# Fr. Conceicao Rodrigues College of Engineering, Bandra (West), Mumbai-400 050

| **Subject: Applied Physics- I** | | | **Academic Year: 2019-20** | | | |
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| **Division: B** | | | **Semester: I** | | | |
| **No Lect** | **Sr** | **Name of the Topic** | **Planned Date** | **Executed Date** | **Mapped CO** | **Delivery Method** |
| | **Module: 2 SOLIDSTATE PHYSICS - CRYSTALLOGRAPHY(03 hrs)** | | | | | |
| 1 | 1 | Introduction to crystallography; unit cellS, Diamond Structure | 16/8/2019 | 16/8/2019 | **CO2 FEC102.2** | |
| 2 | 2 | Miller indices of crystallographic planes & directions; | 22/8 | 22/8 | | |
| 3 | 3 | Interplanar spacing, X-ray diffraction and Bragg's law; | 23/8 | 23/8 | | |
| 4 | 4 | Determination of Crystal structure using Bragg's diffractometer; | 26/8 | 26/8 | | |
| | **Module: 3 SOLIDSTATE PHYSICS - SEMICONDUCTORS(06 hrs)** | | | | | |
| 5 | 1 | Classification of semiconductors(direct & indirect band gap, elemental | 27/8 | 27/8 | CO 3 FEC102.3 | |
| 6 | 2 | Conductivity, mobility, current density (drift & diffusion) in semiconductors(n type and p type); | 29/8 | 29/8 | | |
| 7 | 3 | Fermi Dirac distribution function; Fermi energy level in intrinsic & extrinsic semiconductors; | 17/9 | 17/9 | | |
| 8 | 4 | effect of impurity concentration and temperature on fermi level; | 19/9 | 19/9 | | |
| 9 | 5 | Fermi Level diagram for p-n junction(unbiased, forward bais, reverse bias); | 24/9 | 24/9 | | |
| 10 | 6 | Hall Effect, Numericals | 26/9 | 26/9 | | |
| 11 | 7 | Applications of semiconductors: Rectifier diode, LED, Zener diode, Photo diode, | 28/9 | 28/9 | | |
| | **Module 4 OPTICS - I (05 hrs)** | | | | | |
| 12 | 1 | Interference by division of amplitude, Interference in thin film of constant thickness due to reflected and transmitted light; | 1/10 | 1/10 | CO4 FEC102.4 | |
| 13 | 2 | Wedge shaped film; Newton's rings | 7/10 | 7/10 | | |
| 14 | 3 | Numericals on Wedge shaped film; Newton's rings | 9/10 | 9/10 | | |
| 15 | 4 | Applications of interference- Determination of thickness of very thin wire or foil;determination of refractive index of liquid; wavelength of incident light; | 11/10 | 11/10 | | |
| 16 | 5 | Applications of interference- radius of curvature of lens; testing of surface flatness; Anti-reflecting films and Highly reflecting film. | 15/10 | 15/10 | | |
| | **Module 1 QUANTUM MECHANICS (07 hrs)** | | | | | |

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| 17 | 1 | Introduction, Wave particle duality; de Broglie wavelength; experimental verification of de Broglie theory; | 16/10 | 16/10 | CO1 FEC102 .1 | |
| 18 | 2 | properties of matter waves; wave packet, phase velocity and group velocity; | 17/10 | 17/10 | | |
| 19 | 3 | Wave function; Physical interpretation of wave function; | 19/10 | 19/10 | | |
| 20 | 4 | Heisenberg's uncertainty principle;, Electron diffraction experiment,Applications of uncertainty principle; | 22/10 | 22/10 | | |
| 21 | 5 | Schrodinger's time dependent wave equation; time independent wave equation; | 23/10 | 23/10 | | |
| 22 | 6 | Motion of free particle; Particle trapped in one dimensional infinite potential well. | 24/10 | 24/10 | | |
| 23 | 7 | Numerical problems | | | | |
| | **Module 5 SUPERCONDUCTORS & SUPER CAPACITORS(03 Hrs)** | | | | | |
| 24 | 1 | Superconductors: Critical temperature, critical magnetic field, Meissner's effect | 30/10 | 30/10 | CO5 FEC102 .5 | |
| 25 | 2 | Type I and Type II and high Tc superconductors; | 31/10 | 31/10 | | |
| 26 | 3 | Supercapacitors: Principle, construction, types, materials and applications,comparison with capacitor and batteries : Energy density, Power density | | | | |
| | **Module 6 ENGINEERING MATERIALS & APPLICATIONS ( 02Hrs)** | | | | | |
| 27 | 1 | Liquid crystals: Nematic, Smectic and cholesteric phases, Liquid crystal display.Multiferroics : Type I & Type II multiferroics and applications, | | | CO6 FEC102 .6 | |
| 28 | 2 | Magnetoresistive Oxides: Magnetoresistance, GMR and CMR materials, introduction to spintronics | | | | |