Vaish Technical Institute Rohtak (Haryana)

Electrical Engineering Department

Lesson plan

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| **Name of Faculty** |  **Naresh Kumar Jain** |
| **Discipline** | **Electrical Engineering** |
| **Semester** | **3rd (odd- semester)** |
| **Subject** | **Electrical and Electronics Engineering Materials** |
| **Lesson Plan Duration** | **From July 2018 to Nov 2018** |
| **Work load (Theory + Practical ) Per Week** | **(04+00)** |
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| **Week** | **Day** | **Topics** |
| **1st** | **1** | **Introduction to Classification of materials** |
| **2** | **Classification of conducting , semi conducting and insulating materials based on atomic****Structure**  |
| **3,4** | **Classification based on energy bands****Revision.** |
| **2nd** | **1** | **Introduction to conducting materials. Affect of temp. & alloying on the resistance and other property of conducting material.** |
| **2** | **Classification of conducting material as low resistivity and high resistivity materials** |
| **3,4** | **To study following properties of Copper: Resistivity, Temp. coefficient, Density, Mechanical properties, Corrosion, Contact Resistance.** |
| **3rd** |  **1,2** | **To study following properties of Alluminum: Resistivity, Temp. coefficient, Density, Mechanical properties, Corrosion, Contact Resistance.** |
| **3,4** | **To study following properties of Steel: Resistivity, Temp. coefficient, Density, Mechanical properties, Corrosion, Contact Resistance.** |
| **4th** | **1,2** | **To study practical application with reason of low resistivity Copper alloy i.e. Brass, Bronze (Cadmium & Beryllium).** |
| **3,4** |  **Applications of special metals e.g. Silver, Gold, Platinum etc** |
| **5th** | **1,2** | **Application of high resistivity materials and their applications i.e. Manganin, Constantan, Tantalum, Nichrome, Mercury, Platinum, Carbon and Tungsten** |
| **3** | **Introduction to bundle conductor & its application.** |
| **4** | **Superconductors and their applications** |
| **6th** | **1,2** | **Types of Semi-conducting material: Germanium, Silicon & Carbon their atomic structure and application.** |
| **3,4** |  **Revision and problem related to above topics.** |
| **7th** | **1** | **Insulating materials; General Properties.** |
| **2** | **Electrical Properties : Resistivity, surface resistance, dielectric loss, dielectric strength, dielectric constant.** |
| **3** | **Insulating materials; Physical Properties Hygroscopicity, tensile and compressive strength, abrasive resistance, brittleness.** |
| **4** | **Thermal Properties: Heat resistance, classification according to permissible****temperature rise, effect of overload on the life of electrical appliance etc.** |

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|  **8th** | **1** | **Chemical Properties: Solubility, chemical resistance, weatherability.** |
| **2** | **Mechanical properties, mechanical structure, tensile structure.** |
| **3** | **Introduction to Insulating Materials and their applications.** |
| **4** |  **Definition of Plastic and its classification.** |
| **9th** | **1** | **Thermosetting materials: Bakelite, Amino resins, Epoxy resins their important****properties and applications.** |
| **2** | **Thermo-plastic materials: procedure for preparation of PVC, Polyethelene, Silicones, their important properties and applications.** |
| **3** | **Natural insulating materials, properties and their applications.** |
| **4** | **Properties and application of Mica & Mica products, Asbestos & Asbestos products, Ceramic materials.** |
|  **10th** | **1** | **Properties and application of Glass & Glass products Cotton, Glass fibre sleeves, Silk, Jute, Paper, Rubber, Bitumen.** |
| **2** | **Properties and application of Mineral and insulating oil for transformer, insulating varnish for coating & Impregnation.** |
|  **3,4** | **Revision and problem related to above topics.** |
|  **11th** | **1,2** | **Gaseous materials; Air, Hydrogen, Nitrogen, SF their properties and applications.** |
| **3** | **Types of Magnetic Materials: Introduction, Ferromagnetic materials, permeability.** |
| **4** | **B-H curve, magnetic saturation, hysteresis loop including coercive force and residual****Magnetism.** |
| **12th** | **1** | **Concept of eddy current and hysteresis loss, Curie temperature, magneto striction****effect.** |
| **2** | **Soft Magnetic Materials: Alloyed steels with silicon: High Silicon Steel alloy for****Transformers.** |
| **3** | **Low Silicon Steel alloy for electric rotating machines.** |
| **4** | **Cold rolled grain oriented steels for transformer, Non-oriented steels for rotating****machine, Nickel-iron alloys, Soft Ferrites.** |
|  **13th** | **1** | **Application of all soft magnetic material as discussed above.** |
| **2** | **Hard magnetic materials: Tungsten steel, Chrome steel , Cobalt steel and hard ferrites & applications.** |
| **3** | **Special Materials: Thermocouple, Bimetals & applications.** |
| **4** | **Special Materials: Lead soldering & fuse material & applications.** |
| **14th** | **1** | **Revision and problem related to above topics.** |
| **2** | **Revision and problem related to above topics.** |
|  **3,4** | **Introduction of various engineering materials necessary for fabrication of electrical****Machines such as motors, generators, transformers etc.** |
| **15th** | **1,2** | **Revision and problem related to above topics.** |
| **3,4** | **Discussion regarding Performance.** |
| **16th** | **1** | **Class Test.** |
| **2** | **Viva-voice related to subject.** |
| **3** | **Revision/Review/Test of old HSBTE Papers.** |
| **4** | **Revision/Review/Test of old HSBTE Papers.** |