**Lesson Plan**

Name of faculty : Er. Sita Devi

Discipline : Electrical Engineering

Semester : 4th

Subject : Electrical engineering material and semiconductor device (EE-202-L)

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| Week | Theory | | **Date of Actual covered** | **Signatures** | | | | | |
| Lecture  Day | Topic (Including assignment / Test) | **Concerned teacher** | | | **HOD** | **DP** | |
| **Unit-I** | | | | | | | | | |
| 1st | 1 | Introduction to conducting materials |  | |  |  | | |  |
| 2 | Review of energy bands |
| 3 | Description of materials |
| 4 | Drift velocity, collision time, |
| 2nd | 5 | Mean free path,mobility |  | |  |  | | |  |
| 6 | Introduction to conductivity |
| 7 | Relaxation time |
| 8 | Factor affecting conductivity of materials |
| 3rd | 9 | Types of thermal conductivity |  | |  |  | | |  |
| 10 | Wiedmann-Franz law |
| 11 | Super conductivity,effect of magnetic field |
| 12 | Application of conducting materials |
| **Unit-II** | | | | | | | | | |
| 4th | 13 | Introduction to dielectric materials |  | |  |  | | |  |
| 14 | Behavior of dielectric materials in static electric field |
| 15 | Dipole moments, polarization, Dielectric constant |
| 16 | Polarizability, Susceptibility |
| 5th | 17 | Mechanisms of polarization, behavior in alternating field |  | |  |  | | |  |
| 18 | Dielectric loss, loss tangent |
| 19 | Types of dielectric and insulating materials |
| 20 | Electrostriction, piezo-electricity, application |
| 6th | 21 | Introduction to magnetic materials: permeability, magnetic susceptibility |  | |  |  | | |  |
| 22 | magnetic moment, magnetization |
| 23 | Dipole moment, types of magnetic materials, magnetostriction |
| 24 | Eddy current & hysteresis losses, application |
| **7th** | **1st Minor Test** | | | | | | | | |
| **Unit-III** | | | | | | | | | |
| 8th | 25 | Discussion on 1st minor test questions |  | |  |  | | |  |
| 26 | Introduction to semiconductor materials |
| 27 | Review of Si & Ge as semiconductor materials, continuity equation |
| 28 | P-N junction, drift & diffusion |
| 9th | 29 | Diffusion & transition capacitances of P-N junction |  | |  |  | | |  |
| 30 | Brief introduction to planar technology for device fabrication |
| 31 | Metal-semiconductor junction (ohmic and non- ohmic) |
| 32 | Breakdown mechanisms in p-n junction |
| 10th | 33 | Introduction to zener diode and application |  | |  |  | | |  |
| 34 | Electrical and optical excitation in diodes |
| 35 | Introduction to LED |
| 36 | Solar cells and photo-detectors |
| **Unit-IV** | | | | | | | | | |
| 11th | 37 | Introduction to BJT |  | |  |  | | |  |
| 38 | Types of BJT and its operation |
| 39 | Different modes of operation of BJT |
| 40 | Introduction to UJT |
| 12th | 41 | Characteristic of UJT & its applications |  | |  |  | | |  |
| 42 | Introduction to JFET |
| 43 | Characteristics of JFET and its biasing |
| 44 | Introduction to MOSFET |
| 13th | 45 | Working of MOSFET in depletion mode |  | |  |  | | |  |
| 46 | Working of MOSFET in enhancement mode |
| 47 | Introduction to thyristors : SCR |
| 48 | The Diac and its application |
| **14th** | **2nd Minor test** | | | | | | | | |
| 15th | 49 | The Triac and its application |  | |  |  | | |  |
|  | 50 | Introduction to GTO |
|  | 51 | Introduction to IGBT |
|  | 52 | Introduction to VMOS |