

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

## استمارة وصف البرنامج الأكاديمي للكليات والمعاهد

للعام الدراسي ٢٠٢٣-٢٠٢٤

الجامعة : تكريت

الكلية/ المعهد: كلية هندسة العمليات النفطية

القسم العلمي : هندسة سيطرة المنظومات النفطية

تاريخ ملء الملف : ٢٠٢٣/١١/٢٥

التوقيع :

اسم المعاون العلمي : أ.م.د. عمر ياسين ضايح

التاريخ : ٢٠٢٣/١٢/٣

التوقيع :

اسم رئيس القسم : م. ياسين خضر ياسين

التاريخ : ٢٠٢٣/١١/٢٨

دقق الملف من قبل

شعبة ضمان الجودة والأداء الجامعي

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التاريخ : ٢٠٢٣/١١/٢٨

التوقيع :

مصادقة السيد العميد

أ.م.د. غسان حمد عبد الله

٢٠٢٣/١٢/٣

التوقيع :



Ministry of Higher Education and  
Scientific Research - Iraq  
University of Tikrit  
College of Petroleum Process Engineering  
Department of Petroleum System Control  
Engineering



MODULE DESCRIPTOR FORM  
نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	ELECTRICAL MACHINES		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	PCS125		
ECTS Credits	4		
SWL (hr/sem)			
Module Level	UGI	Semester of Delivery	2
Administering Department	PSCE	College	PPE
Module Leader	Mohammed H. Ibrahim	e-mail	
Module Leader's Acad. Title	Assistant Lecturer	Module Leader's Qualification	M.Sc.
Module Tutor	None	e-mail	None
Peer Reviewer Name		e-mail	
Review Committee Approval		Version Number	1

Relation With Other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	PCS111	Semester	1
Co-requisites module	None	Semester	

## Module Aims, Learning Outcomes and Indicative Contents

### أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

<b>Module Aims</b> أهداف المادة الدراسية	The aim of the module is to provide a comprehensive understanding of DC machines, covering fundamental principles of magnetism and electromagnetism, including magnetic force, flux density, and magnetic circuits. Additionally, the course delves into the construction and operation of DC generators and motors, exploring topics such as magnetomotive force, Faraday's laws, armature windings, torque, efficiency, and speed control. The lectures also touch upon single induction motors, aiming to equip students with the knowledge necessary to analyze, design, and operate DC machines effectively.
<b>Module Learning Outcomes</b> مخرجات التعلم للمادة الدراسية	<ol style="list-style-type: none"><li>1. Understand DC machine principles and components.</li><li>2. Grasp magnetism and electromagnetism fundamentals, including magnetic force laws.</li><li>3. Ability to Calculate and analyze magnetic flux, flux density, and circuits.</li><li>4. Apply magnetomotive force and Faraday's laws to magnetic circuits.</li><li>5. Understand Lenz's law, induced EMF, and self-induction.</li><li>6. Ability to analyze magnetic hysteresis and its relevance to DC machines.</li><li>7. Describe DC generator construction, armature windings, motor characteristics, and speed control techniques, including single induction motor operation.</li></ol>
<b>Indicative Contents</b> المحتويات الإرشادية	<ol style="list-style-type: none"><li>1. Introduction to DC Machines: Overview of DC machines and their applications.</li><li>2. Magnetism and Electromagnetism: Basic principles of magnetism, Coulomb's laws and magnetic force, and Intensity of magnetic fields.</li><li>3. Magnetic Circuits: Magnetic flux and flux density, Analysis of magnetic circuits, and Magnetomotive force and reluctance.</li><li>4. Faraday's Laws and Induced EMF: Application of Faraday's laws in DC machines, Understanding Lenz's law, and Coefficient of self-induction.</li><li>5. Magnetic Hysteresis: Concept and effects of magnetic hysteresis and Implications for DC machines.</li><li>6. DC Generators: Construction and operation principles and Types of DC generators.</li><li>7. DC Armature Windings: Different types of armature windings and Characteristics and applications.</li><li>8. Characteristics and Losses: Analysis of DC machine characteristics and Losses and efficiency calculations.</li><li>9. DC Motors: Overview of DC motor types and Armature torque analysis.</li><li>10. Motor Performance and Control: Speed, losses, starting, braking characteristics, and Speed control techniques for DC motors.</li><li>11. Electric Braking: Principles and methods of electric braking.</li><li>12. Single Induction Motors: Operating principles and characteristics.</li></ol>

## Learning and Teaching Strategies

### استراتيجيات التعلم والتعليم

<b>Strategies</b>	The learning and teaching strategies of this course encompass a blend of theoretical instruction, practical demonstrations, and interactive engagement to ensure comprehensive understanding and practical application of DC machine principles. Lectures provide theoretical foundations, explaining concepts such as magnetism, electromagnetism, and magnetic circuits, while practical demonstrations offer hands-on experience with DC generators and motors. Interactive discussions and problem-solving sessions encourage student participation, facilitating deeper comprehension and critical thinking. Assessment methods include assignments and quizzes, ensuring continuous evaluation of student progress and understanding.
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## Student Workload (SWL)

### الحمل الدراسي للطالب

<b>Structured SWL (h/sem)</b> الحمل الدراسي المنتظم للطالب خلال الفصل		<b>Structured SWL (h/w)</b> الحمل الدراسي المنتظم للطالب أسبوعياً	
<b>Unstructured SWL (h/sem)</b> الحمل الدراسي غير المنتظم للطالب خلال الفصل		<b>Unstructured SWL (h/w)</b> الحمل الدراسي غير المنتظم للطالب أسبوعياً	
<b>Total SWL (h/sem)</b> الحمل الدراسي الكلي للطالب خلال الفصل			

## Module Evaluation

### تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
<b>Formative assessment</b>	<b>Quizzes</b>	3	30% (30)	4, 8, 12	LO #1,2,3,5,6,7,9,10, and 11
	<b>Assignments</b>	2	10% (10)	Continuous	
	<b>Projects / Lab.</b>	-	-	-	-
	<b>Case Study</b>	-	-	-	-
<b>Summative assessment</b>	<b>Midterm Exam</b>	2 hr	10% (10)	7	LO #1-7
	<b>Final Exam</b>	3 hr	50% (50)	16	All
<b>Total assessment</b>		100% (100)			

## Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
<b>Week 1</b>	Introduction to DC Machine
<b>Week 2</b>	Magnetism and Electromagnetism, Magnetic Force (Coulomb laws), Intensity of Magnetic field
<b>Week 3</b>	Magnetic Flux, Flux Density, Magnetic Circuit
<b>Week 4</b>	Magnetomotive Force, Reluctance, Magnetic Circuits, Faraday's Laws
<b>Week 5</b>	Lenz's Law, Induced EMF, Coefficient of Self-induction
<b>Week 6</b>	Magnetic Hysteresis
<b>Week 7</b>	DC Generators, Construction of DC Generation
<b>Week 8</b>	Types of DC Armature Windings, Types of DC Generators
<b>Week 9</b>	Characteristics and Losses of DC Machine, Condition for Maximum Efficiency
<b>Week 10</b>	DC Motors, Types of DC Motors, Armature Torque of DC Motor
<b>Week 11</b>	Speed, Losses, Starting, Braking and Characteristic of DC Motors
<b>Week 12</b>	Speed Control of DC Motors, Electric Braking, DC Motor Characteristics
<b>Week 13</b>	Single Induction Motors
<b>Week 14</b>	Single Induction Motors
<b>Week 15</b>	<b>Preparatory Week</b>
<b>Week 16</b>	<b>Final Exam</b>

## Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
<b>Required Texts</b>	E. HUGHES "ELECTRICAL TECHNOLOGY" LONGMANS, LONDON, 2005.	No, but available as a soft copy
<b>Recommended Texts</b>	Mehta VK, Mehta R. Principles of electrical machines. S. Chand Publishing; 2002.	No, but available as a soft copy
<b>Websites</b>		

**APPENDIX:**

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