M.Tech in Materials Science

Syllabus for Entrance Test

Syllabus covers 5 major subjects: Physics, Chemistry, Mathematics, Biology, and Elements of Computing.
The minimum expected level is +2 level

Physics

Unit – 1
Interference, Diffraction, Simple harmonic motion, Kepler’s law, angular momentum, uniform circular motion, motion of a particle in central force, viscosity, surface tension, Young’s modulus, moment of inertia, thermodynamic laws, isothermal adiabatic, expansions, specific heats, entropy, enthalpy, free energy, Maxwell – Boltzmann distribution.

Unit – 2
UV- Visible Spectra, Infrared spectra, Fourier transform infrared spectra, Raman spectra, Mie scattering, Rayleigh scattering, X-ray diffraction, Bragg’s law, space lattice, NaCl and KCl structures, Nuclear Magnetic Resonance, Fermi energy.

Chemistry

Unit – 3
Inorganic Chemistry-

Unit – 4
Organic Chemistry –
Classification and nomenclature of alkenes, alkali halides, Mechanism of organic reactions, Alcohols, Phenols, Amines, Carbonyl Compounds, Carboxylic acids, cyclo- alkanes, Aromatic hydrocarbons, Heterocyclic compounds, Dyes, oil, Fats, Waxes, Soaps and detergents, Polymers.

Unit-5
Physical Chemistry –
Gases, Adsorption, Catalysis, Liquid mixtures, Colligative properties, Phase equilibrium, Chemical Kinetics, Electrochemistry, Corrosion, Elementary Quantum mechanics, Colloids, Radioactivity, Surface Chemistry.
**Mathematics**

**Unit 6**
Elements of set theory, Mathematical logic, Matrices and Determinants, Vectors and Groups, Circles and Conic sections.

**Unit 7**
Trigonometric functions and inverse trigonometric functions, Differentiation and Integration, Differential equations.

**Biology**

**Unit -8**

**Unit-9**
Enzymes, antibodies, photosynthesis, respiration, metabolism, catabolism, amino acids, nutrition, clinical diagnostics, structure and replication of DNA and RNA, protein synthesis, immunology.

**Elements of Computing**

**Unit- 10**
Elements of computing concepts of algorithms, integer arithmetic, floating arithmetic, number systems, Boolean algebra, Essential tools- Word Processing, Spread sheets, simple operating System commands, Basic block diagram of a computer, basic input and output devices.