Department of Physics
Chittagong University of Engineering and Technology
Chittagong-4349, Bangladesh

Lecture Plan:

Department: Computer Science & Engineering (CSE)

Course Title: Physics   Course No. Phy-141

Number of Credit: 03   Number of Lecture/week: 03

Text Book

Book No.	Title	Author (s)	Edition
T-1	Waves and Oscillations	N. Subrahmanyam, Brijlal	1st
T-2	A Text Book of Optics	N. Subrahmanyam, Brijlal	22nd
T-3	Modern Physics	R. Murugeshan	7th
T-4	Engineering Physics	Dr. Giasuddin Ahmad	1st
T-5	Quantum Mechanics	Gupta, Kumar, Sharma	15th

Reference Book

Book No.	Title	Author (s)	Edition
R-1	Outlines of Physics	Dr. Giasuddin Ahmad	1st
R-2	Introduction to Solid State Physics	Charles Kittel	7th
R-3	Concepts of Modern Physics	Arthur Beiser	5th
R-4	Fundamentals of Solid State Physics	Saxena, Gupta, Saxena	1st
R-5	Lecture Materials		

Lecture plan details is in the next page

 Signature of Course Teachers:

1. Dr. Md. Mohi Uddin

2. Dr. Swapan Kumar Roy

Copy to**:**
1.   Dean, Faculty of Engineering and Technology, CUET
2.   Head, Department of Physics, CUET
3.   Head, Department of Computer Science & Engineering (CSE), CUET
4.   Guard file

Lecture No.	Lecture Material (detail all topics) Phy-141	Book Ref.
01	Physical Optics: Interference of light: meaning, coherence sources: definition and relation between path difference and phase difference and how it can be obtained. Theory of interference; analytical treatment for intensity distribution, condition for maxima and minima.	T-2, R-1
02	Young's double slit experiment: Description, Calculation for interference fringes interference in thin films: interference due to reflected light: analytical treatment.	T-2, R-1
03	Interference by multiple reflections: constant and varying thickness films: wedge shaped films analytical treatment.	T-2, R-1
04	Cont. lec. -3	T-2, R-1
05	Newton's rings: theory, Newton's rings by reflected light, result, determination of the refractive index of a liquid using Newton's ring experiment.	T-2, R-1
06	Diffraction of light: Definition of diffraction, Fresnel & Fraunhofer diffraction: discussion.	T-2, R-1
07	Fraunhofer diffraction by single slit: derivation of expression and discussions.	T-2, R-1
08	Fraunhofer diffraction by double slit: derivation of expression and discussions. Difference between interference & diffraction.	T-2, R-1
09	Cont. of Lec. -8. Plane diffraction grating: construction and working.	T-2, R-1
10	Polarization: definition, polarization of transverse waves, plane of polarization, plane of vibration, polarization by reflection, production and analysis of polarized light.	T-2, R-1
11	Brewster's law: statement and explanation. Malus law: statement and explanation, Polarization by double refraction: explanation.	T-2, R-1
12	Nicol prism: Construction, application, Polaroid: explanation.	T-2, R-1
13	Optical activity: definition and explanation, specific rotation: definition and explanation. Polarimeters: construction and working details.	T-2, R-1
14	Quantum effect: explanation. Photoelectric effect: experimental & results, work function, Einstein's explanation.	T-3, T-4, R-3, R-5
15	Compton effect: deduction of an expression for Compton wavelength.	T-3, T-4, R-3, R-5
16	Discussions on de Broglie wave, define phase and group velocity and establish relation between them, Wave-particle duality, Problems.	T-3, T-4, R-3, R-5
17	Statement and explanation of Heisenberg uncertainty principle.	T-3, T-4, R-3, R-5
18	Derivation of Schrödinger time-dependent and time-independent equation, wave function, Physical significance of ψ.	T-3, T-4, R-3, R-5
19	Penetration of a potential barrier: Tunnel effect, Square well potential.	T-3, T-4, R-3, R-5
20	Qualitative summary of simple harmonic oscillator and problem	T-3, T-4, R-3, R-5
21	Structure of matter: Crystalline and non-crystalline solids, single crystal and polycrystalline solids, lattice, basis, unit cell, basis vector & translation vectors, symmetry: meaning & types (rotation, translation, reflection and its combination)	R-2, R-4

22	Crystal systems: Element of symmetry in 3-D: plane, axis and center, 14 Bravais lattices in 7 Crystal systems.	R-2, R-4
23	Definition of packing fraction: calculation of packing fractions for sc, bcc, fcc & hcp structures.	R-2, R-4
24	Coordination number, NaCl and CsCl structure, crystal planes and directions, Miller indices, definition & procedure for findings, to draw different atomic planes using Miller indices, Reciprocal lattice, calculation of inter-planar spacing for cubic system.	R-2, R-4
25	Relation between inter-planar spacing & Miller indices, Bragg's law.	R-2, R-4
26	Defects in Solids: Crystal defects: meaning & effect of crystal defect, types & definition: discussion of point, line defect.	R-2, R-4
27	Cont. Lec. -27	R2, R4
28	Distinction between metal, insulator & semiconductor in terms of energy band.	R-4
29	Waves and Oscillation: Differential equation of a simple harmonic motion, Total energy and average energy: calculation and graphical representation.	T-1, T4, R-1
30	Combination of simple harmonic oscillation: Composition of SH vibration of same frequency but different phase and amplitude, Composition of 2 SH vibration at right angles to each other having equal frequencies but differing in phases and amplitudes. (Lissajous's figures).	T-1, T4, R-1
31	Spring-mass system: Oscillation of spring-mass system, Effective mass, Calculation of time period of torsional pendulum & torsional rigidity, damped oscillation.	T-1, T4, R-1
32	Determination of damping co-efficient, forced oscillation: Resonance, sharpness of resonance, two-body oscillation: mode shape, spring coupled system.	T-1, T4, R-1
33	Reduced mass: definition, differential equation of a progressive power and intensity of wave equation.	T-1, T4,R-3
34	Stationary wave: mathematical treatment, property, group velocity and phase velocity: meaning, relation, example.	T-1, T4
35	LASER: induced absorption, stimulated and spontaneous emission, coherence, Principal of LASERs, properties of LASER beam, resonators.	T-3, R-3
36	Population inversion, pumping, Ruby LASER, He-Ne, Co_2 LASER.	T-3, R-3
37	N_2, and dye LASER, Application of LASER: Material processing with LASERs, welding, material removal and material shaping.	T-3, R-3
38-39	Review of the course	

Signature of the course teachers:

(Dr. Md. Mohi Uddin)

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Department of Physics, CUET

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