LESSON PLAN

Name of the Subject: ENGINEERING PHYSICS (**14BT1BS01)**
Class& Semester: B.Tech I Year

S. No.	Topic	No. of periods	Book(s) followed	Topics for self study
UNIT-I:LASERS, FIBER OPTICS AND HOLOGRAPHY				
1.	**Lasers:** Introduction, characteristics of laser	1	T1	
2.	Principles of lasing action	1	T1	
3.	Spontaneous and stimulated emission of radiation	1	T1	
4.	Einstein's coefficients	1	T1	
5.	Population inversion	1	T1	
6.	Ruby laser	1	T1	
7.	Helium-Neon laser	1	T1	
8.	Semiconductor laser	1	T1	
9.	Applications of lasers	1	T1	
10.	**Fiber optics:** Introduction, Construction and working principle of optical fiber	1	T1	
11.	Acceptance angle, acceptance cone and numerical aperture	1	T1	
12.	Types of optical fibers and refractive index profiles	1	T1	
13.	Attenuation and losses in fibers	1	T1	
14.	Optical fiber communication system	1	T1	
15.	Applications of optical fibers in sensors and medicine	1	T1	
16.	**Holography:** Introduction, construction of a hologram	1	T1	
17.	Reconstruction of image from hologram, applications	1	T1	
18.	Problems	1	T1	
Total periods required:		**18**		
UNIT-II: SPECIAL THEORY OF RELATIVITY, ACOUSTICS OF BUILDINGS AND CRYSTALLOGRAPHY				
19.	**Special Theory of Relativity:** Introduction, absolute frame of reference	1	T1	
20.	Time dilation, length contraction	1	T1	
21.	Addition of velocities	1	T1	
22.	Mass-energy equivalence, energy-momentum relation	1	T1	

23.	**Acoustics of Buildings:** Introduction, Basic requirement of acoustically good hall	1	T1	
24.	Reverberation and time of reverberation, Sabine's formula for reverberation time (qualitative treatment)	1	T1	
25.	Absorption coefficient of Sound and its measurement, factors affecting the architectural acoustics and their remedies.	1	T1	
26.	**Crystallography:** Introduction, crystal planes and directions	1	T1	
27.	Miller indices	1	T1	
28.	Separation between successive (hkl) planes	1	T1	
29.	X-ray diffraction by crystal planes	1	T1	
30.	Bragg's law	1		
31.	Laue method	1	T1	
32.	Powder method	1	T1	
33.	Problems	2	T1	
Total periods required:		**16**		
UNIT-III: PRINCIPLES OF QUANTUM MECHANICAS AND BAND THEORY OF SOLIDS				
34.	**Principles of Quantum Mechanics:** Black body radiation	1	T1	
35.	Wien's law, Rayleigh-Jeans law and Planck's law (qualitative)	1	T1	
36.	Waves and particles	1	T1	
37.	Matter waves, de-Broglie's hypothesis	1	T1	
38.	G.P. Thomson experiment	1	T1	
39.	Heisenberg's uncertainty principle	1	T2	
40.	Schrödinger's one dimensional wave equation (time independent)	1	T2	
41.	Significance of wave function	1	T2	
42.	Particle in a one dimensional potential box	1	T2	
43.	Fermi-Dirac distribution and effect of temperature (qualitative treatment)	1	T1	
44.	Scattering-source of electrical resistance	1	T2	
45.	**Band Theory of Solids:** Electron in a periodic potential	1	T2	
46.	Kronig-Penney model (qualitative treatment)	2	T1	
47.	Origin of energy band formation in solids, effective mass of electron	1	T1	
48.	Distinction between metals, semiconductors and insulators based on band theory	1	T1	
49.	Problems	1	T1	
Total periods required:		**17**		

UNIT-IV:DIELECTRIC PROPERTIES OF MATERIALS AND SEMICONDUCTORS				
50.	**Dielectric Properties of Materials:** Introduction, dielectric constant	1	T1	
51.	Electronic polarization	1	T1	
52.	Ionic and orientation polarizations (qualitative treatment)	1	T1	
53.	Local field	1	T1	
54.	Clausius - Mossotti equation, frequency dependence of polarisability (qualitative treatment)	1	T1	
55.	Ferro and Piezo electricity	2	T1	
56.	**Semiconductors:** Introduction, Intrinsic semiconductors-carrier concentration	1	T2	
57.	Extrinsic semiconductors- carrier concentration	1	T1	
58.	Electrical conductivity in semiconductors	1		
59.	Drift and diffusion, Einstein's relation	1	T2	
60.	Hall effect	1	T2	
61.	Direct and indirect band gap semiconductors	1	T2	
62.	p-n junction, energy diagram of p-n diode diode equation (qualitative)	1	T1	
63.	LED	1	T1	
64.	Photo diode and solar cell	1	T1,T2	
65.	Problems	1	T1	
Total periods required:		**17**		
UNIT-V: MAGNETIC PROPERTIES OF MATERIALS, SUPERCONDUCTIVITY AND NANOMATERIALS				
66.	**Magnetic Properties of Materials:** Introduction, origin of magnetic moment	2	T2	
67.	Classification of magnetic materials into dia, para, ferro, anti-ferro and ferri magnetism	1	T2	
68.	Hysteresis	1	T2	
69.	Soft and hard magnetic materials	1	T2	
70.	**Superconductivity:** General properties	1	T2	
71.	Meissner effect	1	T2	
72.	Penetration depth, Type-I and Type-II superconductors	1	T2	
73.	Flux quantization, Josephson effects	1	T2	
74.	Applications of superconductors	1	T1	
75.	**Nanomaterials:** Introduction, surface area to volume ratio, quantum confinement	1	T2	
76.	Properties of nanomaterials	1	T2	

77.	Synthesis of nanomaterials by ball milling, plasma arcing	1	T2	
78.	Pulsed laser deposition and sol-gel method	1	T1	
79.	Carbon nanotubes-properties and applications	1	T1	
80.	Applications of nanomaterials	1	T2	
81.	Problems	1	T1	
Total periods required:		**17**		
Grand total periods required:		**85**		

TEXTBOOKS :

T1: S. Mani Naidu,**Engineering Physics**, Pearson Education, 2013.
T2: P. K. Palaniswamy, **Engineering Physics**, Scitech Publications India Private Limited, 2009

REFERENCE BOOKS:

R1: R. K. Gaur and S. L. Gupta , **Engineering Physics**, , DhanpatRai Publications (P) Ltd., 8th Edition, 2001.
R2 : M. R. Srinivasan,**Engineering Physics** , New Age International (P) Limited, Publishers, 1st Edition,2010.

Signature of the faculty Member **Signature of the HOD**