

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



**COURSE STRUCTURE & SYLLABUS
FOR
First Year B.Tech. Common**

Effective from 2012-2013

First Year B.Tech. Common COURSE STRUCTURE

SEMESTER-I/II

Theory

Sl. No.	Course Name	Course No	Course offering Department	L	T	P	Credit Hrs
1.	Mathematics-I (only for 1 st Sem)	AMC 11101	AM	3	1	0	7
2.	Mathematics-II (only for 2 nd Sem)	AMC 12101	AM	3	1	0	7
3.	Physics (Group-I)/ Chemistry (Group-II)	APC 11101/ ACC 11101	AP/AC	3	0	0	6
4.	Engineering Graphics (Group-I)/ Manufacturing Process (Group-II)	MMC 11101/ MMC 11102	ME & MME	1	4	0	6
5a.	Electrical Technology (Group-I)	EEC 11101	EE	3	1	0	7
5b.	Electronics Engineering (Group-II)	EIC 11101	ECE	3	0	0	6
6a.	Engineering Mechanics (Group-I)	MMC 11103	ME & MME	3	1	0	7
6b.	Computer Programming(S) (Group-II)	CSE 11301	CSE	3	0	0	6
7.	Earth System Science (S) [AGL 2-0-01 & ESE 1-0-0] (Group-I) / Disaster Management [MSD 2-0-0] & Energy Resources [APD 1-0-0] (S) (Group-II)	GLD/CMD11301/ MSD/APD 11301	AGL & ESE/ DMS & AP	3	0	0	6
8.	Value Education, Human Rights and Legislative Procedure (S) (Group-I)/ English for Science & Technology (Group-II)	HSC 12305/HSC 11103	HSS	3	0	0	6
9.	Co-Curricular Activities (Only for 2 nd Sem)		DSW	0	0	0	(3)

Practical

10.	Physics Practical (Group-I)/ Chemistry Practical(Group-II)	APC 12201/ACC 12201	AP/AC	0	0	3/2	1.5
11.	Electrical Technology Practical(Group-I)/ Electronics Engineering Practical(Group-II)	EEC 12201/ EIC12201	EE/ECE	0	0	3/2	1.5
12.	Computer Programming Practical (S) (Group-II)	CSE 12301	CSE	0	0	2	2

Total for Semester I (For Group-I)				19	7	3	48
Total for Semester I (For Group-II)				19	5	5	48
Total for Semester II (For Group-I)				19	7	3	48 +(3)
Total for Semester II (For Group-II)				19	5	5	48 +(3)

**First Year B.Tech. Common
COURSE CONTENT**

SEMESTER-I/II

APC11101/APC12101 PHYSICS

(3-0-0)

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, Schrödinger 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 equation, Equation of electromagnetic field, Propagation of electromagnetic waves in different isotropic media, energy of electromagnetic waves, Poynting's theorem & Poynting's vector. Rocks and minerals as dielectrics, electrical conductivity and electrical phenomena in rocks, Piezo-, ferro-, tribo-, and pyro-electricity.

Reference Books:

1. Heat And Thermodynamics; Brij Lal & Subrahmanyam; S Chand & Co Ltd; 2001
2. Thermal And Statistical Physics; R B Singh; New Age Publications; 2009
3. An Introduction To Thermal Physics; Schroeder; Dorling Kindersley India; 2007
4. Thermal Physics And Statistical Mechanics; Roy & Gupta; New Age Publications; 2001
5. Concepts Of Modern Physics; Beiser; McGraw-Hill Science; 2010
6. Modern Physics; Sivaprasath & Murugesan; S. Chand Publisher; 2009

APD 11301/12301 ENERGY RESOURCES

(1-0-0)

AP: Energy Resources (1-0-0)

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

Reference Books:

1. Non-Conventional Energy Sources by G.D.Rai, Khanna Publishers.
2. Fundamentals of Renewable Energy Resources by G.N. Tiwari & M.K. Ghosal, Alpha Science International.
3. Solar Energy: Fundamentals and Applications by H P Garg & J Prakash, Tata McGraw-Hill Publishing Company Ltd.
4. Solar Energy: Principles of Thermal Collection and Storage by S P Sukhatme, Tata McGraw-Hill Publishing Company Ltd.

PRACTICALS:

**APC 11201/
APC 12201**

PHYSICS

(0-0-3/2)

1. Experiments on Semi-conductors-Measurement of band gap
2. Experiments on Semi-conductors-Measurement of Hall Effect
3. Measurement of thermal conductivity of bad conductors
4. Optical experiments on Diffraction using diffraction grating
5. Experiments using He-Ne Laser-Diffraction: Experiments to measure diameter of circular aperture; Polarisation experiments to measure Brewster's angle & refractive index.