


| LESSON PLAN FOR Engineering Materials (SESSION: September - December, 2022) MECHANICAL ENGG. 3rd SEMESTER | | | |
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| S.NO. | Period No.'s | Topic | PARTICULARS |
| 1 | 1-4 | General | Introduction to engineering materials , Classification of materials, Properties of engineering materials- mechanical, thermal and electrical, Selection criteria for use in industry |
| 2 | 5-18 | Ferrous Materials | Classification of iron and steel, Sources of iron ore and its availability, Manufacture of pig iron, wrought iron, Cast iron and steel (Flow Diagrams only), Types of Cast Iron: White, malleable, grey, mottled, modular and alloy and their usage, Steels and alloy steel, Classification of steels, Different manufacturing methods of steel, open hearth, Bessemer & electric arc., Availability, Properties and usage of steels., Specification as per BIS and equivalent standards., Effect of various alloying element like Cr, Ni, Co, V, Mo, Si, Mn, S on mechanical properties of steel., Use of alloy steels (high speed steel stainless steel, spring steel, silicon steel |
| 3 | 19-23 | Non Ferrous Materials | Important ores and properties of aluminium, copper, zinc, tin, lead., Properties and uses of Al alloys, Copper alloys, Bearing metals, solders |
| 4 | 24-33 | Composite, Ceramics and Plastics. | Definitions, sources., Metal matrix composites, ceramic matrix composites, fibre reinforced composites, carbon – carbon composites., Engineering ceramics, natural and artificial ceramics, Various trade name of engineering plastics, thermosetting and thermoplastic, Plastic coatings, Fibers and their classification: inorganic and organic fibers., Engineering application of composites, ceramics and plastics., Introduction to smart/ intelligent materials |
| 5 | 34-38 | Insulating Materials | Various heat insulating material and their usage like asbestos, glass wool, thermocole, cork, puf, china clay., Various electrical insulating material and their use like China clay, leather, bakelite, ebonite, glass wool, rubber, felt. |
| 6 | 39-40 | Testing of Metals and Alloys | Identification tests: appearance, sound, spark, weight, magnetic, band microstructure, filing |
| 7 | 41-56 | Fundamentals of Heat Treatment | Purpose of heat treatment, Theory of solid solution, Impact of cold and hot working on metal structure, Iron-Carbon Diagram, TTT Curve in steels and its importance., Basic idea about martensitic transformation, Various heat treatment processes-hardening, tempering, annealing, normalizing, case hardening, Types of heat treatment furnaces |

Instruction Reference

- 1 Material Sciences by R.K Rajput
- 2 Material sciences and metallurgy by D.S. Nat
- 3 Manufacturing Engineering and Technology by Kalpakjian Pearson and Co. Ltd

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| Approved | HOD Sign. |
| Date 30/08/22 |  |

