

# Introduction to Crystallographic texture and related phenomenon - Web course

## COURSE OUTLINE

The objective of this course is to learn how to characterize crystallographic texture. The course includes a detailed overview of characterization techniques used in polycrystal science and engineering. Evolution of microstructure and modeling of deformation behaviour during processing and carries forward to various case studies in real life.

## COURSE DETAIL

Sl. No	Topic/s	Number of Hours
1.	Concepts of texture in materials, their representation by pole figure and orientation distribution functions	6
2.	Texture measurement by different techniques: X-ray diffraction, neutron diffraction, synchrotron X-rays, ultrasonic waves	4
3.	Origin and development of textures during materials processing stages: solidification, deformation, annealing, phase transformation	2
4.	Deformation microstructure and texture in FCC, BCC and HCP metals and alloys	4
5.	Modelling of deformation texture, Sachs, Taylor and Self consistent models for polycrystal deformation and texture evolution	4
6.	Annealing phenomenon: Recovery, recrystallization and grain growth, texture evolution during annealing	6
7.	Solidification and transformation texture	2
8.	Texture development during coatings and thin film deposition	2
9.	Influence of texture on mechanical, chemical and physical properties: Yield strength, ductility, fatigue, corrosion, stress corrosion cracking, magnetic and dielectric properties	4



NP-TEL

# NPTEL

<http://nptel.iitm.ac.in>

## Metallurgy and Material Science

### Pre-requisites:

UG courses on Introduction to Materials science, Characterization of materials and Mechanical behaviour of Materials.

### Coordinators:

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10.	Texture and formability	2
11.	Case studies: Texture control in aluminium industry, automotive grade and electrical steels, magnetic and electronic materials	4
	<b>Total Hours</b>	40

**References:**

1. M. Hatherly and W.B. Hutchinson, An Introduction to Textures in Metals (Monograph No. 5), The Institute of Metals, London.
2. V. Randle and O. Engler, Introduction to Texture Analysis: Microtexture, Microtexture and orientation mapping, Gordon and Breach Science Publishers.
3. F.J. Humphreys and M. Hatherly, Recrystallisation and Related Phenomenon, Pergamon Press.
4. Texture and Anisotropy, U.F. Cocks, C.N. Tome and H.-R. Wenk, Cambridge University Press.