

Faculty of Engineering & Technology

Physics 3

Information :

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:

- Enrich students' knowledge about Oscillations, waves, optics and Modern physics.
- Enrich students' knowledge about atomic structure and crystal systems.
- Train 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 :

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 :

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) College physics- Giambattista and Richardson, Mac gramtill, 3rd edition, 2010.
 - 2) Physics for scientists and engineers- Serway, Thomson Brookes/Cok., 8th edition, 2011.
- a) College physics- Giambattista and Richardson, Mac gramtill, 3rd edition, 2010.
- b) Physics for scientists and engineers- Serway, Thomson Brookes/Cok., 8th edition, 2011.