## Faculty of Engineering & Technology

## Physics 3

**Information :**

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| **Course Code :** | PHY 231 | **Level :** | Undergraduate | **Course Hours :** | 3.00- Hours |

**Department :** Department of Structural Engineering & Construction Management

**Instructor Information :**

| Title | Name | Office hours |
|---|---|---|
| Lecturer | AHMED MOHAMED ALI ASHOUR AHMED | 21 |
| Assistant Lecturer | SHEROUK SOBHI ABDELSALAM FOUDA | 4 |

**Area Of Study :**

By the end of the course the students will be able to:

ÅEnrich students' knowledge about Oscillations, waves, optics and Modern physics.
ÅEnrich studentsôknowledge about atomic structure and crystal systems.
ÅTrain students to apply studied topics on application related to Structural engineering.

**Description :**

Ideal oscillation: representation, Energy and applications. Damped and forced oscillation. Classification of waves, Mechanical transverse wave, Sound waves: types, Speed and Intensity, Doppler effect. Superposition of waves, Standing Waves in string, rods and membranes. Light nature, Reflection, Refraction, Huygen's Principle. Interference: Conditions, Young's double slit, Intensity distribution, phase change. Diffraction: single and double slit patterns, diffraction grating. Polarization. Max-Planck's principle, photoelectric effect, the wave properties of particles, the quantum particle, uncertainty Heisenberg's principle. Hydrogen atom: Bohr's model, solids classification and crystalline structure. X-ray: production, spectral analysis, application.

**Course outcomes :**

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| **a.Knowledge and Understanding: :** | |
| 1 - | a1- Explain and describe the types of oscillations and waves.. |
| 2 - | a2- Define optics and modern physics each as a single topic. |
| 3 - | a3- Describe and define geometrical and physical optics. |
| 4 - | a4- Explain the comparative view between classical and modern physics. |
| 5 - | a5- Describe the atomic physics and atomic structure. |
| **b.Intellectual Skills: :** | |
| 1 - | b1- Analyze different physical quantities |
| 2 - | b2- Predict the action/outcome of different bodies, systems. |
| 3 - | b3- Justify the governing laws of oscillations, waves, Optics, modern and atomic physics. |
| 4 - | b4- Think logically and creatively. |

| c.Professional and Practical Skills: : | |
|---|---|
| 1 - | c1- Measure the different physical parameters and perform experiments related to the studied topics. |
| 2 - | c2- Adapting knowledge to solve engineering problems using scientific tools. |
| **d.General and Transferable Skills: :** | |
| 1 - | d1- Work effectively in a team. |
| 2 - | d2- Accomplish the skills which are related to creative thinking, problem solver. |

**Course Topic And Contents :**

| Topic | No. of hours | Lecture | Tutorial / Practical |
|---|---|---|---|
| Ideal oscillation: representation, Energy and applications. Damped and forced oscillation. | 10 | 6 | 4 |
| Classification of waves, Mechanical transverse wave | 12 | 6 | 6 |
| Sound waves: types, Speed and Intensity, Doppler effect | 5 | 3 | 2 |
| Superposition of waves, Standing Waves in string, rods and membranes | 10 | 6 | 4 |
| Light nature, Reflection, Refraction, Huygens' Principle | 9 | 3 | 6 |
| Interference: Conditions, Young's double slit, Intensity distribution, phase change. Diffraction: single and double slit patterns, diffraction grating. Polarization | 8 | 6 | 2 |
| Max-Planck's principle, photoelectric effect, wave properties of particles, the quantum particle, and uncertainty Heisenberg's principle. | 10 | 6 | 4 |
| Hydrogen atom: Bohr's model, solids classification and crystalline structure. X-ray: production, spectral analysis, application | 11 | 9 | 2 |

**Teaching And Learning Methodologies :**

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| Discussion |
| Interactive Lecturing |
| Problem solving |
| Experimental learning |
| Cooperative learning |

**Course Assessment :**

| Methods of assessment | Relative weight % | Week No | Assess What |
|---|---|---|---|
| Final Exam | 40.00 | 16 | |
| Lab | 20.00 | 1 | |
| Mid-Term Exam 1 | 15.00 | 6 | |
| Mid-Term Exam 2 | 15.00 | 11 | |
| Participation and performance | 10.00 | 1 | |

**Course Notes :**

handout and notes

**Recommended books :**

1.ñCollege physicsò, Giambattista and Richardson, Mac gramttill, 3rd edition, 2010.
2.ñPhysics for scientists and engineersò, Serway, Thomson Brookes/Cok., 8th edition, 2011.
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b) ñPhysics for scientists and engineersò, Serway, Thomson Brookes/Cok., 8th edition, 2011.