



## MODULE DESCRIPTOR FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	<b>ADVANCED POWER ENGINEERING</b>	Module Delivery	
Module Type	CORE	✓ Theory Lecture ✓ Lab Tutorial ✓ Practical ✓ Seminar	
Module Code	<b>UOMU0205063</b>		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	3	Semester of Delivery	2
Administering Department	DEPARTMENT OF ELECTRICAL ENGINEERING TECHNIQUES	College	AL-MUSTAQBAL UNIVERSITY/ENGINEERING TECHNICAL COLLEGE
Module Leader		e-mail	<a href="mailto:Hassan.Muwafaq.Gheni@uomus.edu.iq">Hassan.Muwafaq.Gheni@uomus.edu.iq</a>
Module Leader's Acad. Title	Hassan Muwafaq Gheni	Module Leader's Qualification	Doctor
Module Tutor	None	e-mail	None
Peer Reviewer Name	None	e-mail	None
Review Committee Approval	1/10/2025	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

<b>Module Objectives</b> أهداف المادة الدراسية	<p>The aim of the module on Basic Electrical Power Engineering is to provide students with a foundational understanding of the principles, concepts, and applications related to electrical power systems. The module aims to introduce students to the fundamental knowledge and skills necessary for further study and specialization in electrical power engineering.</p> <p>Learning Outcomes:</p> <ol style="list-style-type: none"><li>1- Demonstrate a basic understanding of electrical power systems, their components, and their operation.</li><li>2- Apply fundamental mathematical and analytical techniques to solve basic problems in power systems.</li><li>3- Recognize and explain the different types of power generation, transmission, and distribution technologies.</li><li>4- Identify basic safety considerations and regulations in electrical power engineering.</li></ol>
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	<p>5- Demonstrate effective communication of basic electrical power engineering concepts, both orally and in written form.</p> <p>Indicative Contents:</p> <p>Introduction to Electrical Power Systems:</p> <p>Overview of electrical power systems and their components. Basic concepts and definitions in electrical power engineering. Circuit Analysis Techniques:</p> <p>Introduction to different types of power generation, such as thermal, hydro, and renewable. Overview of power plants and their operation. Power Transmission and Distribution:</p> <p>Introduction to transmission and distribution systems. Overview of transformers, transmission lines, and distribution networks. Safety and Regulations</p>
<p><b>Module Learning Outcomes</b></p> <p>مخرجات التعلم للمادة الدراسية</p>	<ol style="list-style-type: none"> <li>1- Demonstrate a basic understanding of electrical power systems, including their components, operation, and key principles.</li> <li>2- Apply fundamental mathematical and analytical techniques to solve basic problems in electrical circuits and power systems.</li> <li>3- Recognize and explain the various types of power generation,</li> <li>4- transmission, and distribution technologies used in electrical power systems.</li> <li>5- Understand and adhere to basic safety considerations and regulations in electrical power engineering.</li> </ol>
<p><b>Indicative Contents</b></p> <p>المحتويات الإرشادية</p>	<p>Indicative content includes the following:</p> <ul style="list-style-type: none"> <li>• <u>Part A – Transmission line performance.</u> Transmission line performance: Short line, Transmission line performance: Medium line, General Network Constants A,B,C and D, [20 hrs]</li> <li>• <u>Part B Underground cables.</u> Underground cables construction, types of cables, operating voltage, stress of cables methods of decreasing stress [10 hrs]</li> <li>• <u>Part C. Symmetrical components and sequences</u> Symmetrical components +ve, -ve and zero sequence the circuit in unbalance condition analysis at unbalance condition [20 hrs]</li> <li>• <u>Part D HVDC</u> High voltage DC converter, filters, transmitting and receiving power transmission on DC [8 hrs]</li> <li>• Revision problem classes [2 hrs]</li> </ul>
<p><b>Learning and Teaching Strategies</b></p> <p>استراتيجيات التعلم والتعليم</p>	
<p><b>Strategies</b></p>	<ol style="list-style-type: none"> <li>1-<b>Hands-on Experiments:</b> Engage students in practical experiments to deepen their understanding of circuits.</li> <li>2-<b>Simulation Software:</b> Use circuit simulation software for virtual circuit design and analysis.</li> </ol>

	<p><b>3-Problem-solving Exercises:</b> Include various problem-solving exercises to apply circuit analysis techniques.</p> <p><b>4-Group Projects:</b> Assign collaborative projects for circuit design and construction.</p> <p><b>5-Real-world Applications:</b> Discuss practical applications of circuits in different devices and systems.</p> <p><b>5-Interactive Discussions:</b> Encourage student participation and critical thinking through open-ended questions.</p> <p><b>6-Conceptual Understanding:</b> Focus on intuitive understanding alongside mathematical analysis.</p> <p><b>7-Assessment Variety:</b> Use diverse assessment methods to gauge student understanding.</p> <p><b>8-Office Hours and Support:</b> Offer individualized assistance through office hours or online support.</p>
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### Student Workload (SWL)

الحمل الدراسي للطلاب

<b>Structured SWL (h/sem)</b> الحمل الدراسي المنتظم للطلاب خلال الفصل	63	<b>Structured SWL (h/w)</b> الحمل الدراسي المنتظم للطلاب أسبوعياً	4.2
<b>Unstructured SWL (h/sem)</b> الحمل الدراسي غير المنتظم للطلاب خلال الفصل	62	<b>Unstructured SWL (h/w)</b> الحمل الدراسي غير المنتظم للطلاب أسبوعياً	4.13
<b>Total SWL (h/sem)</b> الحمل الدراسي الكلي للطلاب خلال الفصل	125		

### Module Evaluation

تقييم المادة الدراسية

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

### Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
1	Transmission line performance: Short line
2,3	Transmission line performance: Medium line
4,5	General Network Constants A,B,C and D
6,7	Underground Cables
8,9	Symmetrical Components
10,11,12	Positive, Negative, and Zero sequence reactance diagram
13,14	HVDC Transmission system
15	Final Examination

### Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
1	Transmission line model loading capacitive load

2	Calculation of the parameter for three-phase transformers
3	Visit to transforming sub-station
4	Line characteristic for resistive load
5	Line characteristic for inductive load
6	Line characteristic for capacitive load
7	Voltage drop in the transmission line
8	Visit to diesel generating station
9	Determination of sequence current
10	Visit to gas turbine generating station
11	Oil test
12	Visit to hydroelectric generating station
13	Visit to thermal generating station
14	Review

### Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
<b>Required Texts</b>	P. V. Gupta, M. L. Soni, A course in Electrical Power	Yes
<b>Recommended Texts</b>	P. V. Gupta, Transmission and Distribution	No
<b>Websites</b>	<a href="https://books.google.iq/books/about/A_Course_in_Electrical_Power.html?id=j3B5AQAACAAJ&amp;redir_esc=y">https://books.google.iq/books/about/A_Course_in_Electrical_Power.html?id=j3B5AQAACAAJ&amp;redir_esc=y</a>	

#### APPENDIX:

### GRADING SCHEME

مخطط الدرجات

Group	Grade	التقدير	Marks (%)	Definition
<b>Success Group (50 - 100)</b>	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
<b>Fail Group (0 - 49)</b>	FX – Fail	مقبول بقرار	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note:

NB 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.