SHAMBHUNATH INSTITUTE OF ENGINEERING & TECHNOLOGY JHALWA, ALLAHABAD

STUDY SCHEME (Lecture Plan: 2018-19)

B.Tech: 3rd Semester **Paper Code: ROE-033**

Subject: (LASER SYSTEM AND APPLICATIONS)

Branch: EC,ME,EE

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L. No.	Content	Remark
1	**Unit – I Basic Principle of Modern Physics**	
2	Black body radiation	
3	Atomic structure	
4	Spectral series of hydrogen atom	
5	Polarization	
6	Absorption and florescence of X-ray,	
7	Energy distribution in electrons	
8	Probability of distribution of free electrons	
9	Free electron in metals	
10	Energy level in free electrons	
11	Application of Schrodinger equation in potential well,	
12	potential step, tunneling effect.	
13	**Unit – II : Elements and Techniques of Laser**	
14	Concept of coherence	
15	Temporal and Spatial coherence,	
16	Coherence length and time	
17	Brightness and Intensity	
18	Directionality and Monochromacity	
19	Absorption, Spontaneous and Stimulated Emission process	
20	Einstein's coefficients	
21	Population inversion,	
22	Pumping and pumping schemes,	
23	laser gain	
24	Optical cavities	
25	Optical cavities and its types	
26	**Unit – III: Principle of Lasers and General Lasers**	
27	Main components of Laser	
28	Principle of Laser action,	
29	Introduction to general lasers and their types	
30	Introduction to general lasers and their types	
31	Three & four level Lasers,	
32	Three & four level Lasers,	
33	Continuous Wave Lasers	

34	Pulsed Lasers	
35	Q-switch lasers	
36	**Unit – IV: Types of Laser Systems**.	
37	Solid state Lasers: Neodymium laser	
38	Nd-Yag laser,	
39	Nd-Glass laser and Alexandrite laser	
40	Liquid Lasers: Dye laser	
41	Tuning in Dye laser,	
42	Model-Locked Ring Dye laser.	
43	Gas Laser: Ionic lasers,.	
44	Argon ion laser, Krypton ion laser	
45	He-Cadmium laser	
46	Copper vapour laser, Carbon dioxide laser.	
47	Excimers laser. Semiconductor Laser.	
48	Characteristics of semiconductor lasers, Semiconductor diode lasers,	
49	Hetrojunction lasers, Homojunction lasers,	
50	Quantum well lasers.	
51	**Unit – V Laser Applications** ,	
52	Material Processing: Material processing with lasers	
53	Interaction mechanism, Material processing mechanism	
54	Drilling, Cutting and Welding process with laser.	
55	Laser hardening. Medical Science: Medical lasers	
56	Laser diagnostic, Laser in ophthalmology, laser in glaucoma	
57	Laser for general surgery, Laser in dermatology, laser in dentistry, Laser in medicine.	
58	Optical Communication: Optical source for fiber optical communication	
59	Powering and coupling, Transmission, Hologram their characteristics. LIDAR.	

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(Faculty Physics)