PHYSICS

**POST GRADUATE DEGREE
STANDARD**

UNIT I
CLASSICAL MECHANICS
Generalised co-ordinates - D'Alembertz principle Lagrangian equations and its application - Hamilton's equaiton from variational principle - Principle of Least action - Canonical Transformation - Poison Brackets and Legrange Brackerts - Hamilton - Jacobi eqation - Action angle variable Kepler problem - Theory of small oscillation - Normal modes and frequencies - Linear Triatomic molecule - Rigid body dynamics - Top.

UNIT II
RELATIVITY AND SPACE PHYSICS
Postulates of special theory of Relativity - Lorentz transformation equaitons and its consequences - simultanity - variation of Mass - Mass - energy relation. Gravitaitonal constant and its determination - Escape velocity and orbital velocity - geostationary orbit and satellite communication - Remote sensing - Perspective of Geophysics.

UNIT III
MATHEMATICAL PHYSICS
Vector analysis - Gauss theorem, Green's thoerem, Stoke's theorem and thier applications - Matrix - Eigen value and Eigen vector - Trace of Matrix - Cayley - Hamilton theorem - Reduction of Matrix to a diagonal form - solutions of Linear algebraic equations - complex variables - cauchy - Riemann conditions - Cauchy's integral theorem - Residues and singularities - Cauchy's Residue theorem - solution of partial differential equations - Application to heat conduction and wave propogation - Normal modes of strigns and mebranes - Special functions - Bessel, Legendre, Hermite and laguerre differential equations - properties of speical functions.

UNIT IV
ELECTRO MAGNETIC THOERY
Gauss law - poisson and Laplace equations - solution of Laplace equation in a Rectangular Box - Molecular polarizability and electrical susceptibility - Maxwell's equations - Poynting's theorem - vector and scalar potentials - Gauge invariance - coulomn and Lorentz guages - Lorentz force - equation of continuity - The wave equation - plane waves in a non-conducting medium - Reflection and refraction at a plane inteference between dielectrics - Fresnel's law.

UNIT V
ELECTRONICS
F E T amplyfiers - DC amplifiers - Darlington Pair amplifier - Differential amplifier - common mode rejection ratio - operational amplifiers - invertor - summer - differentiator - integrator - comparator - Multivibrators - three types - Schmitt Trigger - Phase shift oscillator - Wienbridge oscillator - Principle of radio communication - AM and FM transmission - RADAR principle - Types of scanning - Duplexer - radar becon - uses principles of Television - Television Transmission and reception - interlaced scanning - composite video signal - Yagi antenna - principle of colour T.V.

PAPER - II

UNIT I
THERMODYNAMICS AND STATISTICAL
Mechanics :- Laws of thermodynamics - Entropy - thermodynamic potentials - maxwell's equaitons and its applicaitons - Gibbs phase rule - phase transition - clausius eleperon equation - Third law of

thermodynamics - postulates of classical statistical Mechanics - Liouville's theorem - micro canonical, canonical and grand canonical ensombles - partition function and entropy of an ideal gas - Gibbs Parodox - BlacBody radiation and Planck's Radiation - Phonons - Maxwel's distribution and its application - postulates of quantum statistics - Bose Einsting and Fermi Divac Statistics - Applications.

UNIT II
OPTICS, SPECTROSCOPY AND MOLECULAR PHYSICS
Crystal optics - Different type of laser - thier principle theory and applicaitons - Laser Raman Spectroscopy - applications - Raman effect - Kramer and Heisenberg theory - Raman spectra and their relation with infra red - Molecular structure - NMR, ESR, NQR and mossbar effect - theory, techniques and applications - Coupling schemes - zeeman effect - paschen - Back effect - spectra structure of atomic molecules - rotation, vibration and rotation - vibration spectra - Electronic spectra of diatomic molecules - Frank - Condon principle.

UNIT III
QUANTUM MECHANICS
Postulates - Schrodinger equation - wave function - Hydrogen atom - first order and second order Perturbations - stark effect - WKB quantization rule - Time dependent perturbation theory - Fermi's golden rule - Adiabatic and sudden Approximation - Scattering Cross section - Born Approximation - Relativistic equation - Freeparticle - Electromagnetic potentials - Energy level in a coulmns field - Dirac's Relativitic equation - Diracs' equaiton for a central field - spin angular momentum - Negative energy states.

UNIT IV
SOLID STATE PHYSICS AND NUCLEAR PHYSICS:
Crystal classes and systems - 2d, 3d - Laltices - Liquid crystals - crystal growth - Vibration of Monoatomic Lattices - Phonons - Lattice heat Capacity - Planck distribution - Einstein Model - Debye Model of the lattice heat capacity - Thermal conductivity - Energy band in metals and insulators - Semi conductor crystals bandgap-Tight bound approximation - De Hass - Van Alphen effect. Nuclear mass - Binding energy - Nuclear shell model - Liquid drop model - Yukawas;s mesaon theory - Alpha decay - Fermis' theory of bdecay - Nuclear isomersm - Particle detectors - Nuclear fission - Different fusion process - Classification of elementary particles - Isospin quantum numbers - Cosmic rays.

UNIT V
DIGITAL ELECTRONICS AND MICROPROCESSOR:-
Logic gates - DTL, RTL, TTL and ECL - Half and full adders Half and full substractors - parallel Binary adder - 8421 adder - Alegebric simplification - Hundamental products - sum of products - AND - OR - Networks - Karnaugh map - NAND - NAND - Networks - Counter techniques RS, RST, JK and master and slave flip flop - ripple counters - parallel counters - BCD counter - shift register - series and parllel register - D/A and A/D conversion. Introduction to microprocessor - arlchitecture of MPU 8085 addressing modes - instruction type - software programmes involving addition, subtraction and logical operations only - Semi conductor memory types - characteristics RAMs - Reprogrammable ROMs.