MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	Electrical machines			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	RETE 205				
ECTS Credits	6				
SWL (hr/sem)	150				
Module Level	2		**Semester of Delivery**	4	
Administering Department	RETE		**College**	College of Oil & Gas Techniques Engineering/Kirkuk	
Module Leader	Saygin Siddiq Ahmed		**e-mail**	Saygin.ahmed@ntu.edu.iq	
Module Leader's Acad. Title	Assistant lecturer		**Module Leader's Qualification**	M.Sc	
Module Tutor			**e-mail**		
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date			**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 Aims أهداف المادة الدراسية	1- Connect electrical circuits and compare theoretical results with practical1. 2- Introduce the student to understand electrical theories and prove them in practice 3- The student can distinguish between direct current and alternating current
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. To familiarize the student with the importance of The most important electrical principles 2. Learning Outcomes, Teaching, Learning and Assessment Methods 3. To distinguish the electrical components and parts and their working principle.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A - Principles of circuits To develop the student's mental ability to connect simple and complex circuits. The student learns how to develop a strategy to change a complex circuit to a simple circuit with the same results. Part B – Principles to connect circuits The student learns to connect circuits according to the circuit diagram.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
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 type of simple experiments involving some sampling activities that are interesting to the students.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	72	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4.8
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	**Transformers:** Operating principle, classification, construction
Week 2	Emf equation, phasor diagrams, Equivalent circuit model, Losses & efficiency,
Week 3	Voltage regulation, Frequency response, polarity test
Week 4	Autotransformers, Isolation & instrument transformers
Week 5	**D.C. Machines:** Operating principle, generator & motor action, construction,
Week 6	Types of excitation, Emf & torque equations, Power stages & efficiency
Week 7	Commutation, Armature Reaction, Characteristics & applications of d.c generators
Week 8	Starting & speed control of d.c motors, Characteristics & applications of d.c motors
Week 9	Midterm Exam
Week 10	**Induction Machines:** Three-phase induction motors. Principle of operation, construction, types
Week 11	Rotating magnetic field, emf equation of an AC Machine, Torque developed in an induction motor
Week 12	Torque-speed characteristics, Starting & speed control, Single phase induction motors, Starting, application
Week 13	**Synchronous Machines:** Construction, types & operating principle of synchronous generator, A.C armature windings, Equivalent circuit, Phasor diagrams
Week 14	Voltage regulation, parallel operation, synchronization
Week 15	Power Angle characteristics, effect of field excitation change
Week 16	Final Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Applications DC motors acquired, installed and types
Week 2	Applications Electromotive force equalization velocity speed control
Week 3	Applications DC motor torque in the laboratory
Week 4	Torque and speed in the laboratory
Week 5	Applications characteristics of all types of DC motors
Week 6	Applications ingle motors in the laboratory
Week 7	Applications Three-phase starter in the laboratory
Week 8	star and a triangle in single & three phase
Week 9	Midterm Exam
Week 10	Students watching the types of DC motors in the laboratory
Week 11	Students watching the shape of the transistor in the laboratory and how it works
Week 12	Electromotive force equalization velocity speed control
Week 13	Applications full wave uniform and see the wave on the OSC
Week14	Applications uniform half wave and see the wave on the OSC
Week 15	Preparatory week before the final Exam
Week16	Final Exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	"Basic Electrical Engineering", THERAJA.	Yes
Recommended Texts	"Electrical and Electronic Principles and Technology", John Bird	Yes
Websites	Basic Electrical machines website tutorials	

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.