

University of Mumbai			
Class : F.E. (All Branches of Engineering)		Semester – I	
SUBJECT : APPLIED PHYSICS			
Periods per Week	Lecture	3	
	Practical	1	
	Tutorial	-	
		Hours	Marks
Evaluation System	Theory Examination	2	75
	practical	--	--
	Oral Examination	--	--
	Term Work	--	--
	Total	--	100

Detail of the Syllabus

Sr. No	Details	Hrs.
O1	<p>Crystallography & X-rays Lattice , basis , crystal axes, unit cells, lattice parameters & crystal systems, SC, BCC,FCC, diamond, NaCl , zinc blend and HCP crystal structures, Miller indices, planes display & directions, Liquid crystal structures, Miller indices, planes & directions, liquid crystals & phases , LCD display & its specifications 2] X-rays --- Origin of X-rays and X-ray spectra, X-ray diffraction & Bragg's Law and determination of crystal structure 3] Real crystals – crystal imperfections, point defects and dislocations</p>	12
O2	<p>Physics of Semiconductors 1] Classifications of Solids, Fermi-Dirac statistics concept of Fermi level & its variation with temperature, impurity and applied voltage 2] Intrinsic & extrinsic carrier concentrations, carrier drift mobility, resistivity and Hall Effect, carrier diffusion, Einstein's relations, current density & continuity equations 3] Einstein's relations, current density & continuity equations, derivation for depletion layer width</p>	08
O3	<p>Superconductivity 1] Critical temperature, critical magnetic field, Type I & Type II superconductors, high T_c superconductors, 2] Meissner effect, Josephson Effect 3] SQUIDS, plasma confinement, Maglev</p>	05

04	Acoustics 1] Acoustics of Building, Absorption, Importance of Reverberation Time, Units of Loudness, Decibel, Phone 2] Conditions for good Acoustics methods of Designs for Good Acoustics, Determination of Designs for Good Acoustics, Determination of Absorption coefficient, Noise Pollution	05
05	Ultrasonic 1] Principles of production, Piezoelectric & magnetostriction effect. 2] Piezoelectric & magnetostriction oscillator, ultrasonic materials – quartz & ferroelectric materials, cavitations effect 3] Applications based on cavitations effect and echo sounding, ultrasonic imaging & medical diagnosis	05
06	Electron Optics 1] Electrostatic & Magneto static focusing system 2] Construction & Working of CRT , CRO and its applications	05

Theory Examination

1. Question paper will be comprising of total 7 question , each of 15 marks
2. Only 5 question need to be solved
3. Q. 1 will be compulsory and based on entire syllabus
4. Remaining questions will be marked in nature (e.g. suppose Q.2 has part (a) from , module 3 then part (b) will be from any module other than module 3)
5. In question paper weight age of each module will be proportional to number of respective lecture hours as mentioned in the syllabus

Term work:

Term work shall consist of minimum five experiments and a written test .

The distribution of marks for term work shall be as follows ,

Laboratory work (Experiments and Journal) : 10 Marks

Test (at least One) : 10 marks

Attendance (practical and theory) : 5 marks

The final certification and acceptance of term work ensures the satisfactory performance of laboratory work and minimum passing in the term work.

Suggested Experiments	Applied Physics – I
	1) PF of SC,BCC,FCC,Diamond and HCP(Zn) crystal structures
	2) Crystal lattice planes , Miller Indices and interplanar spacing of (100) (110) and(111) set of planes in SC, BCC And FCC
	3) Hall effect & determination of Hall Coefficient
	4) I-V characteristics of Si and GaAs diodes (IR LED)
	5) CRO - Measurement of frequency & amplitude
	6) CRO- Lissa Jous Patterns and measurement of phase difference
	7) Ultrasonic distance meter
	8) Measurement of wavelength & velocity of ultrasonic waves

Recommended Books:

1. Solid State Physics – Charles Kittle , EEE Pbl
2. Physics of Semiconductors - S.M. Sez, Wiley Eastern
3. Engineering Physics – Gaur & Gupta, Dhanpat Rai & co.
4. A Textbook of Engineering Physics – Kshirsagar & Avadhanulu, S Chand.
5. Modern Engineering Physics – Vasudeva s Chand Pbl.
1. Concept of Modern Physics – Ather Beiser, Tata Mcreaw Hill