

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information				
معلومات المادة الدراسية				
Module Title	Electromagnetic waves		Module Delivery	
Module Type	Core		<input checked="" type="checkbox"/> Theory <input checked="" type="checkbox"/> Lecture <input type="checkbox"/> Lab <input type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar	
Module Code	UOMU031034			
ECTS Credits	5			
SWL (hr/sem)	125			
Module Level	2	Semester of Delivery		1
Administering Department	Type Dept. Code	College	Type College Code	
Module Leader	Sara jalel		e-mail	E-mail
Module Leader's Acad. Title		Module Leader's Qualification	Ph.D.	
Module Tutor	Name (if available)		e-mail	E-mail
Peer Reviewer Name	Name		e-mail	E-mail
Scientific Committee Approval Date	01/06/2023	Version Number	1.0	

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

Co-requisites module	None	Semester	
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Module Aims, Learning Outcomes and Indicative Contents	
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	<ol style="list-style-type: none"> 1. To understand the ways in which various concepts in electromagnetism come into play in particular situations; to represent these electromagnetic phenomena and fields mathematically in those situations; and to predict outcomes in other similar situations.. 2. To understand the mathematics to express the phenomena in electromagnetism. 3. This course deals primarily with a vector calculus based description of static electric field. 4. To understand the polarization, dielectric constant and the boundary conditions at the interface at the two different dielectric media. 5. To calculate the electric field by applying Gauss's law for fixed charges and dielectric materials.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	<ol style="list-style-type: none"> 1. Use the mathematics to express the phenomena in electromagnetism. 2. Define the electric field, the electric potential, and electric dipole 3. Calculate the electrostatic field, electrostatic potential of the charge, dipole and multipoles 4. Apply Gauss's law to solve some problems. 5. Apply Poisson's equation to solve some problems 6. Apply Laplace's equation to solve some problems. 7. Define the electric displacement, polarization of the materials, dielectric constant, and electric susceptibility. 8. Calculate the electric field outside a dielectric materials. 9. Calculate the electrostatic electric and potential fields in dielectric materials, microscopic theory of dielectric and electrostatic energy 10. Define the Ferroelectricity phenomena. 11. Calculate the energy density of the electrostatic field. 12. Calculate the energy of a System of Charged Conductors

<p>Indicative Contents</p> <p>المحتويات الإرشادية</p>	<p>Vector analysis, coordinate system Electric Charge. [6 hrs]</p> <p>Coulomb's law, The Electric Field, Electrostatic Potential ,Conductors & Insulators, Gauss's Law, The Electric Dipole, Multipole Expansion . . [9 hrs]</p> <p>Poisson's Equation, Laplace's Equation, Laplace's Equation in one independent Variable, Laplace's Equation in Spherical Coordinates, Conducting Sphere in Uniform, Cylindrical Harmonics, Electrostatic Images, Point charge & Conducting Sphere, Line charges & Line Images, System of Conductors, Poisson's Equation. . [12 hrs]</p> <p>Polarization, Field Outside of a Dielectric Medium, The Electric Field inside a Dielectric, The Electric Displacement Electric Susceptibility and Dielectric Constant</p> <p>Point Charge in a Dielectric Field, Boundary Conditions on the Field Vector, Boundary Value Problem Involving Dielectrics, Dielectric Sphere in a Uniform Electric Field. .[12 hrs]</p>
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<p>Learning and Teaching Strategies</p> <p>استراتيجيات التعلم والتعليم</p>	
<p>Strategies</p>	<p>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.</p>

<p>Student Workload (SWL)</p> <p>الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا</p>			
<p>Structured SWL (h/sem)</p> <p>الحمل الدراسي المنتظم للطالب خلال الفصل</p>	<p>60</p>	<p>Structured SWL (h/w)</p> <p>الحمل الدراسي المنتظم للطالب أسبوعيا</p>	<p>4</p>
<p>Unstructured SWL (h/sem)</p>	<p>65</p>	<p>Unstructured SWL (h/w)</p>	<p>25</p>

الحمل الدراسي غير المنتظم للطالب خلال الفصل		الحمل الدراسي غير المنتظم للطالب أسبوعيا	
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation					
تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	Midterm Exam	2hr	20% (20)	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 + Week2	Vector analysis, coordinate system.

Week3 + Week4 + Week5	Electric Charge , Coulomb's law, The Electric Field, Electrostatic Potential ,Conductors & Insulators, Gauss's Law, The Electric Dipole, Multipole Expansion
Week 6	First exam
Week7 + Week8 + Week9 + Week10	Poisson's Equation, Laplace's Equation, Laplace's Equation in one independent Variable, Laplace's Equation in Spherical Coordinates, Conducting Sphere in Uniform, Cylindrical Harmonics, Electrostatic Images, Point charge & Conducting Sphere, Line charges & Line Images, System of Conductors, Poisson's Equation.
Week11 + Week12 + Week13 + Week14	Polarization, Field Outside of a Dielectric Medium, The Electric Field inside a Dielectric, The Electric Displacement Electric Susceptibility and Dielectric Constant, Point Charge in a Dielectric Field, Boundary Conditions on the Field Vector, Boundary Value Problem Involving Dielectrics, Dielectric Sphere in a Uniform Electric Field.
Week 15	Second exam

Learning and Teaching Resources		
مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	introduction to Electrodynamics by David J. Griffiths, [Prentice-Hall, Inc., 1999], 3rd Edition.	Yes
Recommended Texts	Foundations of Electromagnetic Theory by Reitz, John R., Milford, Frederick J., Christy, Robert W. [Addison-Wesley, 2008] 4th Edition	No
Websites	https://www.khanacademy.org/science/physics	

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.