GUJARAT TECHNOLOGICAL UNIVERSITY

B.E Semester: 4

METALLURGY ENGINEERING

Subject Name METALLURGY FOR NON-METALLUGISTS (Institute Elective-I)

Sr. No.	Course content
1.	Introduction to Metals: Scope and Applications, Important metals used.
2.	Structure of Metals : Crystal structure. Thermal curve for solidification. Simple binary diagrams. Allotropic modifications of iron. Iron-Carbon diagram. Various phases of iron, corresponding microstructures.
3.	Steels : Effect of alloying elements on the properties of iron. Major types of steels. Stainless steels.
4.	Heat Treatment of Metals : TTT and CCT diagrams. Hardenability. Different heat treatments for steel: procedures, equipments, quenchants. Introduction to case and surface hardening.
5.	Non-Ferrous Metals : Industrial applications. Major groups. Heat treating procedures.
6.	Casting Methods and Cast Irons : Sand casting. Die casting. Centrifugal casting. Investment casting. Processing of castings. Types of cast irons, microsturctural features and salient charactertics.
7.	Metal Forming : Cold and Hot working. Forging. Rolling. Extrusion and Swaging at high temperature. Cold rolling. Wire drawing. Cutting. Piercing etc.
8.	Joining : Basic of welding. Sources of energy. Methods of shielding. Types of welding methods: SMAW, GTAW, GMAW , SAW. Methods of cutting.

9.	Performance during Service : Failure of metals during service. Failure modes. Failure due to Fatigue, Wear and high temp. Definition of corrosion, different types, methods of prevention.
10.	Mechanical Testing & NDT : Description of testing methods, NDT methods.

Reference Books:

1). Elements of Metallurgy
-Dr D. Swarup
2). Introduction to Metallurgy
-A. R. Bailey
3). Material Science and Metallurgy
-C. Daniel Yesudian and D.G.H. Samuel
4). Elements of Physical Metallurgy
-Guy A.
5). Introduction to Physical Metallurgy
-Sidney A Avner
6). Physical Metallurgy
-Y. Lakhtin