Course Content & Grade

Branch	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
B.TECH. Common	Engineering Physics	BT- 2001	Theory	Practical	
			Min.“D”	Min.“D”	5.0

Unit I
Quantum Physics
Group and particle velocities & their relationship. Uncertainty principle with elementary proof and applications (determination of position of a particle by a microscope, non existence of electron in nucleus, diffraction of an electron BTam by a single slit). Compton scattering. Wave function and its properties, energy and momentum operators, time dependent and time independent Schrödinger wave equation. Application of time independent Schrödinger wave equation to particle trapped in a one dimensional square potential well (derivation of energy eigen values and wave function)

Unit II Wave Optics
Interference: Fresnel's biprism, Interference in thin films (due to reflected and transmitted lght), interference from a wedge shaped thin film, Newton’s rings and Michelson’s interferometer experiments and their applications. Diffraction at single slit, double slit and n-slits (diffraction grating). Resolving power of grating and prism. Concept of polarized light, Brewster's laws, Double refraction, Nicol prism, quarter & half wave plate.

Unit III Nuclear Physics
Nuclear liquid drop model (semi empirical mass formula), nuclear shell model, Linear Particle acceleratos: Cyclotron, general description of Synchrotron, Synchrocyclotron, and BTtatron. Geiger- Muller Counter, Motion of charged particles in crossed electric and magnetic fields. Uses of Bainbridge and Auston mass Spectrographs.

Unit IV
Solid State Physics
Qualitative discussion of Kronig Penny model (no derivation), Effective mass, Fermi-Dirac statistical distribution function, Fermi level for Intrinsic and Extrinsic Semiconductors, Zener diode, tunnel diode, photodiode, solar-cells, Hall effect.
Superconductivity: Meissner effect, Type I and Type II superconductors, Di-electric polarization, Complex permittivity, dielectric losses

UNIT V
Laser and FiBTr Optics
Laser: Stimulated and spontaneous processes, Einstein’s A & B Coefficients, transition probabilities, active medium, population inversion, pumping, Optical resonators, characteristics of laser BTam. Coherence, directionality and divergence. Principles and working of Ruby, Nd:YAG, He-Ne & Carbon dioxide Lasers with energy level diagram.. Fundamental idea about optical fiBTr, types of fiBTrs, acceptance angle & cone, numerical aperture, V-numBTr, propagation of light through step index fiBTr (Ray theory) pulse dispersion, attenuation, losses & various uses. Applications of lasers and optical fiBTrs.

Reference Books: -
1.Engineering Physics- Purnima Swarup Khare, Laxmi Publication
2.A Text Book of Engg Physics – N. Gupta & S.K. Tiwary , Dhanpat Rai & Co. , Delhi
3.Concepts of Modern Physics- BTiser, TMH
4.Solid State Physics by Kittel ,Wiley India
5.Engineering Physics-Fundamentals and Modern Applications – by Purnima Swarup Khare, Infinity Press Publications

List of suggestive core experiments: -

1. Biprism, Newton's Rings, Michelsons Interferometer.
2. Resolving Powers –Telescope, Microscope, and Grating.
3. G.M. Counter
4. Spectrometers-R.I., Wavelength, using prism and grating
5. Optical polarization based experiments: Brewster's angle, polarimeter etc.
6. Measurements by LASER-Directionality, Numerical aperture, Distance etc.
7. Uses of Potentiometers and Bridges (Electrical)..
8. Experiments connected with diodes and transistor.
9. Measurement of energy band gap of semiconductor.
10. To study Hall effect.
11. Solar cell.
12. To find the width of s single slit by f He-Ne Laser.
13. To determine the numeral aperture (NA) of a Optical Fibre.
14. To determine plank's constant.
15. Other conceptual experiments related to theory syllabus.