Lesson plan

Subject / Code: Applied Physics / (BSC 102) **Academic Year: 2024-25**

Year/ Sem: FE I **Faculty: _____** **Div/Branch:_____**

Lect. No.	Topic	Planned date	Execution date	Modes of Content Delivery	Assessment Method	Remark
	PREREQUISITE - Basic knowledge of optics and atomic structure, Wave front and Huygen's principle, reflection and refraction, Interference by division of wavefront, refractive index of material, Snell's law, Basics of vector algebra, partial differentiation concepts, dual nature of radiation, Photoelectric effect, Matter waves, Davisson-Germer experiment. Intrinsic and extrinsic semiconductors, electrical resistivity and conductivity concepts.					
M1	**LASERS**					
1	Characteristics of Lasers, Spontaneous emission and stimulated emission; metastable state, population inversion, pumping mechanism.			**1, 3, 5**	**1, 3, 5, 11**	
2	Active medium & Active center, resonant cavity, coherence length and coherence time.			**1, 3, 5**	**1, 3, 5, 11**	
3	Helium-Neon laser: construction and working.			**1, 2, 3, 5**	**1, 3, 5, 11**	
4	Application: Elementary Knowledge of LiDAR, Barcode Reader, Application of Laser in metal work.			**1, 3, 5**	**1, 3, 5, 11**	
M2	**FIBER OPTICS**					
5	Optical Fiber: Critical angle; acceptance angle, Numerical Aperture, total internal reflection and propagation of light.			**1, 3, 5**	**1, 3, 5, 11**	

6	Types of optical: Single mode & Multimode, Step index & Graded index fibers.			**1, 3, 5**	**1, 3, 5, 11**	
7	Attenuation, Attenuation Coefficient and factors affecting attenuation.			**1, 3, 5**	**1, 3, 5, 11**	
8	Fiber optic communication system, Advantages of optical fiber.			**1, 3, 5**	**1, 3, 5, 11**	
M3	**INTERFERENCE IN THIN FILM**					
9	Interference in thin film of uniform thickness, conditions of maxima and minima for reflected system.			**1, 3, 5**	**1, 3, 5, 11**	
10	Conditions of maxima and minima for wedge-shaped film (qualitative).			**1, 3, 5**	**1, 3, 5, 11**	
11	Engineering Applications: - Newton's ring for the determination of unknown monochromatic wavelength and Refractive index of transparent liquid.			**1, 3, 5**	**1, 3, 5, 11**	
12	Engineering Applications: - Anti-reflecting coating.			**1, 3, 5**	**1, 3, 5, 11**	
M4	**ELECTRODYNAMICS**					
13	Vector calculus: Gradient, Divergence and Curl with Numericals.			**1, 3, 5**	**1, 3, 5, 11**	
14	Gauss's law for electrostatics, Gauss's law for magnetostatics.			**1, 3, 5**	**1, 3, 5, 11**	
15	Ampere's circuital Law and Faraday's Law. Divergence theorem and Stokes theorem.			**1, 3, 5**	**1, 3, 5, 11**	

16	Maxwell's equations in point form, integral form and their significance.			**1, 3, 5**	**1, 3, 5, 11**	
M5	**QUANTUM PHYSICS**					
17	De-Broglie hypothesis of matter waves; de-Broglie wavelength for electron, properties of matter waves, problems of de-Broglie wavelength.			**1, 3, 5**	**1, 3, 5, 11**	
18	Heisenberg's Uncertainty Principle and its applications: Non-existence of electron in the nucleus.			**1, 3, 5**	**1, 3, 5, 11**	
19	Wave function and probability density, mathematical conditions for wave function, Need and significance of Schrodinger equations.			**1, 3, 5**	**1, 3, 5, 11**	
20	Schrodinger time independent and time dependent equation.			**1, 3, 5**	**1, 3, 5, 11**	
21	Energy of a particle enclosed in rigid box and related numerical problems			**1, 3, 5**	**1, 3, 5, 11**	
22	Quantum mechanical tunnelling and Principles of quantum computing: concept of Qubit			**1, 3, 5**	**1, 3, 5, 11**	
M6	**SEMICONDUCTOR PHYSICS**					
23	Direct & indirect band gap semiconductor, Electrical conductivity of semiconductors.					
24	Drift velocity, Mobility and conductivity in semiconductors.					

25	Fermi Dirac distribution function.					
26	Position of fermi level in intrinsic semiconductors and Position of fermi level in extrinsic semiconductors.					