**مختصر توصيف المقرر**

**معلومات المقرر*** **(Course Information)**

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| **اسم المقرر:** | فيزياء عامة 3 |
| **رقم المقرر:** | فيز 2032 |
| **اسم ورقم المتطلب السابق:** | فيز 1022 |
| **اسم ورقم المتطلب المرافق:** | -- |
| **مستوى المقرر:** | الثالث |
| **الساعات المعتمدة:** | 4 (3+2+0) |

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| **Module Title:** | General Physics III |
| **Module ID:** | PHYS 2032 |
| **Prerequisite:** | PHYS 1022 |
| **Co-requisite:** | -- |
| **Course Level:** | Third |
| **Credit Hours:** | 4 (3+2+0) |

**وصف المقرر :** **Module Description**

Theoretical part: Electric Charge, Insulators and conductors, Coulomb's law, Point charge, The electric field, Electric field of multiple point charges, The electric field of continuous charge distribution, examples of various shapes (disks, rings, spheres, planes), The parallel plate capacitor, Electric dipole, motion of point charge and electric dipole in electric field, Electric flux, Gauss's law, Applications of Gauss's law, Conductor in electrostatic equilibrium, The electric current, Batteries, current density, Conductivity and resistivity, Electric potential, The potential of point charges, The potential of dipole, The electric potential of many charges, Capacitance and capacitors, Energy stored in a capacitor, Fundamental circuits, Ohm's law, Series resistors, Parallel resistors, Kirchhoff's laws, RC circuits, Magnetism and magnetic force, source of magnetic fields, Magnetic field of a current, Magnetic dipoles, Ampere's law and solenoids, The magnetic force on a moving charge, The magnetic force on a current-carrying wire, Forces and torques on current loops, Induced current, Motional emf, Magnetic flux, Lenz's law, Faraday's law, Induced fields and EM waves, Inductors, LC circuits, LR circuits, AC circuits and phasor, Capacitors in AC circuits, RC filter circuits, Inductor circuits, The RLC circuits, Power in AC circuits, Wave phenomena, Longitudinal and transverse waves, Sound, The nature of light and the laws of geometric optics, Image formation, Interference of light waves, Diffraction patterns and polarization.

Practical part: Verification of Ohm's Law, Metric bridge, Charge and discharge of capacitors, Inductive Reactance, Capacitive Reactance, RCL circuits, Transformers, Speed of sound in air, Refractive Index of a Prism, Focal length of Lenses, Focal Length of Mirrors, Joules equivalence.

**أهداف المقرر :** **Module Aims**

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| **1** | Studying principles of electricity | 1 |
| **2** | Knowing the Basic electric circuits AC and DC | **2** |
| **3** | Studying principles of magnetism | **3** |
| **4** | Studying the basics of optics and waves | **4** |

**Learning Outcomes:** **مخرجات التعليم:**

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| **1** | **Knowledge**<br>• To distinguish between the AC and DC currents<br>• To distinguish between parallel and series connections.<br>• To compute the magnitude of magnetic fields and forces.<br>• To know the basic laws of electricity.<br>• To know all related laws of mirrors lenses and prisms.<br>• To distinguish between Gauss's and Coulomb's laws.<br>• To know the potential differences and fields of a point charge and conductors. | 1 |
| **2** | **Cognitive Skills**<br>• Study Coulomb's law, and learn how to relate it to electric forces acting on the electric charges located on the electric fields.<br>• Learn how to apply Gauss's law to various Charge Distributions.<br>• Be able to find Potential Difference and Electric Potential Due to Point Charges.<br>• Distinguish between Parallel and Series combinations of Capacitors and resistors.<br>• Calculate magnetic fields and forces in conductors.<br>• Distinguish between DC and AC currents.<br>• Apply Lorenz and Ampère's laws.<br>• Know how to use Kirchhoff's Rules.<br>• Relate the equations of physics.<br>• Describe all laws related to mirrors, lenses and prisms. | 2 |
| **3** | **Interpersonal Skills and Responsibility**<br>• The ability to interact professionally with others, to engage effectively in teamwork, and to function productively on multidisciplinary group projects.<br>• To develop in each student, the good writing skills so that they are able to communicate effectively and clearly<br>• To develop in each student good oral communication skills so that they are able to communicate effectively with others<br>• The report is required to demonstrate proficient organizational skills and writing skills. | 3 |
| **4** | **Communication, Information Technology and Numerical Skills**<br>• To develop the team working skills necessary to perform effectively.<br>• To develop the ability to argue scientifically with the instructor.<br>• To know how to use the computer program to analyze the data, and make some simulation<br>• To know how to search the web for any updated information concerning the assigned experiment.<br>• To analyze the data with good mathematics and theory. | 4 |
| **5** | **Psychomotor**<br>Not applicable. | 5 |

**Course Contents:** **محتوى المقرر:**

| ساعات التدريس (Hours) | عدد الأسابيع (Weeks) | قائمة الموضوعات (Subjects) |
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| 3+2 | 1 | Electric charge, Coulomb's law, introduction to the electric field, and the electric forces acting on the electric charges located on the electric fields.<br>**Introduction** |

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| 3+2 | 1 | Electric Field of a Continuous Charge Distribution, Gauss's Law, Application of Gauss's Law to Various Charge Distributions, parallel plate capacitors.<br>**Experiment 1** |
| 6+4 | 2 | Potential Difference and Electric Potential, Electric Potential and Potential Energy Due to Point Charges, Definition of Capacitance, Combinations of Capacitors (Parallel Combination-Series combination) Energy Stored in a Charged Capacitor,<br>**Experiment 2 + Experiment 3** |
| 6+4 | 2 | DC electric current, electrical connections, ohm's laws, resistors (parallel connection-series connection), Electrical Energy and Electrical Power in DC circuits, Kirchhoff's Rules.<br>**Experiment 4 + experiment 5** |
| 6+4 | 2 | Magnetic field and Magnetic Forces Acting on a Current-Carrying Conductor, Motion of a Charged Particle in a Uniform Magnetic Field, Lorenz law.<br>**Experiment 6 + Experiment 7** |
| 6+4 | 2 | Sources of the Magnetic Field, Ampère's Law and its applications, The Magnetic Force Between Two Parallel Conductors, Faraday's Law of induction, Induced emf and Electric Fields, energy stored in a magnetic field.<br>**Experiment 8 + Experiment 9** |
| 6+4 | 2 | Alternating Current, Resistors in an AC Circuit Inductors in an AC Circuit, inductive reactance capacitive reactance, Power in an AC Circuit, Resonance in a Series RLC Circuit, phase angle,<br>**Experiment 10 + Experiment 11** |
| 6+4 | 2 | The Nature of Light, Reflection Laws, types of mirrors,<br>**Substitution week+ Final Experimental Exam** |
| 3 | 1 | Index of refraction, Huygens's Principle, Dispersion and Prisms, Total Internal Refraction, critical angle, types of lenses, and basic rules for refraction by lenses, images forming by lenses. |

**Textbook and References:** **الكتاب المقرر والمراجع المساندة:**

| سنة النشر<br>Publishing Year | اسم الناشر<br>Publisher | اسم المؤلف (رئيسي)<br>Author's Name | اسم الكتاب المقرر<br>Textbook title |
|---|---|---|---|
| 9th Ed. (2013) | *Cengage Learning* | *Raymond A. Serway and John W. Jewett* | **Physics for scientists and engineers**<br>***ISBN***-10: 013805715X |
| **سنة النشر**<br>**Publishing Year** | **اسم الناشر**<br>**Publisher** | **اسم المؤلف (رئيسي)**<br>**Author's Name** | **اسم المرجع**<br>**Reference** |
| 9th Ed. (2011) | Cengage Learning | *Raymond A. Serway, Chris Vuille* | **College Physics**<br>***ISBN***-10:0840062060 |
| 9th Ed. (2012) | John Wiley & Sons | *John D. Cutnell, Kenneth W. Johnson* | **Physics**<br>***ISBN***-10: 0470879521 |