




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



MODULE DESCRIPTOR FORM

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| Module Information | | | | |
|-----------------------------|---------------------------|-------------------------------|--|----------------------|
| معلومات المادة الدراسية | | | | |
| Module Title | ELECTRICITY AND MAGNETISM | | Module Delivery | |
| Module Type | BASIC | | Theory ✓ Lab ✓ Tutorial ✓ Seminar ✓  | |
| Module Code | MPH201 | | | |
| ECTS Credits | 8 | | | |
| SWL (hr/sem) | 200 | | | |
| Module Level | 1 | Semester of Delivery | | |
| Administering Department | Medical Physics | 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 | Ali Nadhim Munif | | e-mail | Ali.n@uowa.edu.iq |
| Peer Reviewer ame | - | e-mail | - | |
| Review Committee Approval | 2023 - 2024 | 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

| | |
|--|---|
| <p>Module Aims أهداف المادة الدراسية</p> | <p>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.</p> |
| <p>Module Learning Outcomes مخرجات التعلم للمادة الدراسية</p> | <ol style="list-style-type: none"> 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. |
| <p>Indicative Contents المحتويات الإرشادية</p> | <p>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.</p> <p>AC circuits I – Time dependent signals, average and RMS values. Capacitance and inductance, energy storage elements, simple AC steady-state sinusoidal analysis.</p> <p>AC Circuits II - Phasor diagrams, definition of complex impedance, AC circuit analysis with complex numbers.</p> <p>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).</p> <p>Fundamentals</p> <p>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.</p> <p>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.</p> <p>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</p> |

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 أسبوعياً | 9 |
| Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل | 110 | Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً | 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) المناهج 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) المناهج 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 | No |
| Recommended Texts | Electronics basics books | No |
| 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