No.	Information on subject (2019-2020)	
1.	Unit Name:	Introduction to physical metallurgy
2.	Unit Code:	Met-21023
3.	Classification:	Engineering Subject
4.	Credit Value:	3
5.	Semester/Year Offered:	1/2
6.	Pre – requisite:	
7.	Mode of Delivery:	Lecture, Tutorial, Practical
8.	Assessment System and Breakdown of Marks:	
	Tutorial Practical	15% 15%
	Mid – term/Final Examination	70%
9.	Academic Staff Teaching Unit:	Demonstrator
10.	Course outcome of unit: In this course, students will be able to 1. classify materials and determine atomic structure of materials. 2. identify atomic and ionic arrangements and to determine points, directions and planes in the unit cell and liner density, packing fraction and planar density. 3. explain point defects, line defects and surface defects of materials and describe diffusion mechanism and calculate the problems about diffusion.	
11.	Synopsis of unit: The course covers the types of materials, atomic structure and atomic bonding, points, directions and planes in the unit cell, imperfections in the atomic and ionic arrangements, point defects, line defects and surface defects of materials and atom and ion movements in materials.	
12.	Topic 1. Introduction to materials science and engineering – What is materials science and engineering – Classification of materials – Functional classification of materials – Environmental and other effects – Materials design and selection 2. Atomic structure – The structure of the atom – The electronic structure of the atom – Atomic bonding – Binding energy and interatomic spacing 3. Atomic and ionic arrangements – Short-range order versus long-range order – Amorphous materials – Lattice, basis, unit cells, and crystal structures – Points, directions, and planes in the unit cell	

	– Interstitial sites 4. Imperfections in the atomic and ionic arrangements – Point defects – Dislocations – Surface defects 5. Atom and ion movements in materials – Application of diffusion – Stability of atoms and ions – Mechanisms for diffusion – Activation energy for diffusion – Rate of diffusion (Fick's first law) – Factors affecting diffusion – Composition profile (Fick's second law) – Diffusion and materials processing
13.	Main references: The Science and Engineering of Materials, Six Edition, Donald R. Askeland
14.	Additional reference: Materials Science and Engineering An Introduction, Eight Edition, William D. Callister , Jr. David G. Rethwisch

Lists of Practical

No.	Lab title	Duration
1	Crystallography of unit cell (study on different crystal structure systems)	5 hrs
2	Determination of relationship between atomic radius and lattice parameter of S.C, B.C.C and F.C.C of unit cell	5 hrs
3	Determination and construction of point defects	5 hrs