



Ministry of Higher Education and
Scientific Research – Iraq
Al-Furat Al-Awsat Technical University
Al-Musaib Technical College
Department of Electrical Engineering Techniques



MODULE DESCRIPTOR FORM

نموذج وصف المادة الدراسية

Module Information				
معلومات المادة الدراسية				
Module Title	Power system protection		Module Delivery	
Module Type	Core		☒ Theory Lecture ☒ Lab ☐ Tutorial ☒ Practical ☒ Seminar	
Module Code	EET407			
ECTS Credits	6			
SWL (hr/sem)	150			
Module Level	4	Semester of Delivery		2
Administering Department	DEPARTMENT OF ELECTRICAL ENGINEERING TECHNIQUES	College	Al-Furat Al-Awsat Technical University Al-Musaib Technical College	
Module Leader			e-mail	
Module Leader's Acad. Title	Assist Lecturer	Module Leader's Qualification	Master	
Module Tutor	Name (if available)	e-mail	E-mail	
Peer Reviewer Name	Name	e-mail	E-mail	
Scientific Committee Approval Date	15/06/2023	Version Number	1.0	

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	Semester	
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. Students will learn the meaning of protection ,the basic requirements for protection and the parts of the protective system. 2. Students will learn the function of measuring transformer and their characteristic, the importance and the meaning of primary and secondary protection 3. Identify the types of relays and protect the important parts of the power system
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Write at least 6 Learning Outcomes, better to be equal to the number of study weeks. 1. Meaning and importance of protection and basic requirements for protection. 2. Instrument transformer and their function, back and main protection. 3. Divide the power system in to protective zones. 4. Types of fuses and circuit breakers. 5. Relays their function and types. 6. Protection of generator, transformer, transmission and distribution systems.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A - Protection</u> Definition of Protection, Parts of the protection system, and basic requirements for protection[8hr] Main and Back up protection, Protective zones [8hr] <u>Part B – Protective Relays[12hr]</u> Define relay , their types and function. <u>Part-C- Protection of System equipment [20hr]</u> Protection of Generator, Transmission Lines, Bus Bar, motor

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1-Conceptual Understanding: Explain protection system, protective zones, primary and Back up protection 2-Mathematical Foundations: Types of Protective Relays 3- Protection of power system equipment's.

Student Workload (SWL)			
الحمل الدراسي للطلاب محسوب ل ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطلاب خلال الفصل	63	Structured SWL (h/w) الحمل الدراسي المنتظم للطلاب أسبوعيا	4.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطلاب خلال الفصل	87	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطلاب أسبوعيا	5.8
Total SWL (h/sem) الحمل الدراسي الكلي للطلاب خلال الفصل	150		

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

Delivery Plan (Weekly Syllabus)	
المنهاج الاسبوعي النظري	
	Material Covered
Week 1	What mean of protection, requirements of protection, Basic protection scheme components
Week 2	Instrument transformers (current and voltage transformers)
Week 3	Concept of main and back up protection.
Week 4	What mean by protective zones and its requirments, divide the power system to protective zones,
Week 5	Protective relays and their classification, fuses and circuit breaker.
Week 6	Over current protective Relays.
Week 7	Differential Relays.
Week 8	Distance Relays.

Week 9,10	Protection of power transformer
Week 11	Protection of Transmission and Distribution lines.
Week 12	Protection of generator.
Week 13	Protection of Bus Bar
Week 14	Motor protection
Week 15	Final Examination

Delivery Plan (Weekly Lab. Syllabus) المناهج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Current transformer tests.
Week 2	Lab 2: Voltage transformer tests.
Week 3	Lab 3: Simple protection system
Week 4	Lab 4: Thermal over current relay.
Week 5	Lab 5: Inverse-time over current relay
Week 6	Lab 6: Directional relay.
Week 7	Lab 7: Differential relay.
Week 8	Lab 8: Protection of transformer by using differential relay.
Week 9	Lab 9: Lab 1: Introduction to Matlab Simulink.
Week 10	Lab 10: Matlab Simulink for over current relay.
Week 11	Lab 11: Matlab Simulink for differential relay to protect transmission line.
Week 12	Lab 12: Matlab Simulink for differential relay to protect three phase transformer.
Week 13	Lab 13: Matlab Simulink for distance relay.
Week 14	Lab 14: Review
Week 15	

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	A course in Electrical Power, P.v.Gupta 1987	Yes
Recommended Texts	SWITCHGEAR AND PROTECTION, SUNIL S. RAO 1982	No

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