

MODULE DESCRIPTION FORM

Module Information			
Module Title	Electric Power and Machines		Module Delivery
Module Type	Basic		☒ Theory ☒ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☐ Seminar
Module Code	AIE216		
ECTS Credits	4		
SWL (hr/sem)	100 H/Sem.		
Module Level	2	Semester of Delivery	3
Administering Department	Artificial Intelligence Eng.		College
			College of Engineering
Module Leader	Hasnaa M. El-Arwash		e-mail
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Module Leader's Acad. Title	Assistant Prof.		Module Leader's Qualification
			Ph.D.
Module Tutor	Hasnaa M. El-Arwash		e-mail
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Peer Reviewer Name			e-mail
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Scientific Committee Approval Date	27/9/2025		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	Electrical Power: Three-phase Systems - Theory, Operation, and Models of Transformers - Transmission Line Models - Voltage and Frequency Control - Active and Reactive Power - Optimal Operation of Power Systems Machines: Theory of Operation and Construction of DC Motors - Torque, Capacitance, and Current Curves - Applications of DC Motors - Theory of Operation and Construction of Stepper Motors - Permanent Magnet and Minimum-Inertia DC Motors - Theory of Operation and Construction of Three-phase Induction Motors



Module Learning Outcomes	Knowledge	A2	A2.1 Analyze electrical power systems applicable to the specific discipline by applying the concepts of generation, transmission of electrical power systems. A2.2 Design, model and analyze an electrical system or component for a specific application. A2.3 identify the tools required to optimize the electrical system.
		A5	A5.1 Estimate and measure the electric machines. A5.2 Analyze the performance of D.C and A.C machines.
	Skills	B1	B1.1 Function efficiently as an individual B1.2 Function as a member of multidisciplinary and multicultural teams
		B2	B2.1 Communicate effectively – graphically with a range of audiences using contemporary tools. B2.2 Communicate verbally and in writing with a range of audiences using contemporary tools.
	Ethics	C2	C2.1 Recognize professional and ethical responsibility. C2.2 Adhere and respect diversity.
Indicative Contents	Indicative content includes the following. Power systems: <u>Unit 1:</u> Three-phase Systems - Theory, Operation, and Models of Transformers - Transmission Line Models [8 hours] <u>Unit 2:</u> Voltage and Frequency Control - Active and Reactive Power - Optimal Operation of Power Systems.[8 hours] Machines: <u>Unit 3:</u> Theory of Operation and Construction of DC Motors - Torque, Capacitance, and Current Curves - Applications of DC Motors [6 hours] <u>Unit 4:</u> Theory of Operation and Construction of Stepper Motors [6 hours] Permanent Magnet and Minimum-Inertia DC Motors – <u>Unit 5:</u> Theory of Operation and Construction of Three-phase Induction Motors[6 hours]		
Learning and Teaching Strategies			
Strategies	• Presentation • Interactive learning • Discussions • Brainstorming • Group Solving Problems • Problem-Based Learning • Self-learning		



Student Workload (SWL) for 15 weeks			
Structured SWL (h/sem)	63	Structured SWL (h/w)	5.2
Unstructured SWL (h/sem)	37	Unstructured SWL (h/w)	4.8
Total SWL (h/sem)	100		

Module Evaluation					
تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	A2,A5
	Assignments	2	10% (10)	2, 4,6,8,10,12 and 14	A2,A5
	Projects / Lab.				
	Report	1	10% (10)	13	A2,A5
Summative assessment	Midterm Exam	1hr	10% (10)	7	A2
	Final Exam	3hr	50% (50)	15	A2,A5
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)		
المناهج الاسبوعي النظري		
	Material Covered	LOs
Week 1	• Introduction	
Week 2	• Three-phase Systems	A2, B1, B2, C2
Week 3	• Theory, Operation, and Models of Transformers	A2, B1, B2, C2
Week 4	• Transmission Line Models	A2, B1, B2, C2
Week 5	• Voltage and Frequency Control	A2, B1, B2, C2
Week 6	• Active and Reactive Power	A2, B1, B2, C2



Week 7	Optimal operation of power system	A2, B1, B2, C2
Week 8	Theory of Operation and Construction of DC Motors	A5, B1, B2, C2
Week 9	Applications of DC Motors	A5, B1, B2, C2
Week 10	Mid-term EXAM	A2
Week 11	Theory of Operation and Construction of Stepper Motors	A5, B1, B2, C2
Week 12	Theory of Operation and Construction of Permanent Magnet and Minimum-Inertia DC Motors	A5, B1, B2, C2
Week 13	Theory of Operation and Construction of Permanent Magnet and Minimum-Inertia DC Motors	A5, B1, B2, C2
Week 14	Theory of Operation and Construction of Three-phase Induction Motors	A5, B1, B2, C2
Week 15	Theory of Operation and Construction of Three-phase Induction Motors	A5, B1, B2, C2
Week 16	- Rubric Exam - Preparatory week before the final Exam	A2, A5

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	
Week 2	
Week 3	
Week 4	
Week 5	
Week 6	
Week 7	



Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	1. Electric Power Principles, James L. Kirtley. 2. Electrical Power, S. L. Uppal. 3. Principles of Electric Machines and Power Electronics P.C. Sen	Yes
Recommended Texts	1. Electric Machine and Transformers Bbag S.Guru 2. Electric Machinery Fundamentals Stephen J.Chapman	Yes
Websites	https://eng.alayen.edu.iq/colleges/e/42	

Grading Scheme مخطط الدرجات				
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.				

