

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Electromagnetic Static Fields		Module Delivery
Module Type	Core		☒ Theory ☐ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☐ Seminar
Module Code	ATU11303		
ECTS Credits	4		
SWL (hr/sem)	100		
Module Level	UGII	Semester of Delivery	
Administering Department		College	NETC
Module Leader	Ghufran Mahdi Hatem	e-mail	Coj.ghf@atu.edu.iq
Module Leader's Acad. Title	lecturer	Module Leader's Qualification	Ph.D.
Module Tutor	Name (if available)	e-mail	E-mail
Peer Reviewer Name	Nasir Hussein Selman	e-mail	Coj.nas@atu.edu.iq
Scientific Committee Approval Date	01/10/2024	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. To provide a comprehensive understanding of the fundamental concepts and principles of electromagnetic fields. 2. To develop the ability to analyze and solve problems related to electromagnetic fields. 3. To enhance critical thinking skills in applying electromagnetic field theory to practical engineering applications. 4. To foster an appreciation for the importance of electromagnetic fields in various disciplines of engineering and science.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Explain the basic concepts and principles of electromagnetic fields. 2. Analyze and solve problems related to static and dynamic electric and magnetic fields. 3. Apply electromagnetic field theory to practical engineering applications. 4. Demonstrate an understanding of the interactions between electric and magnetic fields. 5. Evaluate and analyze electromagnetic wave propagation and transmission. 6. Apply mathematical techniques, including vector calculus, in the analysis of electromagnetic fields.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. 1. Introduction to Electromagnetic Fields a. Review of vector calculus and coordinate systems and transformation Between Coordinates and Dell operator b. Electric charge and Coulomb's law c. Electric field intensity and electric flux d. Gauss's law and its applications 2. Electric Fields in Materials a. Electric potential and voltage b. Conductors, insulators, and dielectrics c. Capacitance and capacitance calculations d. Poisson's and Laplace's equations

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 types of simple experiments involving some sampling activities that are interesting to the students.

Student Workload (SWL)			
الحمل الدراسي للطلاب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطلاب خلال الفصل	48	Structured SWL (h/w) الحمل الدراسي المنتظم للطلاب أسبوعيا	3.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطلاب خلال الفصل	52	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطلاب أسبوعيا	3.5
Total SWL (h/sem) الحمل الدراسي الكلي للطلاب خلال الفصل	100		

Module Evaluation					
تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	15% (15)	5 and 10	LO #1.....#16
	Assignments	2	15% (15)	2 and 12	LO #3, #4 and #6, #7
	Homework	0	0%	-----	-----
	Report	2	10% (10)	13	LO #5, #8 and #10
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction to Electromagnetic Fields
Week 2	Vector definition- Scalars And Vectors and Vector Algebra
Week 3	The Cartesian Coordinate System - Vector Component And Unit Vectors - The Vector Field - Dot Product - Cross Product
Week 4	Cylindrical Coordinate - Spherical Coordinate
Week 5	Transformation Between Coordinates
Week 6	Del Operator - Laplacian Operator - Gradient - Divergence and Curl
Week 7	Coulomb law -Electric force

Week 8	Coulomb law - Electric field intensity - Field due to continuous volume charge - Field of line charge - Field of sheet charge
Week 9	Mid-term Exam
Week 10	Electric Flux Density
Week 11	Gauss Law - Application of Gauss Law - Maxwell First Equation.
Week 12	Energy and Potentials in A Moving Point Charge in An Electric Field
Week 13	Dielectric and Capacitance - Current and Current Density - Continuity of Current - Metallic Conductor
Week 14	Boundary Conditions - Image Theory - Semiconductor - Dielectric Materials – Capacitance
Week 15	Poisson's and Laplace's equations
Week 16	Final Exam

Learning and Teaching Resources		
مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	W.H. Hayt, and J.A. Buck, "Engineering Electromagnetics", McGraw-Hill, 2007.	Yes
Recommended Texts	1) David K. Cheng, "Fundamentals of Engineering Electromagnetics", Prentice Hall, 1993. 2) Matthew N.O. Sadiku, "Elements of Electromagnetics", 4th ed. Oxford, 2006.	Yes
Websites	https://empossible.net/academics/emp3302/	

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.				