

# Bhoj Reddy Engineering College for Women: Hyderabad

Faculty of Physics

Lesson plan of faculty member for the academic year 2017–18

Class: I B Tech

Branch - Section: ECE-A

Semester: II

Subject: Engineering Physics

Lectures per week: 4

| Lecture Number   | Topics to be covered  | Date (s)         |
|--|---|------------------|
| <b>UNIT-I Principles of Quantum Mechanics</b>                |   |                  |
| 1  | Waves and particles   | 18 December 2017 |
| 2  | de-Broglie hypothesis, matter waves   | 20 December 2017 |
| 3  | Davisson and Germer experiment  | 21 December 2017 |
| 4  | Problems, Heisenberg's uncertainty principle  | 22 December 2017 |
| 5  | Consequences of Heisenberg's uncertainty principle, problems                                  | 27 December 2017 |
| 6  | Schrodinger time independent wave equation  | 28 December 2017 |
| 7  | Physical significance of wave function  | 29 December 2017 |
| 8  | Particle in 1-D potential box   | 03 January 2018  |
| 9  | Electron in periodic potential, Kronig-Penny model (qualitative treatment)                    | 04 January 2018  |
| 10   | E-K curve   | 05 January 2018  |
| 11   | Origin of energy band formation in solids   | 08 January 2018  |
| <b>UNIT-II Semiconductor Physics</b>                         |   |                  |
| 12   | Introduction to semiconductors  | 10 January 2018  |
| 13   | Fermi level in intrinsic semiconductors   | 11 January 2018  |
| 14   | Fermi level in extrinsic semiconductors   | 12 January 2018  |
| 15   | Calculation of carrier concentration in intrinsic semiconductors                              | 17 January 2018  |
| 16   | Calculation of carrier concentration in extrinsic semiconductors P-Type                       | 18 January 2018  |
| 17   | Calculation of carrier concentration in extrinsic semiconductors N-Type                       | 19 January 2018  |
| 18   | Direct and indirect band gap semiconductors   | 22 January 2018  |
| 19   | Formation of PN junction, open circuit PN junction  | 24 January 2018  |
| 20   | Energy level diagram of PN junction diode   | 25 January 2018  |
| 21   | Solar cell: I-V characteristics and applications  | 29 January 2018  |
| <b>UNIT – III Dielectric Properties</b>                      |   |                  |
| 22   | Electric dipole, dipole moment, dielectric constant, polarizability                           | 31 January 2018  |
| 23   | Electric susceptibility, displacement vector, electronic, ionic and orientation polarizations | 01 February 2018 |
| 24   | Calculation of electronic polarizability,   | 02 February 2018 |
| 25   | Revision  | 05 February 2018 |
| 26   | Calculation of ionic polarizability   | 12 February 2018 |
| 27   | Calculation of orientation polarizability   | 14 February 2018 |
| 28   | Internal field  | 15 February 2018 |
| 29   | Clausius-Mossotti relation  | 16 February 2018 |
| 30   | Piezoelectricity  | 19 February 2018 |
| 31   | Pyroelectricity and ferroelectricity-BaTiO <sub>3</sub> structure                             | 21 February 2018 |
| 32   | Problems  | 22 February 2018 |
| <b>UNIT – IV Magnetic Properties &amp; Superconductivity</b> |   |                  |
| 33   | Permeability, field intensity, magnetic field induction                                       | 23 February 2018 |
| 34   | magnetization, magnetic susceptibility  | 26 February 2018 |

|   |  |                 |
|---|--|-----------------|
| 35  | problems   | 28February 2018 |
| 36  | Origin of magnetic moment  | 02 March 2018   |
| 37  | Bohr magneton  | 05 March 2018   |
| 38  | Classification of dia, para and ferro magnetic materials on the basis of magnetic moment | 07 March 2018   |
| 39  | Hysteresis curve, Hysteresis curve based on domain theory                                | 08 March 2018   |
| 40  | soft and hard magnetic materials, Properties of antiferro and ferri magnetic materials   | 09 March 2018   |
| 41  | Superconductivity: Superconductivity phenomenon  | 12 March 2018   |
| 42  | Meissner effect, applications of superconductivity                                       | 14 March 2018   |
| <b>UNIT – V Introduction to Nanoscience</b> |  |                 |
| 43  | Origin of nanoscience, nanoscale   | 15 March 2018   |
| 44  | surface to volume ratio, Quantum confinement   | 16 March 2018   |
| 45  | dominance of electromagnetic forces  | 19 March 2018   |
| 46  | Random molecular motion  | 21 March 2018   |
| 47  | Bottomup fabrication: Sol-gel, CVD   | 22 March 2018   |
| 48  | PVD techniques   | 23 March 2018   |
| 49  | Top-down fabrication: ball mill method   | 28 March 2018   |
| 50  | Characterization by XRD, SEM   | 29 March 2018   |
| 51  | TEM  | 02 April 2018   |

**Text book:**

1. Solid State Physics, A. J. Dekkar, Macmillan publishers Ind. Ltd.,
2. Solid State Physics, Chales Kittel, Wiley student edition.
3. Fundamentals of Physics, Alan Giambattisa, BM Richardson and Robert C Richardson, Tata McGraw hill Publishers

Name and signature of the faculty: Vijitha JS

Name and signature of Head of the Department: Vijayalaxmi G