	Ministry of Higher Education and Scientific Research - Iraq University of WARITH ALANBIYAA College of Sciences Department of Medical Physics	

MODULE DESCRIPTOR FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	ELECTRICITY AND MAGNETISM			**Module Delivery**	
Module Type	BASIC			**Theory ✓** **Lab✓** **Tutorial✓** **Seminar✓**	
Module Code	MPH1207				
ECTS Credits	8				
SWL (hr/sem)	200				
Module Level	1		**Semester of Delivery**	1	
Administering Department	MPH1207		**College**	College of Sciences	
Module Leader	Ahmed Mousa Jaafar		**e-mail**	ahmed.mo@uowa.edu.iq	
Module Leader's Acad. Title	Lecturer		**Module Leader's Qualification**	PhD in medical Physics	
Module Tutor			**e-mail**		
Peer Reviewer ame			**e-mail**		
Review Committee Approval			**Version Number**	1	

Relation With Other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	No	**Semester**	No
Co-requisites module	No	**Semester**	No

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	The course aims to provide students with information and skills in static electricity and magnetism necessary for the undergraduate level. Potentially qualifying undergraduate studies in the physical sciences, building a strong background for those who will continue to study materials related to the applications of static electricity and magnetism.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Recognizing the Charges at rest: Electrostatics Charges in motion: Electric current. 2. Explaining COULOMBS LAW AND ELECTRIC FIELDS 3. .Explaining CURRENT, RESISTANCS. 4 . Discussing the reaction and involvement of atoms in electric circuits. 5. Describing electrical power, charge, and current. 6. Defining Ohm's law. 7 .Explaining the LENZ S LAW 8. Identifying the basic circuit elements and their applications. 9. Discussing the Magnetism force in magnetic field. 10. Discussing the magnetic moment , magnetic field.
Indicative Contents المحتويات الإرشادية	DC circuits – Current and voltage definitions, Passive sign convention and circuit elements, Combining resistive elements in series and parallel. Kirchhoff's laws and Ohm's law. Anatomy of a circuit, Network reduction, Introduction to mesh and nodal analysis. AC circuits I – Time dependent signals, average and RMS values. Capacitance and inductance, energy storage elements, simple AC steady-state sinusoidal analysis. AC Circuits II - Phasor diagrams, definition of complex impedance, AC circuit analysis with complex numbers. RL, RC and RLC circuits - Frequency response of RLC circuits, simple filter and band-pass circuits, resonance and Q-factor, use of Bode plots, use of differential equations and their solutions. Time response (natural and step responses. Fundamentals Resistive networks, voltage and current sources, Thevenin and Norton equivalent circuits, current and voltage division, input resistance, output resistance, coupling and decoupling capacitors, maximum power transfer, RMS and power dissipation, current limiting and over voltage protection. Components and active devices – Components vs elements and circuit modeling, real and ideal elements. Introduction to sensors and actuators, self-generating vs modulating type sensors, simple circuit interfacing. Diodes and Diode circuits – Diode characteristics and equations, ideal vs real. Signal conditioning, clamping and clipping, rectification and peak detection,

	photodiodes, LEDs, Zener diodes, voltage stabilization, voltage reference, power supplies
Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	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			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	90	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	9
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	110	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	31
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	200		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	5	4	2, 4, 5, 6, 9	1, 2, 3, 4, 5, 6
	Reports	10	1	all	4, 5
	Project	1	4	8	6, 8, 9
	Homework	2	3	3, 7	3, 7, 9
Summative assessment	**Midterm Exam**	1	10	7	
	Final Exam	1	50	15	
Total assessment			100		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Charges at rest: Electrostatics.
Week 2	Charges in motion: Electric currents.
Week 3	COULOMBS LAW AND ELECTRIC FIELDS.
Week 4	POTNTIAL, CURRENT.
Week 5	RESISTANCS.
Week 6	OHMS LAW.
Week 7	Med- term exam
Week 8	RESISTANCE; SIMPLE CIRCUTS.
Week 9	KIRCHHOFF S LAWS EQUIVALENT.
Week 10	Magnetism.
Week 11	IN MAGNETIC FIELDS.
Week 12	MAGNETIC MOMENT, SOURCES OF MAGNETIC FLUX FORCES.
Week 13	LENZ S LAW.
Week 14	MAGNETIC FIELD
Week 15	Final exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الأسبوعي للمختبر	
weeks	**Material Covered**
Week 1	EXP 1: Capacitive Reactance in the AC Circuit
Week 2	EXP 2: Study of Self-Inductance and Inductive Reactance in Alternating Current Circuits
Week 3	EXP 3: Capacitor Charging
Week 4	EXP 4: Earth's Magnetic Field
Week 5	EXP 5: Determining the Internal Resistance and Maximum Power of a Cell
Week 6	Discussion for the project 1
Week 7	EXP 6: Discussion for the experiments (1-5)
Week 8	EXP 7: Mapping the Electric Field
Week 9	EXP 8: Determination of Resistance of Resistors in Parallel Connection
Week 10	EXP 9: Slide Wire Wheatstone Bridge
Week 11	EXP 10: LCR Resonant Circuit Series
Week 12	Discussion for the experiments (6-9)
Week 13	Discussion for the project Project 2
Week14	Discussion for the project 3
Week 15	Final Exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Schaum's outlines of theory and problems of college physics More Physics: electric charges and fields – electromagnetism	
Recommended Texts	Electronics basics books	
Websites	https://books-library.net/free-32056793-download	

APPENDIX:

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	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.

ملاحظة: هذا النموذج تم وضعه وتقديمه من قبل مديرية ضمان الجودة في وزارة التعليم العالي والبحث العلمي