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| **LESSON PLAN** | | |
| **Name of the**  **Faculty** | | Sh. Navneet Kaushik |
| **Discipline** | | ELECTRICAL ENGINEERING |
| **Semester** | | 3RD |
| **Subject** | | Electrical and Electronics Engineering Materials |
| **Lesson Plan**  **Duration** | | 15 WEEKS |
| **Work Load (Lecture/ Practical) per week (in hours)** | | Theory-4 |
| Week |  |  |
|  | Topic |
| 1st | 1st | Introduction to Classification of materials |
|  | Classification of Conducting ,semi conducting and insulating materials based on atomic structure |
| 2nd | Classification based on energy bands |
| 3rd | Revision and Class test of 1st unit |
| 4th | Introduction to Conducting Materials Resistance and factors affecting it |
| 2nd | 1st | Such as alloying and temperature |
| 2nd | Classification of conducting material as low resistivity and high resistivity materials |
| 3rd | low resistance materials Copper: General properties as conductor resistivity, temperature  coefficient and density |
| 4th | Mechanical properties of hard-drawn and annealed copper corrosion, contact resistance |
| 3rd | 1st | Application of copper in the field of electrical engineering. |
| 2nd | Aluminium: General properties as resistivity, temperature coefficient, density |
| 3rd | Mechanical properties of hard and annealed aluminium, solder ability, contact resistance |
| 4th | Applications in the field of electrical engineering. |
| 4th | 1st | Steel: Mechanical properties of steel |
| 2nd | Applications in the field of electrical engineering. |
| 3rd | Introduction to bundle conductors and its applications |
| 4th | Low resistivity copper alloys Brass, Bronze and their applications |
| 5th | 1st | Applications of special metals e.g. Silver, Gold, Platinum etc |
| 2nd | High resistivity materials and their applications manganin, constantan, |
| 3rd | Nichrome, mercury, platinum, carbon and tungsten |
| 4th | Superconductors and their applications |
| 6th | 1st | Revision and problem related to 2nd unit |
| 2nd | Class Test of 2nd unit |
| 3rd | Review of Semi-conducting Materials, Semi-conductors and their properties |
| 4th | Materials used for electronic components like resistors, capacitors, diodes, transistors and  inductors etc |
| 7th | 1st | Revision and problem related to 3rd unit |
| 2nd | Class Test of 3rd unit |
| 3rd | Insulating materials; General Properties |
| 4th | Electrical Properties :Resistivity, surface resistance, dielectric loss, dielectric strength |
| 8th | 1st | Physical Properties Hygroscopicity,tensile and compressive strength, abrasive resistance, brittleness |
| 2nd | Thermal Properties: Heat resistance, classification according to permissible |
| 3rd | temperature rise |
| 4th | Chemical Properties: Solubility, chemical resistance, weather ability |
| 9th | 1st | Mechanical properties, mechanical structure, tensile structure |
| 2nd | Revision and problem related to 4thunit |
| 3rd | Class Test of 4th unit |
| 4th | Introduction to Insulating Materials and their applications |
| 10th | 1st | Plastics Definition and classification |
| 2nd | Thermosetting materials: Bakelite, amino resins, epoxy resins their important properties and  applications |
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| 3rd | Thermo-plastic materials: PVC, Polyethelene, silicones, their important properties and applications |
| 4th | Natural insulating materials, properties and their applications |
|  | 1st | Mica and Mica products, Asbestos and asbestos products, Ceramic materials |

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| 11th | 2nd | Glass and glass products Cotton, silk, jute, paper, Rubber, Bitumen |
| 3rd | Mineral and insulating oil for transformer, insulating varnish for coating and impregnation |
| 4th | Gaseous materials; Air, Hydrogen, Nitrogen, SFtheir properties and applications |
| 12th | 1st | Revision and problem related to 5thunit |
| 2nd | Class Test of 5th unit |
| 3rd | Magnetic Materials: Introduction, Ferromagnetic materials, permeability |
| 4th | B-H curve, magnetic saturation, hysteresis loop including coercive force and residual magnetism |
| 13th | 1st | Concept of eddy current and hysteresis loss, Curie temperature, magnetostriction effect. |
| 2nd | Soft Magnetic Materials: Alloyed steels with silicon: High silicon alloy steel for transformers |
| 3rd | low silicon alloy steel for electric rotating machines |
| 4th | Cold rolled grain oriented steels for transformer, Non-oriented steels for rotating machine, Nickel-  iron alloys, Soft Ferrites |
| 14th | 1st | Hard magnetic materials Tungsten steel, chrome steel , hard ferrites cobalt and |
| 2nd | Steel applications. |
| 3rd | Revision and problem related to 6thunit |
| 4th | Class Test of 6th unit |
| 15th | 1st | Special Materials Thermocouple, bimetals |
| 2nd | leads soldering and fuses material and their applications |
| 3rd | Revision and problem related to 7thunit |
| 4th | Introduction of various engineering materials necessary for fabrication of electrical such as  motors, generators, transformers etc. |