VEER NARMAD SOUTH GUJARAT UNIVERSITY

Syllabus for B. Sc. Semester V

Subject: Physics (PHY-5011)

Paper –XI

[2 credit course- 2 hours per week]

Unit – I **Numerical analysis** **Duration: 15 hrs**

Errors in Numerical calculations:

Errors and their computations (1.1), a general error formula (1.4), errors in a series approximation (1.5)

Solutions of algebraic equations:

Introduction (2.1), the bisection method (2.2), the method of false position (2.3), the iteration method (2.4), Newton-Raphson method (2.5)

Interpolation:

Introduction (3.1), errors in polynomial interpolation (3.2), finite differences (3.3), forward differences (3.3.1), backward differences (3.3.2), central differences (3.3.3), symbolic relations and separation of symbols (3.3.4), detection of errors by use of difference tables (3.4), differences of a polynomial (3.5), Newton's formula for interpolation (3.6) , divided differences and their properties (3.10), Newton's general interpolation formula (3.10.1), interpolation by iteration (3.10.2), inverse interpolation (3.11)

Text book: Introductory Methods of Numerical Analysis by S S Sastry
PHI publications (4th Edition)

Unit – II **Material Science** **Duration: 15 hrs**

Electrical Properties of Materials:

Introduction (6:I), classical free electron theory of metals (6:II), drawbacks of classical theory (6:III), relaxation time, collision time and mean free path (6:IV)

Magnetic Properties of Materials:

Introduction (9:I), Magnetic permeability (9:II), magnetization (9:III), diamagnetism (9:IX), paramagnetism (9:XI), Weiss theory of paramagnetism (9:XII), Ferromagnetism (9:XIX), the domain model (9:XXVII)

Superconductivity:

A survey of superconductivity (8:II), an account of the mechanism of superconductors (8:III), effects of magnetic field (8:IV), ac resistivity (8:V), critical current (8:VI), flux exclusion: the Meissner effect (8:VII), thermal properties (8:VIII), penetration depth (8:XII), type – I and type – II superconductors (8:XIII), potential applications of superconductivity (8:XXIV)

Text book: Solid state physics by S O Pillai,
New age international publishers (Revised 6^{th} edition)

Note: Illustrative problems on all the relevant topics should be covered.

REFRENCE BOOKS:

1. Numerical analysis by Tim Sauer, Pearson
2. Numerical analysis by G Shanker Rao & Shanker G Rao, New age international
3. Introduction to Numerical Analysis by Devi Prasad, Narosa publication
4. Solid state physics by Ali Omer, Pearson
5. Solid state physics by A J Dekker, Mcmillan
6. Introduction to Solid state physics by C Kittal, Wiley