

# LSC 421 Physics and Mathematics

## Basic Physics

1. Quantum Physics: Wave versus particle, Heisenberg and Uncertainty, Schrödinger and Matter waves, Photoelectric effect, Atom and Nuclei, The quantum Vacuum
2. Properties of Matter: Elasticity, Hydrostatic, Surface tension, Microscopic consideration for study of properties of matter, Atomic and Molecular structure, Structure of solids, amorphous solids, Structure of single crystals,
3. Thermal Physics: Laws of Thermodynamics and its application in Biological system, Temperature and related topics, Internal energy, Heat and First law of Thermodynamics, The ideal monatomic gas, Application of first law to Ideal Gases, Entropy and the second law
4. Fundamental Electromagnetism: Charge and Current, Coulomb's law, Electric field, Electrostatic potential, Gauss's law for Electronics, basic electromagnetism: effect on currents, charges

## Basic Mathematics

1. Real Number System
2. Elements of Algebra
3. Relations, Functions, including Periodic Functions, Inverse Functions, Growth Rates and Topics from Differential Calculations such as max/min of functions of one variable differentials and approximations
4. Partial derivatives, max/min of function of more than one variable
5. Anti-Derivatives, Indefinite integrals and definite integration
6. Logarithms and Exponential Functions
7. Differential Equations and differences equations models in biology and ecology