Classroom Approach - Students independently study theoretical concepts before class, allowing more time for practical problem solving during sessions.</p> <p>5. Continuous Assessment - Use of periodic tests and practical assignments</p>
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10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	5	Introduction to the basic principles of control systems.	basic principles of control systems.	presence	
2	5	Mathematical Representation of mechanical and electrical system	Representation of control systems	presence	
3	5	Mathematical representation of thermal and hydraulic systems	Representation of control systems	presence	
4	5	Differential equations for first and second order control systems	first and second order control systems	presence	

5	5	Transfer function for mechanical and electrical control systems	Transfer function	presence	
6	5	Transfer Function thermal and/or hydraulic control systems	Transfer function	presence	
7	5	Transfer function for hybrid control systems	Transfer function	presence	
8	5	Review & monthly exam	exam	presence	
9	5	Converting the system to block diagram	system and block diagram	presence	
10	5	Mechanisms for simplifying control plans	simplifying control plans	presence	
11	5	Time response of first-order systems and measurement standards	Time response	presence	
12	5	Time response of second-order systems and measurement standards	Time response	presence	
13	5	Study of the stability of systems in terms of the location of roots	stability	presence	
14	5	General discussions, review, and monthly exams.	exams.	presence	
15	5	Second month exam	monthly exams.	presence	

11. course elauation

Degree distribution

Task	degree
Attendance and class participation	2
Homework	3
Quiz	3
Lab	7
Mid exam	35
Finale exam	50
Total	100

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Mechanical vibration 5 th ed by S.S.Rao
Main references (sources)	Engineering Mechanics Dynamics by Meriam
Recommended books and references (scientific journals, reports ...)	
Electronic References, Websites	

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Course Description From

1. Course Name:	
Engineering Materials Properties / Fourth Year	
2. Course Code:	
EME 414	
3. Semester / Year :	
First Semester / fourth year	
4. Description Preparation Date:	
Academic Year 2024–2025	
5. Available Attendance Forms	
Theoretical Lectures + Practical Sessions and Discussions	
6. Number of Credit House (Total) / Number of Units (Total)	
45 Hours / 2 Units	
7. Course administrator's name (mention all , if more than one name)	
Name: Prof. Dr. Riyadh A. Badr Email: reyadh.azawi@uosamarra.edu.iq	

8. Course Objectives	
Course Objectives	<p>To understand the internal structure of engineering materials and how it affects their properties.</p> <p>To comprehend the mechanical and physical properties of materials.</p> <p>To study the effect of heat treatments on the behavior of materials.</p> <p>To analyze the relationship between microstructure and practical performance.</p> <p>To develop the ability to select appropriate materials for various engineering applications.</p>

9. Teaching and Learning Strategies

Strategies	<p>Study of mechanical properties: hardness, toughness, tensile and compressive strength.</p> <p>Microscopic analysis of materials using optical microscopy.</p> <p>Laboratory experiments to measure physical and thermal properties.</p> <p>Case studies on material corrosion and failure.</p> <p>Classroom discussions and research reports on the development of engineering materials.</p>
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10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	3		Introduction to materials science and atomic structure.		
2	3		Introduction to materials science and atomic structure.		
3	3		Atomic bonding and crystal structures in solids.		
4	3		Atomic bonding and crystal structures in solids.		
5	3		Crystal defects and their influence on material properties.		
6	3		Crystal defects and their influence on material properties.		
7	3		Mechanical properties: stress, strain, and hardness.		
8	3		Mechanical properties: stress, strain, and hardness.		
9	3		Heat treatments and their effect on structure and properties.		
10	3		Heat treatments and their effect on structure and properties.		
11	3		Failure mechanisms: corrosion, fatigue, creep.		
12	3		Failure mechanisms: corrosion, fatigue, creep.		
13	3		Advanced materials and industrial applications.		
14	3		Advanced materials and industrial applications.		
15	3		General review and final assessment.		

11. Course Evaluation

Task	Percentage
Attendance and Participation	5%
Assignments	
Quizzes	5%
Midterm Exam	30%
Final Exam	60%
Total	100%

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Materials Science and Engineering: An Introduction by William D. Callister Engineering Materials 1 by Michael F. Ashby & David R.H. Jones
Main references (sources)	Peer-reviewed scientific journals in materials science and properties Academic lectures from leading universities
Recommended books and references (scientific journals, reports ...)	
Electronic References, Websites	Academic websites such as ScienceDirect and SpringerLink Specialized journals in materials, corrosion, and engineering testing

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2025/7/



Course Description From

1. Course Name:
High Voltage Engineering
2. Course Code:
EME 415
3. Semester / Year :
First Semester / fourth year
4. Description Preparation Date:
2024/2025
5. Available Attendance Forms
Theoretical
6. Number of Credit House (Total) / Number of Units (Total)
45 hours / 2 units
7. Course administrator's name (mention all , if more than one name)
Name: Asst. Lecturer Sayf Waleed Majeed Email: sayfwaleed@uosamarra.edu.iq

8. Course Objectives	
<p>Course Objectives</p> <ol style="list-style-type: none"> 1. Understand the basic principles of high voltage generation and measurement. 2. Analyze and understand insulation breakdown phenomena and their impact on power systems. 3. Efficiently design and select insulating materials and high-voltage equipment. 4. Assess high voltage risks and apply professional safety procedures. 5. Conduct high voltage tests and scientifically interpret the results. 	<p>This course aims to provide students with fundamental knowledge on methods of producing, generating, and measuring high voltage, studying high voltage phenomena, properties of electrical insulators, mechanisms of electrical breakdown in gases, liquids, and solids, in addition to insulation techniques and equipment protection.</p>

9. Teaching and Learning Strategies

Strategies	<ol style="list-style-type: none"> 1. Interactive Lectures: Presenting basic theoretical concepts through audio-visual supported lectures, involving students in class discussions. 2. Problem Solving and Case Study Analysis: Training students on solving real-world problems related to high-voltage system design and testing, analyzing actual incidents of insulation breakdown or equipment failure. 3. Group Projects: Assigning mini-projects including designing overvoltage protection systems or analyzing insulation performance using simulation tools. 4. Student Presentations: Encouraging students to deliver presentations on advanced topics like impulse voltage, industrial grounding, or modern insulation systems. 5. Research-Based Learning: Guiding students to explore scientific papers and recent references in the high voltage field, enhancing critical analysis skills. 6. Simulation Techniques: Employing engineering software like MATLAB/Simulink and COMSOL to simulate high-voltage electrical phenomena and analyze the results. 7. Formative and Continuous Assessment: Utilizing varied assessment methods including assignments, quizzes, and practical evaluations with regular feedback. 8. Field Visits (Optional): Organizing visits to substations or industrial high-voltage labs to enhance practical understanding of theoretical concepts.
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10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	3	Define high voltage concepts	Introduction to High Voltage	Lecture	Quiz
2-3	6	Explain generation techniques	High Voltage Generation	Lecture	Assignment + Test
4-5	6	Analyze performance of different insulators	Insulators and Their Types	Lecture + Video Presentation	Quiz
6-7	6	Identify types of breakdown in media	Electrical Breakdown	Simulation	Report
8	3	Review previous concepts	Midterm Exam Review	Review + Exam	Midterm Exam
9-10	6	Apply different measurement methods	High Voltage and Current Measurement	Theoretical	Quiz
11-12	6	Conduct equipment testing	High Voltage Testing	Theoretical	Report
13-14	6	Analyze industrial applications	High Voltage Applications	Case Study	Presentation
15	3	Comprehensive course summary	General Review	Review	Oral/Written

11. Course Evaluation		
Task	Number	Percentage
Attendance and Class Participation	Continuous	5%
Assignments	2	5%
Daily Exams	3	10%
Midterm Exam	1	20%
Final Exam	1	60%
Total		100%

12. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	N/A
Main references (sources)	High Voltage Engineering Fundamentals – E. Kuffel, W. S. Zaengl, J. Kuffe
Recommended books and references (scientific journals, reports ...)	High Voltage Engineering by M.S. Naidu and V. Kamaraju
Electronic References, Websites	- https://ieeexplore.ieee.org - https://www.sciencedirect.com - https://nptel.ac.in/courses/108/105/108105067/

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2025/7/



Course Description From

1. Course Name:	
Power electronics	
2. Course Code:	
EME 416	
3. Semester / Year:	
First Semester / fourth year	
4. Description Preparation Date:	
15 / 7 /2025	
5. Available Attendance Forms:	
Classroom and online attendance	
6. Number of Credit Hours (Total) / Number of Units (Total):	
45 Hour / 2 credits	
7. Course administrator's name (mention all , if more than one name)	
Name: Lecturer Younes S. Alwan	
Email: younes.s.al@uosamarra.edu.iq	

8. Course Objectives	
Course Objectives	<ol style="list-style-type: none"> 1. Learn about types of power conversion circuits. 2. Learn to solve various problems related to electrical circuits. 3. Learn methods for practically connecting electrical circuits. 4. Learn computer applications. 5. Learn to draw on graph paper.

9. Teaching and Learning Strategies

Strategies	<ol style="list-style-type: none"> 1. Interactive lectures for students – achieved by combining traditional teaching with digital aids. 2. Case study analysis – examining real-world engineering problems (such as power converters and electrical meters) to illustrate practical applications. 3. Implementation of group projects where students collaborate to develop solutions for various engineering situations. 4. Continuous assessment – using periodic tests and mini-projects to monitor and correct their responses.
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10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	3	General introduction			
2	3	Fundamentals of alternating wave modulation			
3	3	Introduction to converting a variable signal to a single-phase continuous signal			
4	3	Modulating a variable signal to a continuous signal with three phases			
5	3	Modification of the variable signal to a continuous signal for three half-control phases			
6	3	Changing the variable signal to a continuous signal for three phases with full control			
7	3	Changing the continuous signal to a single-phase variable signal			
8	3	Modifying the continuous signal to a variable signal for three phases.			
9	3	First monthly exam			
10	3	Control of single-phase variable signals			
11	3	Control of the variable signal for the three phases			

12	3	Introduction to DC-DC signal control 1			
13	3	Introduction to continuous signal control (DC-DC) 2			
14	3	Applications in power electronics.			
15	3	Second monthly exam			

11. Course Evaluation

Grade Distribution (out of 100) Based on Assigned Student Tasks such as Daily Preparation, Quizzes, Oral and Written Exams, Reports, etc.

Tasks	Score Percentage (%)	
Attendance and Class Participation	10	10%
Assignments	10	10%
Daily Exams	10	10%
Midterm Exam	10	10%
Final Exam	60	60%
Total	100	100%

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Power electronics Devices, circuits, and applications Fourth Edition Muhammad H. Rashid
Main references (sources)	Power Electronics and Motor Drive Systems Stefanos N. Manias
Recommended books and references (scientific journals, reports ...)	All the books similar to the curriculum textbooks.
Electronic References, Websites	

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Course Description From

1. Course Name:
communication Networks
2. Course Code:
EME 417
3. Semester / Year :
First Semester / fourth year
4. Description Preparation Date:
2025/2024
5. Available Attendance Forms
Theoretical Lectures + Discussion Lectures
6. Number of Credit House (Total) / Number of Units (Total)
45 Hours / 2 Units
7. Course administrator's name (mention all , if more than one name)
Name: Yahya Tareq Hussein Email: yahya.t.hussein@uosamarra.edu.iq

8. Course Objectives
<p>The study of Computer Networks aims to teach students the fundamental concepts of computer networks, networking methods, connection techniques, and their basic architecture. It also aims to familiarize students with the hardware devices used for creating networks between electronic devices and computers. Additionally, the course teaches students the programming foundations and protocols required for preparing and organizing data flow through computer networks and methods of information exchange.</p>
I. Cognitive Objectives
<ul style="list-style-type: none">● During the academic year, the student will learn about computer devices, how they work, connection methods, and how information is transferred.● Knowledge of the types of networks used.● Learning and understanding the types of data transmission media and the waveform carrying information in the transmission medium.● Learning and understanding the software and protocols used in networks.
II. Subject-Specific Skills Objectives
<ul style="list-style-type: none">● Familiarity with the mathematical relationships required to calculate data transfer speed.● Familiarity with the laws for calculating the required bandwidth to create a data transmission medium.

- Familiarity with the mathematical laws for calculating the effect of noise on the efficiency of information transfer.
 - Familiarity with the basic concepts of wired and wireless data broadcasting types and optical networks.
- Effective and Value-Based Objectives**
- Encouraging the student to benefit from network connection methods.
 - Encouraging the student to think about the importance of dealing with digital data transfer in networks.
 - Encouraging the student to think and understand the mechanism of connecting and operating different networks.

9. Teaching and Learning Strategies

- 1- The instructor delivers detailed theoretical lectures.
- 2- The instructor masters the basic concepts of practical computer network components, which enhances the learning and teaching method.
- 3- The instructor introduces students to the most important main components of various computer networks, both theoretically and practically.
- 4- Continuous assessment - using periodic tests, practical assignments, and mini-projects to monitor understanding and provide immediate feedback.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	3		Computer Networks, Structure and Topology	PowerPoint presentations	Daily exams + monthly exams
2	3		LAN/WAN Basic Ideas	PowerPoint presentations	Daily exams + monthly exams
3	3		OSI and 7th Layer Definition	PowerPoint presentations	Daily exams + monthly exams
4	3		RS232C and RS449	PowerPoint presentations	Daily exams + monthly exams
5	3		Switching, Circuit Switching, Message Switching, Packet Switching, Datagram, Virtual Circuit	PowerPoint presentations	Daily exams + monthly exams
6	3		Terminal Handling, Roll-Call, and Hub Polling	PowerPoint presentations	Daily exams + monthly exams
7	3		Data Link Layer Design Issues	PowerPoint presentations	Daily exams + monthly exams
8	3		Error Control, Flow Control, Link Management	PowerPoint presentations	Daily exams + monthly exams
9	3		Elementary Data Link Protocol, Protocol 1,2	PowerPoint presentations	Daily exams + monthly exams
10	3		Protocol (3) for Noisy Channel	PowerPoint presentations	Daily exams + monthly exams
11	3		Protocol 6 Using Selective Repeat	PowerPoint presentations	Daily exams + monthly exams
12	3		Sliding Window Protocols	PowerPoint presentations	Daily exams + monthly exams
13	3		Protocol 4, A One Bit Sliding Window Protocol	PowerPoint presentations	Daily exams + monthly exams

14	3		Protocol 5 Using Go Back N	PowerPoint presentations	Daily exams + monthly exams
15	3		Protocol 6 Using Selective Repeat	PowerPoint presentations	Daily exams + monthly exams

11. Course Evaluation

The grade distribution out of 100 marks is based on the tasks assigned to the student, such as daily preparation, daily, oral, monthly, and written exams, reports, etc.

Tasks	Number	Percentage (%)
Attendance and class participation	-	10%
Assignments	3	10%
Daily Exams	3	10%
Monthly Exams	1	10%
Final Exam	1	60%
Total		100%

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	<ul style="list-style-type: none"> Behrouz A Forouzan, <i>Data communications and networking</i>, 4th ed. 2007. Andrew S. Tanenbaum, David J. Wetherall, <i>Computer Networks</i>, 5th ed, 2011
Main references (sources)	<ul style="list-style-type: none"> The college library for additional resources for the curriculum. Access scientific websites to keep up with the latest developments in the subject.
Recommended books and references (scientific journals, reports ...)	<p>All reputable scientific journals related to computer networks.</p> <ul style="list-style-type: none"> James F. Kurose, Keith W. Ross, <i>Computer networking: a top-down approach</i>, 6th ed, 2013. (Chapters 1-6) Andrew S. Tanenbaum, David J. Wetherall, <i>Computer Networks</i>, 5th ed, 2011 Larry L. Peterson & Bruce S. Davie, <i>Computer Networks A Systems Approach</i>, First edition, 2003
Electronic References, Websites	

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2025/71



Fourth year / second semester

Course Description From

1. Course Name:
Electromechanical Systems
2. Course Code:
EME421
3. Semester / Year :
Second Semester / fourth year
4. Description Preparation Date:
2025
5. Available Attendance Forms
Lectures + Discussions
6. Number of Credit House (Total) / Number of Units (Total)
60 hours / 3 units
7. Course administrator's name (mention all , if more than one name)
Name: Lecturer: Omar Mohammed Ahmed Email: omar.alzayat@uosamarra.edu.iq

8. Course Objectives	
Course Objectives	<ul style="list-style-type: none">• Introduce students to Building Information Modeling (BIM) principles and their role in electromechanical systems.• Provide fundamental knowledge of using REVIT MEP software for designing mechanical, electrical, and plumbing systems.• Enable students to perform accurate heating and cooling load calculations based on building requirements.• Teach students the principles and design process of HVAC duct systems and their integration within buildings.• Explain various types of HVAC systems and their applications in industrial and commercial settings.• Develop understanding of firefighting systems and how they are incorporated into building designs.

	<ul style="list-style-type: none"> • Explore control systems related to sensors, valves, temperature regulation, fluid flowrate, pressure, and fluid level. • Familiarize students with different types of energy converters and their roles in electromechanical systems.
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9. Teaching and Learning Strategies

Strategies	<ul style="list-style-type: none"> • Interactive lectures to explain theoretical concepts of BIM and REVIT MEP. • Practical sessions using REVIT MEP software for system design. • Mini-projects covering load calculations and HVAC design. • In-class discussions to solve design problems and encourage critical thinking. • Use of presentations and simulations to explain complex systems. • Field visits (if applicable) to observe real-world applications. • Continuous assessment via assignments, reports, and short quizzes. • Group work to enhance teamwork and technical communication
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Week	Hours	Intended Learning Outcomes	Topic / Unit Name	Learning Method	Assessment Method
1	4	Understand BIM principles and its use in EM systems	Introduction to BIM	Lecture + Presentation	Participation
2	4	Identify key features and interface of REVIT MEP	Introduction to REVIT MEP	Lecture + Software Demo	Quiz
3	4	Calculate basic heating/cooling loads	Heating and Cooling Load Calculation	Lecture + Exercise	Assignment
4	4	Apply formulas for thermal load estimation	Heating and Cooling Load Calculation	Lecture + Problem Solving	Homework
5	4	Perform practical load calculation using Revit	Heating and Cooling Load Calculation	Lab + Case Study	Report
6	4	Understand principles of air distribution	HVAC Duct Design	Lecture	Quiz
7	4	Draw duct layouts in Revit	HVAC Duct Design	Lab	Evaluation
8	4	Apply sizing and velocity limits	HVAC Duct Design	Lecture + Exercise	Assignment
9	4	Complete duct system design for building	HVAC Duct Design	Lab + Project	Report
10	4	Identify HVAC system types and configurations	HVAC Systems	Lecture	Participation

11	4	Understand basic firefighting system components	Firefighting Systems	Lecture + Video	Quiz
12	4	Apply sensor and control logic in HVAC systems	Sensors and Valves	Lab + Group Discussion	Lab Report
13	4	Analyze flowrate and pressure control methods	Control Systems	Lecture	Short Test
14	4	Identify energy conversion components in EM systems	Energy Converters	Lecture + Examples	Participation
15	4	Review & project presentation	Final Integration + Mini Project	Presentation + Review	Project Grade

11. Course Evaluation

Tasks	Points Percentage (%)
Attendance and class participation	10%
Assignments	10%
Quizzes	10%
Midterm Exam	20%
Final Exam	50%
Total	100%

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	<ul style="list-style-type: none">Ashree 2020Nfpa code 13
Main references (sources)	Main References: <ul style="list-style-type: none">HVAC Systems Design Handbook
Recommended books and references (scientific journals, reports ...)	
Electronic References, Websites	Electronic Resources and Websites: <ul style="list-style-type: none">www.autodesk.comwww.engineeringtoolbox.com

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2025/7/1



Course Description From

1. Course Name:
English Language VI
2. Course Code:
C422
3. Semester / Year :
Second Semester / fourth year
4. Description Preparation Date:
2024/2025
5. Available Attendance Forms
Theoretical
6. Number of Credit House (Total) / Number of Units (Total)
30 hours / 2 units
7. Course administrator's name (mention all , if more than one name)
Name: Asst. Lecturer Sayf Waleed Majeed
Email: sayfwaleed@uosamarra.edu.iq

8. Course Objectives	
<p>Course Objectives</p> <ul style="list-style-type: none"> • Read and analyze various academic texts. • Write essays and reports using correct academic English. • Use advanced vocabulary and structures in different contexts. • Deliver oral presentations clearly and confidently. 	<p>English Language VI is an advanced-level English course designed to enhance the academic and professional communication skills of engineering students. The course includes intensive training in reading and understanding scientific and technical texts, refining technical writing skills such as writing reports, emails, and CVs, enhancing oral presentation and discussion skills within team settings. Students will become familiar with common English terminology and acquire language skills that enable them to communicate effectively in academic and professional environments requiring English proficiency.</p>

9. Teaching and Learning Strategies

Strategies

1. Interactive Lectures:

Introducing engineering concepts and texts through explanation and discussion, engaging students through questions and class discussions.

2. Collaborative Learning:

Dividing students into small groups to work on projects or oral presentations, enhancing communication and teamwork skills.

3. Text Analysis:

Training students to read and analyze authentic engineering texts (such as scientific articles, technical manuals, and engineering specifications).

4. Practical Writing:

Regular exercises in writing technical reports, official letters, and articles related to the engineering field.

5. Oral Presentations:

Encouraging students to give oral presentations of their projects using technical English and correct terminology.

6. Role Play & Simulations:

Playing professional roles (such as an engineer in a meeting or presenting a project to a committee) to develop speaking skills in practical situations.

7. Project-Based Learning:

Assign students to prepare a simple technical project, including writing a final report and delivering a presentation in English.

8. Self-directed Learning:

Direct students to external resources such as educational videos, engineering journals, and educational platforms to independently develop language skills.

9. Formal Assessment:

Provide continuous feedback as students progress through written and oral assignments to identify strengths and weaknesses.

10. Technology Integration:

Use electronic tools such as PowerPoint/Canva presentation software and e-learning platforms to deliver activities and tests. Strategy

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	Identifying course syllabus	Introduction to English VI	Interactive lecture	Short classroom questions
2	2	Analyze and understand short texts	Reading Texts	Text analysis – group work	Reading exercise
3	2	Expand vocabulary usage	Vocabulary Building	Individual and group activity	Short vocabulary quiz
4	2	Write organized technical paragraphs	Writing: Paragraph Structure	Practical writing	Written assignment
5	2	Extract info from technical discussions	Listening: Technical Discussions	Simulation and listening	Fill-in-the-blanks, comprehension questions
6	2	Describe tools or technical processes accurately	Writing: Technical Descriptions	Group activity	Descriptive writing exercise
7	2	Present short topics	Midterm Review + Presentations	Oral presentations – review	Presentation + oral evaluation
8	2	Assess acquired skills	Midterm Exam	Written and oral exam	Exam
9	2	Prepare simple technical reports	Report Writing	Practical writing	Written assignment + group review
10	2	Write formal emails and CVs	Email and CV Writing	Practical writing	Writing exercise
11	2	Use advanced structures in technical contexts	Vocabulary Building II – Complex Structures	Group interaction	Vocabulary test
12	2	Analyze case studies	Reading Case Studies	Text analysis	Analytical questions
13	2	Prepare for final oral presentations	Oral Presentation – Final Project Preparation	Presentations and simulations	Oral feedback
14	2	Present final projects in English	Final Presentations	Oral presentations	Detailed evaluation
15	2	Review skills and assess progress	Final Exam Review	Interactive lecture + review	Practice test

11. Course Evaluation		
Task	Count	Weight %
Attendance and class participation	Continuous	5%
Assignments	2	5%
Daily Exams	3	10%
Midterm Exam	1	20%
Final Exam	1	60%
Total		100%

12. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	Headway plus upper intermediate
Main references (sources)	Headway plus upper intermediate
Recommended books and references (scientific journals, reports ...)	English for Science and Technology – by Anthony P. Cowie
Electronic References, Websites	https://www.coursera.org

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Course Description From

1. Course Name:
CONTROL II
2. Course Code:
EME 423
3. Semester / Year :
Second Semester / fourth year
4. Description Preparation Date:
2025/7/15
5. Available Attendance Forms
Theory and tutorial
6. Number of Credit House (Total) / Number of Units (Total)
75hours 3 units
7. Course administrator's name (mention all , if more than one name)
Name: Mohammed O. Atteaa Email: Mohammedatteaa@uosamarra.edu.iq

8. Course Objectives	
Course Objectives	Teaching students the basics of control systems and their applications in electromechanical engineering.

9. Teaching and Learning Strategies

Strategies	<p>1. Interactive lectures - combining theoretical foundations with practical demonstrations.</p> <p>2. Case study analysis - examining real-world engineering problems to illustrate practical applications of vibrations.</p> <p>3. Collaborative Problem Solving - Implement group projects where students work together to develop solutions to complex engineering scenarios.</p> <p>4. Flipped Classroom Approach - Students independently study theoretical concepts before class, allowing more time for practical problem solving during sessions.</p> <p>5. Continuous Assessment - Use of periodic tests and practical assignments.</p>
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10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	5	Systems response, performance criteria, and their representation in MATLAB	Using matlab in system response	presence	
2	5	Analysis and design of feedback systems	feedback systems	presence	
3	5	Stability study of control systems using the Routh method	Stability	presence	
4	5	Engineering applications of the Routh method	Routh method	presence	

5	5	error measures in the steady state of first-order systems	first-order systems	presence	
6	5	Steady-state error measures for second-order systems	second-order systems	presence	
7	5	Engineering applications of error meters in control systems	applications of error meters	presence	
8	5	Review & monthly exam	exam	presence	
9	5	Root locus method for determining system stability	Root locus	presence	
10	5	Applications about the method of root locus	Applications	presence	
11	5	Root locus method in control system design	system design	presence	
12	5	Frequency response in control systems	Frequency response	presence	
13	5	Stability analysis of control systems with alternating input using the Bode method	Stability analysis	presence	
14	5	2nd month exam	exam	presence	
15	5	General discussions and review	review	presence	

11. course elevation

Degree distribution

Task	degree
Attendance and class participation	2
Homework	3
Quiz	3
Lab	7
Mid exam	35
Finale exam	50
Total	100

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Modern control engineering by Ogata
Main references (sources)	Control systems engineering by Nise
Recommended books and references (scientific journals, reports ...)	
Electronic References, Websites	

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Course Description From

1. Course Name:	
Manufacturing Processes / Fourth Year	
2. Course Code:	
EME 424	
3. Semester / Year :	
Second Semester / Academic Year 2024–2025	
4. Description Preparation Date:	
Second Semester / fourth year	
5. Available Attendance Forms	
Theoretical Lectures + Practical Sessions and Laboratory Work	
6. Number of Credit House (Total) / Number of Units (Total)	
30 Hours / 2 Units	
7. Course administrator's name (mention all , if more than one name)	
Name: Prof. Dr. Riyadh A. Badr Email: reyadh.azawi@uosamarra.edu.iq	

8. Course Objectives	
Course Objectives	To introduce the fundamental principles of manufacturing processes. To study metal forming and machining techniques. To understand casting, welding, cutting, and automated machining operations. To develop the ability to select the appropriate manufacturing process. To link manufacturing processes with modern industrial applications.

9. Teaching and Learning Strategies

Strategies	<p>Theoretical lectures supported by practical examples.</p> <p>Use of manufacturing and casting labs for hands-on experiments.</p> <p>Student presentations and assignments on modern manufacturing technologies.</p> <p>Field visits when possible.</p> <p>Periodic quizzes and analysis of experimental results.</p>
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10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2		Introduction to manufacturing processes and their importance		
2	2		Introduction to manufacturing processes and their importance		
3	2		Casting processes and molten metals		
4	2		Casting processes and molten metals		
5	2		Cold and hot metal forming		
6	2		Cold and hot metal forming		
7	2		Traditional cutting and machining operations		
8	2		Traditional cutting and machining operations		
9	2		Welding processes and applications		
10	2		Welding processes and applications		
11	2		Computer Numerical Control (CNC) machining		
12	2		Computer Numerical Control (CNC) machining.		
13	2		Advanced materials in manufacturing		

14	2		Advanced materials in manufacturing		
15	2		Review and final examination		

11. Course Evaluation	
Task	Percentage
Attendance and Participation	5%
Assignments	
Quizzes	5%
Midterm Exam	30%
Final Exam	60%
Total	100%

12. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	Manufacturing Engineering and Technology by Kalpakjian & Schmid Fundamentals of Modern Manufacturing by Mikell P. Groover
Main references (sources)	Peer-reviewed journals in manufacturing and production Accredited university lectures and instructor notes
Recommended books and references (scientific journals, reports ...)	
Electronic References, Websites	Academic websites such as ScienceDirect and SpringerLink Technical magazines in manufacturing and industrial design

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2025/7/



Course Description From

1. Course Name:
Renewable Energy
2. Course Code:
EME 425
3. Semester / Year :
Second Semester / fourth year
4. Description Preparation Date:
MAY/2025
5. Available Attendance Forms:
Theoretical
6. Number of Credit House (Total) / Number of Units (Total):
75 hours /3 units
7. Course administrator's name (mention all , if more than one name)
Name: Dr. Shaymaa Husham Email: shaymaa.h.ab@uosamarra.edu.iq

8. Course Objectives	
Course Objectives	<ol style="list-style-type: none">1. Introduce the principles and types of renewable energy sources.2. Analyze the performance and design of solar, wind, biomass, hydro, and geothermal systems.3. Understand the environmental and economic benefits of renewable energy.4. Explore hybrid systems and energy storage technologies.5. Compare renewable and conventional energy systems.6. Study the integration of renewable systems into electrical and mechanical infrastructures.7. Enhance students' ability to apply renewable technologies in real-world applications.8. Build critical thinking and problem-solving skills in sustainable energy design.9. Prepare students for careers in green energy and sustainability fields.

9. Teaching and Learning Strategies

Strategies	<ul style="list-style-type: none"> • Lectures and visual presentations • Case studies and group work • Practical lab sessions and field data analysis • Design projects and simulations • Guest lectures from industry experts • Assignments and seminars • Use of modeling software and digital platforms
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10. Course Structure

Week	Topic	Learning Outcome	Method	Evaluation	Week
1	Introduction to Renewable Energy	Understand energy challenges and types of renewable sources	Lecture	Quiz	2
2	Solar Radiation and Solar Geometry	Learn solar tracking, irradiance, and tilt angles	Lecture + Problem Solving	Assignment	3
3	Solar Thermal Systems	Analyze collectors, storage, and applications	Lecture + Lab	Lab Report	4
4	Solar Photovoltaic Systems	Understand PV cells, modules, and performance	Lecture + Video	Quiz	5
5	Wind Energy Basics	Learn wind resource assessment and aerodynamics	Lecture + Problem Solving	Homework	6
6	Wind Turbine Design and Performance	Analyze turbine types and energy output	Group Work + Simulation	Midterm Preparation	7
7	Midterm Exam	Evaluate understanding of first half of course	Written Exam	Midterm	8
8	Biomass Energy Systems	Understand conversion techniques and energy yield	Lecture + Case Study	Assignment	9
9	Hydropower and Geothermal Energy	Evaluate site suitability and energy potential	Lecture + Discussion	Presentation	10
10	Hybrid Energy Systems	Analyze integrated systems (e.g., PV-Wind, PV-Diesel)	Lecture + Simulation	Quiz	11
11	Energy Storage Technologies	Study batteries, thermal storage, and hydrogen systems	Lecture + Video	Homework	12
12	Economic and Environmental Impact	Assess lifecycle cost and emissions	Lecture + Research Task	Assignment	13
13	Smart Grid and Integration	Learn grid-tied systems and power electronics	Lecture + Lab	Lab Quiz	14
14	Project Design and Feasibility	Begin student projects and design presentations	Project Work	Ongoing Assessment	15
15	Project Presentations	Present proposed renewable solutions	Student Presentations	Final Presentation	16

11. Course Evaluation

- Attendance & Participation – 5%
 - Quizzes & Homework – 10%
 - Midterm Exam – 20%
 - Assignments – 10%
 - Lab Work & Reports – 15%
 - Final Exam – 30%
 - Project / Presentation – 10%
- Total: 100%**

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)

- *Renewable Energy: Power for a Sustainable Future* – Godfrey Boyle
- *Solar Engineering of Thermal Processes* – Duffie & Beckman

Main references (sources)

- Wind Energy Explained* – J.F. Manwell
- Handbook of Renewable Energy Technology* – A. Sayigh

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

Renewable Energy Journal – Elsevier
IEEE Transactions on Sustainable Energy
Reports by IRENA and IEA

Electronic References, Websites

- www.ireena.org
- www.nrel.gov
- www.iea.org
- PVsyst, HOMER software
- YouTube: solar/wind lab demonstrations

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2025/7/



Course Description From

1. Course Name:
Power Plant Operation and Maintenance
2. Course Code:
EME 426
3. Semester / Year :
Second Semester / fourth year
4. Description Preparation Date:
July 2025
5. Available Attendance Forms:
Theoretical
6. Number of Credit Hours (Total): 3 Theory
45 hours /2 units
7. Course administrator's name (mention all , if more than one name)
Name: Dr. Shaymaa Husham Email: shaymaa.h.ab@uosamarra.edu.iq

8. Course Objectives	
Course Objectives	<ul style="list-style-type: none"> • Introduce the principles and classifications of thermal and renewable power plants. • Explain thermodynamic cycles used in power generation (Rankine, Brayton, Combined). • Analyze the performance and efficiency of various power plant systems. • Understand fuel types, combustion systems, and emissions control. • Examine mechanical and electrical components used in power plants. • Explore instrumentation and control systems applied in power generation. • Study environmental and economic aspects of energy production. • Develop hands-on skills through lab experiments and real-world examples. • Prepare students for careers in the energy and power industries.

9. Teaching and Learning Strategies

Strategies	<ul style="list-style-type: none"> • Lectures with multimedia support • Practical lab sessions with hands-on tools • Case studies from operational plants • Field visits to local power facilities (if available) • Group projects and maintenance planning exercises • Troubleshooting simulations • Assignments and weekly quizzes
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10. Course Structure

Week	Hours	Unit or Subject Name	Required Learning Outcomes	Learning Method	Week
1	3	Introduction & Course Outline	Understand course scope and power plant elements	Lecture + Slides	Quiz
2	3	Pumps: Types & Classification	Distinguish between centrifugal, reciprocating, and rotary pumps	Lecture + Case Examples	Homework
3	3	Centrifugal Pump Design	Identify pump parts (impeller, shaft, seals, etc.)	Lecture + Diagram Analysis	Assignment
4	3	Pump Operation & Efficiency	Analyze pump characteristics, head, cavitation, and efficiency	Lecture + Curve Interpretation	Quiz
5	3	Pump Maintenance & Alignment	Understand maintenance checklist and alignment procedures	Lecture + Technical Discussion	Lab Quiz
6	3	Reciprocating & Rotary Pumps	Compare reciprocating vs rotary pump advantages & limitations	Lecture + Examples	Class Test
7	3	Compressors: Principles & Types	Understand classifications and applications of compressors	Lecture + Classification Activity	Midterm Exam
8	3	Reciprocating Compressors	Describe working, parts, advantages, and limitations	Lecture + Homework Discussion	Quiz
9	3	Centrifugal & Axial Compressors	Explain design, surging, efficiency, velocity triangles	Lecture + Sample Problems	Homework
10	3	Performance & Energy Equations	Apply steady flow energy equation & efficiency concepts	Lecture + Numerical Problems	Assignment
11	3	Gas Turbine Power Plant (Brayton Cycle)	Understand Brayton cycle and component roles	Lecture + Brayton Examples	Class Quiz
12	3	Brayton Cycle Performance	Analyze efficiency, work ratio, and regeneration	Lecture + Cycle Diagrams	Group Project
13	3	Steam Boilers & Components	Identify boiler types (fire-tube, water-tube) and classifications	Lecture + Diagram Explanation	Quiz

14	3	Boiler Accessories & Performance	Study economizer, reheater, air preheater and design implications	Lecture + Comparison Analysis	Lab Report
15	3	Revision + Student Presentations	Review concepts and present assigned equipment maintenance analysis	Presentation + Peer Review	Final Project

11. Course Evaluation

- Participation & Attendance – 2%
 - Homework & Quizzes – 3%
 - Test one – 15%
 - Test two – 15%
 - Final Exam – 60%
 - Presentations / Projects – 5%
- Total: 100**

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	<ul style="list-style-type: none"> • <i>Power Plant Engineering</i> – P.K. Nag • <i>Operation and Maintenance of Thermal Power Stations</i> – Pradip Chanda • <i>Industrial Maintenance and Safety</i> – Charles W. Wilson
Main references (sources)	<input type="checkbox"/> <i>Maintenance Engineering Handbook</i> – Higgins & Mobley <input type="checkbox"/> <i>Power Plant Equipment Operation and Maintenance</i> – CRC Press
Recommended books and references (scientific journals, reports ...)	<input type="checkbox"/> www.energycentral.com <input type="checkbox"/> www.power-eng.com <input type="checkbox"/> www.iea.org <input type="checkbox"/> SCADA system simulations <input type="checkbox"/> YouTube channels on turbine maintenance & plant walkthroughs
Electronic References, Websites	<input type="checkbox"/> www.energycentral.com <input type="checkbox"/> www.power-eng.com <input type="checkbox"/> www.iea.org <input type="checkbox"/> SCADA system simulations <input type="checkbox"/> YouTube channels on turbine maintenance & plant walkthroughs

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2025/7/



Course Description From

1. Course Name:	
Industrial Engineering	
2. Course Code:	
EME 427	
3. Semester / Year :	
Second Semester / fourth year	
4. Description Preparation Date:	
2024/2025	
5. Available Attendance Forms	
Theoretical Lectures + Discussion-based Lectures	
6. Number of Credit House (Total) / Number of Units (Total)	
30 Hours/ 2 unit	
7. Course administrator's name (mention all , if more than one name)	
Name: Ahmed Hadi Mahmood Email: Ahmed.ha.m@uosamarra.edu.iq	

8. Course Objectives	
Course Objectives	<ol style="list-style-type: none"> 1. Integrate managerial, economic, and statistical thinking when analysing electromechanical systems. 2. Apply economic-analysis tools—costing, depreciation, and replacement—to life-cycle decisions. 3. Employ basic statistical techniques (quality control, forecasting) to monitor and improve performance. 4. Design and evaluate production/operations systems with attention to productivity, and safety. 5. Foster critical thinking and teamwork through case studies and a capstone project linked to local industry.

9. Teaching and Learning Strategies

Strategies	A blended approach combining interactive lectures, in-class problem-solving, computer labs (Excel & Minitab), industrial visits, a group project, and guest seminars. Pedagogy shifts from direct instruction toward problem-based learning, urging students to deploy concepts in real contexts.
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10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method	
1	2	Introduction to IE	Distinguish IE from other fields	Interactive lecture + discussion	Class participation	
2	2	Productivity & Performance	Compute OEE and productivity indices	Lecture + exercises	HW 1	
3	2	Work-Study (Time & Motion)	Create flowchart & cycle-time analysis	Lecture + hands-on demo	Short report	
4	2	Statistical Quality Control	Build an X-bar control chart	Lecture	Quiz 1	
5	2	Demand Forecasting	Apply exponential smoothing model	Lecture	HW 2	
6	2	Cost & Break-Even Analysis	Plot break-even chart	Lecture + case study	In-class exercise	
7	2					
8	2	Economic Replacement	Identify optimal economic life	Lecture + group debate	HW 3	
9	2	Correlation Analysis	Understand and compute correlation coefficient (Pearson)	Lecture	Applied exercise	
10	2	Production Planning & Scheduling	Use Johnson's rule on job shop	Lecture + drills	Lab report	
11	2	Machinery Depreciation	Compute SL, DB, SYD depreciation	Lecture + numeric example	Quiz 2	
12	2	Quality Management	Apply TQM principles and interpret seven basic quality tools	Workshop	HW 4	
13	2	Measures of Dispersion	Calculate and interpret variance, standard deviation, coefficient of variation	Lecture + exercises	Quiz 3	
14	2	Project Management (CPM/PERT)	Extract critical path & σ	Lecture	In-class exercise	
15	2	Case Study & Group Project	Present local-factory analysis	Site visit + presentation	Project defence	
16	3	Final exam				

11. Course Evaluation

Tak	Count	Percentage %
Class Attendance and Participation	Continuous	5%
Assignments	4	10%
Quizzes	2	10%
Midterm Exam	1	15%
Final Exam	1	60%
Total		100%

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Mikell P. Groover. <i>Work Systems and the Methods, Measurement, and Management of Work</i> , 2nd ed. Pearson, 2012.
Main references (sources)	Douglas C. Montgomery. <i>Introduction to Statistical Quality Control</i> , 8th ed. Wiley, 2020.
Electronic References, Websites	1. https://www.pearson.com/en-us/subject-catalog/p/work-systems/P200000006490/9780131406507 2. https://www.wiley.com/en-us/Introduction+to+Statistical+Quality+Control%2C+8th+Edition-p-9781119723093

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2025/7/

