Structure of Materials - Video course

COURSE OUTLINE

1. Atomic Arrangement in Crystalline Solids
2. Defects n Crystalline Solids
3. Microstructure Evolution.
4. Quantification of Microstructures

COURSE DETAIL

Sl. No	Topic	Lectures
1.	Bonding in materials.	1
2.	Geometry of Crystals: Symmetry, Lattices.	8
3.	Miller Indices.	1
4.	Crystal Structures.	4
5.	Defects in Crystals.	7
6.	Diffusion.	2
7.	Phase Diagrams.	4
8.	Phase Transformations.	4
9.	Effect of microstructure on properties.	1
10.	Microstructure evolution and heat treatment.	2
11.	Imaging and diffraction for probing structure.	2
12.	Stereology: quantification of microstructures.	5
	TOTAL	41

References:

NP-TEL

NPTEL

http://nptel.iitm.ac.in

Metallurgy and Material Science

Additional Reading:

1. Elementary Crystallography by Martin J. Buerger, John Wiley & Sons.
2. Practical Stereology by John C. Russ and Robert T. Dehoff, Plenum Press (2nd Edition, 2000), New York.
3. Metals Handbook (8th Edition), Vol.8: Metallography, Structures and Phase Diagrams, ASM, 1073.

Hyperlinks:

1. MIT Open Courseware: http://ocw.mit.edu/OcwWeb/Materials-Science-and-Engineering/
2. Defects in Crystals: http://www.tf.uni-kiel.de/matwis/amat/def_en/
3. HyperPhysics: http://hyperphysics.phy-astr.gsu.edu/hbase/hframe.html

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1. Materials Science and Engineering (5th Edition) by V. Raghavan, Prentice-Hall of India Pvt. Ltd., 2004.
2. Structure and Properties of Engineering Materials by V.S.R. Murthy, A. K. Jena, K.P. Gupta and G.S. Murty, Tata McGraw-Hill,
3. Callister's Materials Science and Engienering by William D Callister (Adapted by R. Balasubramaniam), Wiley Inida (P) Ltd., 2007.
4. The Science and Engineering of Materials by Donald. R. Askeland & Pradeep Phule, Cengage Learning, 2006