

**DEPARTMENT OF APPLIED PHYSICS
INDIAN SCHOOL OF MINES, DHANBAD**



**COURSE STRUCTURE & SYLLABUS
FOR
I & II SEMESTER OF
4-YEARS B.TECH./5-YEARS INTEGRATED M.Sc.,
M.Sc. TECH./5-YEARS DUAL DEGREE**

Effective from 2007-2008

COURSE STRUCTURE

B. TECH. [I & II SEMESTER]

Sl No.	Course No.	Name of the Course	L	T	P	Credit Hrs.
1.	AMC 11101 AMC12101	Mathematics-I / Mathematics-II	3	1	0	7
2.	APC 11101/12101 ACC 11101/12101	Physics / Chemistry	3	1	0	7
3.	MMC 11101/12101 MMC 11102/12102	Engineering Graphics / Manufacturing processes	1	3	0	5
4.	EEC 11101/12101 EIC 11101/12101	Electrical Technology / Electronics engineering	3	1	0	7
5.	MMC 11103/12103 HSC 11101/12101	Engineering Mechanics / English for Science & Technology	3	1	0	7
6.	GLD11301/12301 ESD11301/12301 MSD 11301/12301 APD 11301/12301	Earth System Science (S) / Disaster Management and Energy Resources (S)	3	0	0	6
7.	CSC11301/12301 HSC 11301/12301	Computer Programming (S)/ Value Education, Human Right and Legislative Procedure (S)	3	0	0	6
* Practicals						
8.	APC 11201/12201 ACC 11201/12201	Physics / Chemistry	0	0	3/2	1.5
9.	EEC 11201/12201 EIC 11201/12201	Electrical Technology / Electronics Engineering	0	0	3/2	1.5
10.	DSW	Co-Curricular Activities (Only for II nd Semester)	0	0	0	(3)
TOTAL FOR IST SEMESTER			19	7	3	48
TOTAL FOR IIND SEMESTER			19	7	3	48 + (3)

Thermal Physics

Concepts of distribution of molecular velocities; Distribution laws and statistics-MB,FD and BE, mean free path; Transport phenomena-viscosity, diffusion; thermal conductivity, measurement of thermal conductivity; periodic and aperiodic flow of heat; Wiedemann-Franz law.

Heat radiation; black body and black body radiation; Planck's distribution law and its application to classical distribution (Rayleigh-Jeans and Wiens) and total radiation (Stefan- Boltzmann) laws.

Modern Physics:

Brief idea of molecular spectra; Rigid rotator, spectra of simple molecules, rotation and rotation-vibration spectra.

Brief idea of wave packet and wave function, Shrodinger equation, Particle in a Box.

Free electron theory; qualitative idea of band theory of solids and Hall effect

Laser and laser systems (He-Ne and Ruby Lasers).

Electromagnetics and Electrical Phenomena in Rocks:

Maxwell's field equations, Equation of electromagnetic field, Propagation of electromagnetic waves in different isotropic media, energy of electromagnetic waves, Poynting's theorem & Poyting's vector.

Rocks and minerals as dielectrics, electrical conductivity and electrical phenomena in rocks, Piezo-, ferro-, tribo-, and pyro- electricity.

Classification of energy resources and their availability; Renewable and non-renewable energy sources; World energy prospects; Environmental impacts; Energy, power and electricity;

Energy scenario in India: Availability of conventional and nonconventional energy resources and future energy demand;

Indian reserves and resources of natural oil and gas, coal and nuclear minerals;

Potential of hydroelectric power, solar energy, thermal, nuclear, wind, tidal wave and biomass based power in India;

Introduction to hydrogen energy and fuel cells

Measurement of thermal conductivity of bad conductors, Optical experiments on Diffraction using diffraction grating, Experiments on Semi-conductors – Measurement of band gap and Hall Effect, Experiments using He-Ne Laser - Diffraction Experiments to measure diameter of circular aperture, Polarisation Experiments to measure Brewster's angle & refractive index.