

|                      |                 |                             |          |   |     |   |   |   |
|----------------------|-----------------|-----------------------------|----------|---|-----|---|---|---|
| <b>Department</b>    | General Studies | <b>Major</b>                |          |   |     |   |   |   |
| <b>Course Name</b>   | Physics 1       | <b>Course Code</b>          | PHYS 301 |   |     |   |   |   |
| <b>Prerequisites</b> | General physics | <b>Credit Hours<br/>CRH</b> | 4        |   | CTH |   | 6 |   |
|                      |                 |                             | L        | 3 | P   | 2 | T | 1 |

**Course Description :**

The course enables students to gain theoretical and practical background in physics. The course includes the development of skills and understanding of basic principles of coordinate systems. The student has to know the basic notions of the electric circuits, basic electronic devices and the general equilibrium of a rigid body. Also this course is designed to give the student a basic knowledge in the theory of electricity, electrostatics, magnetism, dynamics and kinematic of material point.

**General Objective:**

This course aims at teaching the student the principle skills of some subjects that enable him to understand the specialized courses.

**Detailed Objectives:****Trainee will be able to:**

- 1- Be acquainted with units, dimensions and coordinate systems.
- 2- Dealing electrical properties of solids and how to use them.
- 3- know the basic notions of the electric circuits.
- 4- Analyzed any electric circuit by different methods.
- 5- Solve kinetics problems by combining Newton's Law and kinematic equations, methodically accounting for all forces, and accelerations.
- 6- Solve kinetics problems using the principle of work & energy and impulse & momentum.

**Safety Procedures:**

- 1- Conduct yourself in a responsible manner at all times in the laboratory.
- 2- Follow all written and verbal instructions carefully. If you do not understand a direction or part of a procedure, ASK YOUR TEACHER BEFORE PROCEEDING WITH THE ACTIVITY.
- 3- Keep the laboratory and work area clean and uncluttered
- 4- Observe good housekeeping practices. Work areas should be kept clean and tidy at all times.
- 5- Labels and equipment instructions must be read carefully before use. Set up and use the equipment as directed by your teacher.
- 6- Know the locations and operating procedures of all safety equipment including: first aid kit(s), and fire extinguisher. Know where the fire alarm and the exits are located.
- 7- Never work alone in the laboratory. No student may work in the science classroom without the presence of the teacher.
- 8- A lab coat or smock should be worn during laboratory experiments

| Detailed of Theoretical Contents |   |   |  |
|----------------------------------|---|---|--|
| Hours                            | Contents  |   | Assessment Tools   |
| 6                                | <b>Physics measurement and Coordinate Systems:</b> <ul style="list-style-type: none"> <li>Units - Dimensions - Cartesian Coordinates - Cylindrical Coordinates</li> <li>Spherical Coordinates</li> <li>Examples and Problems.</li> </ul>  |   | <ul style="list-style-type: none"> <li>Oral Presentations</li> <li>Quiz</li> <li>Short answer</li> <li>True/false questions</li> <li>Exams</li> </ul>          |
|                                  | Textbook  | 1 | Fundamentals of physics (extended edition) David Halliday Robert Resnick Gearsal Walker John Wiley and Son, INC, ISBN -0 -471 – 57578-x. Fifth edition -199    |
|                                  |   | 2 | Foundations Of Physics for Technology Colleges and universities freshmen . Dr. Marwan A. Alfahha Third edition 2012  |
| 4                                | <b>Conduction of electricity in solid:</b> <ul style="list-style-type: none"> <li>The electrical properties of solids - Energy levels in a crystalline solid</li> <li>Insulators – Metals - Semiconductors (sc) - Doped SC - The p-n junction</li> <li>The diode - The silicon solar cells</li> <li>Examples and Problems.</li> </ul>   |   | <ul style="list-style-type: none"> <li>Oral Presentations</li> <li>Quiz</li> <li>Short answer</li> <li>True/false questions</li> <li>Exams</li> </ul>          |
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| 6                                | <b>Kinematics, dynamics of material point in Galilean reference frame:</b> <ul style="list-style-type: none"> <li>Rectilinear motion of particles: - Position, Velocity and Acceleration. - Determination of the motion of the particles, - Uniform rectilinear motion,- Uniformly accelerated rectilinear motion.</li> <li>Curvilinear motion of particles: Position vector, velocity, Acceleration.</li> <li>-The three laws of Newton - Conditions of rest or motion of bodies (single particle) under the action of forces.- Study of 1-D space motion, - 2-D space motion, - 3-D space motion, - Motion equations, - General theorems of motion,- Work of forces and energy.</li> <li>Examples and Problems</li> </ul> |   | <ul style="list-style-type: none"> <li>Oral Presentations</li> <li>Quiz</li> <li>Short answer</li> <li>True/false questions</li> <li>Exams</li> </ul>          |
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| 4                                | <b>General equilibrium of a rigid body:</b> <ul style="list-style-type: none"> <li>System of forces acting on a rigid body able to translate: equilibrium condition of translation (sum of forces = zero: forces balance)</li> <li>System of moments of forces (torques) acting on a rigid body able to rotate about a fixed axis or about a pivot point: Vector product equation</li> </ul>  |   | <ul style="list-style-type: none"> <li>Exams</li> <li>Oral Presentations</li> <li>Quiz</li> <li>Short answer</li> <li>True/false questions</li> </ul>          |

| Detailed of Theoretical Contents |   |   |  |
|----------------------------------|---|---|--|
| Hours                            | Contents  |   | Assessment Tools   |
|                                  | <ul style="list-style-type: none"> <li>• Moment of a force about a point - Moment of a force about an axis</li> <li>• Moment due to a couple of forces -Equilibrium condition of rotation (sum of moments=zero: torques in balance).</li> <li>• Examples and Problems&gt;</li> </ul>  |   |  |
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|                                  |   | 2 | Foundations Of Physics for Technology Colleges and universities freshmen . Dr. Marwan A. Alfahha Third edition 2012  |
| 6                                | <b>Alternating Current Circuit and Oscillations:</b> <ul style="list-style-type: none"> <li>• Unit Sub Titles</li> <li>• AC source, Resistors in an AC circuit, rms current, rms voltage, Capacitors in an AC circuit, The capacitive reactance XC, Inductors in an AC circuit, The inductive reactance XL, oscillations in an RLC series circuit, The impedance Z, The phase angle, The maximan voltages across the elements, Power in an AC circuit, Resonance in a series RLC circuit, The resonance frequency, The transformer,</li> <li>• Examples and Problems</li> </ul>                             |   | <ul style="list-style-type: none"> <li>- Exams</li> <li>- Oral Presentations</li> <li>- Quiz</li> <li>- Short answer</li> <li>- True/false questions</li> </ul>  |
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| 6                                | <b>Electric fields and electric potential</b> <ul style="list-style-type: none"> <li>• Coulomb's law -The electric fields- electric field line- electric field due to a point charge- symmetry elements of a distrubition of charge - electric field due to an electric dipole- electric field due to a line of charge- electric field due to charge disk- flux of an electric field- Gauss's law - electric potential- calculating the potential from the field-potential due to a point charge and electrical dipole-calculating the field from the potential</li> <li>• Examples and Problems</li> </ul> |   | <ul style="list-style-type: none"> <li>- Exams</li> <li>- Oral Presentations</li> <li>- Quiz</li> <li>- Short answer</li> <li>- True/false questions</li> </ul>  |
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| Detailed of Practical Contents |  |  |
|--------------------------------|--|--|
| Hours                          | Contents   | Assessment Tools   |
| 4                              | <b>Kirchhoff's circuit laws</b>  | -Exams<br>-Quiz<br>-Short answer   |
| 4                              | <b>Diode characterization (I-V) .</b>  | -Exams<br>-Quiz<br>-Short answer   |
| 6                              | <b>Equilibrium condition of a rigid body able to rotate around a fixed axis: moments theorem</b> | -Exams<br>-Quiz<br>-Short answer   |
| 4                              | <b>Fletcher's trolley</b>  | -Exams<br>-Quiz<br>-Short answer   |
| 6                              | <b>Equilibrium condition of a rigid body subjected to a set of forces</b>                        | -Exams<br>-Quiz<br>-Short answer   |
| 4                              | <b>Ohm's law and parallel/series resistance</b>  | -Exams<br>-Quiz<br>-Short answer   |
| 6                              | <b>Transient regime: RC circuit :Charging and discharging a capacitor</b>                        | -Exams<br>-Quiz<br>-Short answer   |
| 6                              | <b>Resonance in a series RLC circuit</b>   | -Exams<br>-Quiz<br>-Short answer   |
| 6                              | <b>Determination of the specific charge of the electron</b>                                      | -Exams<br>-Quiz<br>-Short answer   |
| <b>Textbook</b>                | 3  | Microelectronics Digital and Analog Circuits and Systems – Jacob mill man- ISBN 0-07-042327. Update edition. |
|                                | 4  | Physics Principal and Problems- Robert B. Clark, Patrick Kenealy- ISBN 0-02826721-4                          |

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|                  | ● | Physics Principal and Problems- Robert B. Clark, Patrick Kenealy> ISBN 0-02826721-4   |

## List of Detailed Equipment for Laboratory, Workshop or Lab

| No. | Laboratory name / workshop | Capacity of training | Human Resources with Certificate |
|-----|----------------------------|----------------------|----------------------------------|
| 1-  | Physics Lab                | 20                   | 2                                |

| Workshop / Lab of PHYSICS |  |          |
|---------------------------|--|----------|
| No.                       | Product's Name   | Quantity |
| 1-                        | Oscilloscope   | 4        |
| 2-                        | Digital multimeter                                       | 20       |
| 3-                        | Adjustable DC Power Supply                               | 10       |
| 4-                        | Diode ( 1N4001 or 1N4007)                                | 100      |
| 5-                        | Resistor (10 $\Omega$ , 100 $\Omega$ ,..., 1k $\Omega$ ) | 100      |
| 6-                        | Capacitor ( 0,1NF, 10NF...)                              | 50       |
| 7-                        | Battery(9v)  | 20       |
| 8-                        | solder   | 2        |
| 9-                        | Connecting wires   | 100      |
| 10-                       | Teslameter   | 2        |
| 11-                       | Coil (Variable number of turns)                          | 10       |