



Introduction to Materials Science and Engineering

Metallurgy and Material Science

Instructor Name: Prof. Rajesh Prasad

Institute: IIT Delhi

Department: Mechanical Engineering

About Instructor: Professor Rajesh Prasad began teaching Materials Science as a graduate student at University of Cambridge where he was supervisor and demonstrator for undergraduate course IA Crystalline Materials. He now has about three decades of experience of teaching materials science courses at both undergraduate and graduate levels at the Indian Institutes of Technology, at Varanasi, Kanpur and Delhi. He has been awarded a Teaching Excellence Award in 2012 by the Indian Institute of Technology Delhi. In 2013, he received the Distinguished Alumnus Award of the Department of Metallurgical Engineering, IIT-BHU, Varanasi.

Pre Requisites: : Science at school level equivalent to 10+2 of Central Board of Secondary Education (CBSE), India

Core/Elective: : Core_Elective

UG/PG: : UG

Industry Support : Any industry concerned with materials, in particular automobile and manufacturing industry. Condensed versions of this course have been offered at Maruti Udyog Limited, Gurgaon, and Terminal Ballistic Research Lab of CSIR, Chandigarh, India.

Course Intro: : This course is designed as a first introduction to microstructure and mechanical properties of engineering materials for undergraduate engineering students. The focus will be on clear presentation of basic fundamentals of structure and defects of crystalline materials. This will then be used to understand the transformations, heat treatments and mechanical behavior of structural materials. The course will also include several classroom and laboratory demonstrations.

COURSE PLAN

SL.NO	Week	Module Name
1	1	Crystal Geometry Part I
2	2	Crystal Geometry Part II
3	3	Structure of Solids Part I
4	4	Structure of Solids Part II
5	5	Structure of Solids Part III
6	6	Defects in Crystalline Solids Part I
7	7	Defects in Crystalline Solids Part II
8	8	Phase Diagrams
9	9	Diffusion
10	10	Phase Transformation Part I and Part II
11	11	Plastic Deformation Part I and Part II
12	12	Fracture and Fatigue