**Lesson Plan**

**Name of Faculty :- Sh. JAIPAL**

**Discipline :- Electrical Engineering**

**Semester :- 3rd Semester**

**Subject :- Electrical and Electronics Engg. Material**

**Lesson Plan Duration:- 15 Week**

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| **Week** | **Theory** |
| 1st | **Lecture Day** | **Topic** |
| 1st  | Classification of materials into conducting materials through a brief reference to their atomic structure and energy bands |
| 2nd | Semi conducting and insulating materials ,Energy bands |
| 3rd |  Introduction to conducting materials, Resistance and factors affecting it such as alloying and temperature etc |
| 4th | Classification of conducting material as low resistivity and high resistivity materials, low resistance materials |
| 2nd | 5th  | Copper: General properties as conductor: Resistivity, temperature coefficient, density |
| 6th  | Mechanical properties of hard-drawn and annealed copper, corrosion, contact resistance. Application in the field of electrical engineering. |
| 7th  | Aluminium: General properties as conductor: resistivity, temperature coefficient, density,  |
| 8th  | Mechanical properties of hard and annealed aluminium, solderability, contact resistance. Applications in the field of electrical engineering |
| 3rd | 9th  | . Steel: Mechanical properties of steel, Applications of steel in the field of electrical engineering |
| 10th  | Introduction to bundle conductors and its applications. |
| 11th  |  Low resistivity copper alloys: Brass, Bronze (cadmium and Beryllium), their practical applications |
| 12th  | Applications of special metals e.g. Silver, Gold, Platinum etc. |
| 4th | 13th  | High resistivity materials and their applications e.g., manganin, constantan, Nichrome, mercury, platinum, carbon and tungsten |
| 14th  |  Superconductors and their applications ,Semi-conductors and their properties, |
| 15th  | Materials used for electronic components like resistors, capacitors, diodes, transistors and inductors etc. |
| 16th  | Electrical Properties: Volume resistivity, surface resistance, Dielectric loss, dielectric strength (breakdown voltage) dielectric constant |
| 5th | 17th  | Physical Properties: Hygroscopicity, tensile and compressive strength, Abrasive resistance, brittleness |
| 18th  | Thermal Properties: Heat resistance, classification according to permissible temperature rise. |
| 19th  | Effect of overloading on the life of an electrical appliance, increase in rating with the use of insulating materials having higher thermal stability, Thermal conductivity, Electro-thermal breakdown in solid dielectrics |
| 20th  | Electro-thermal breakdown in solid dielectrics, Chemical Properties: Solubility, chemical resistance, weatherability, Mechanical properties, mechanical structure, tensile structure |
| 6th | 21st  | Plastics : Definition and Classification ,Thermosetting materials: Phenol-formaldehyde resins (i.e. Bakelite) amino resins (urea formaldehyde and Melamine-formaldehyde), |
| 22nd  | Epoxy resins - their important properties and applications ,Thermo-plastic materials: Polyvinyl chloride (PVC), polyethelene |
| 23rd  | Silicones, their important properties and applications, Natural insulating materials, properties and their applications |
| 24th  | Mica and Mica products, Asbestos and asbestos products  |
| 7th | 25th  | Ceramic materials (porcelain and steatite), Glass and glass products |
| 26th  | Cotton, Silk, Jute, Paper (dry and impregnated), Rubber, Bitumen |
| 27th  | Mineral and insulating oil for transformers switchgear capacitors, high voltage insulated cables, insulating varnishes for coating and impregnation |
| 28th  | Enamels for winding wires ,Glass fibre sleeves |
| 8th | 29th  | Gaseous materials; Air, Hydrogen, Nitrogen, SFtheir properties and applications |
| 30th  | Introduction - ferromagnetic materials, permeability, B-H curve, |
| 31st  | Magnetic saturation, hysteresis loop including coercive force and residual magnetism, |
| 32nd  | concept of eddy current and hysteresis loss, Curie temperature, magnetostriction effect. |
| 9th | 33rd  | Soft Magnetic Materials ,Alloyed steels with silicon: High silicon, alloy steel for transformers |
| 34th  | Low silicon alloy steel for electric rotating machines |
| 35th  | Cold rolled grain oriented steels for transformer, Non-oriented steels for rotating machine |
| 36th  | Nickel-iron alloys, Soft Ferrites,Hard magnetic materials |
| 10th | 37th  | Tungsten steel, chrome steel, hard ferrites and cobalt steel, their applications |
| 38th  | Special materials : Thermocouple, bimetals |
| 39th  | Leads soldering and fuses material and their applications |
| 40th  | Introduction of various engineering materials necessary for fabrication of electrical machines such as motors, generators, transformers etc |
| 11th | 41st  | Revision Unit-1 |
| 42nd  | Revision Unit-1 |
| 43rd  | Revision Unit-1 |
| 44th  | Revision Unit-2 |
| 12th | 45th  | Revision Unit-2 |
| 46th  | Revision Unit-3 |
| 47th  | Revision Unit-3 |
| 48th  | Revision Unit-4 |
| 13th | 49th  | Revision Unit-4 |
| 50th  | Revision Unit-5 |
| 51st  | Revision Unit-5 |
| 52nd  | Revision Unit-6 |
| 14th | 53rd  | Revision Unit-6 |
| 54th  | Revision Unit-7 |
| 55th  | Revision Unit-7 |
| 56th  | Revision Unit-7 |
| 15th | 57th  | Revision Unit-8 |
| 58th  | Revision Unit-8 |
| 59th  | Revision Unit-8 |
| 60th  | Revision Unit-8 |