NOC:Fundamentals of X-ray diffraction and Transmission electron microscopy - Video course

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Metallurgy and Material Science

Coordinators:

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COURSE OUTLINE

It is a first course at the under graduate level on microstructural characterization of materials. This course will cover the basic principles and techniques of X-ray diffraction and transmission electron microscopy along with demonstrations of the instrument details and imaging experiments through videos. This course also deals with the sample preparation techniques for the microstructural analysis with practical examples through videos.

COURSE DETAIL

Week. No.	Lessons/Topics
1	1. Fundamentals of X-ray scattering 2. Bragg's law derivation and the factors affecting the intensity
2	3. Crystallite size, effect of strain on the intensity
3	4. Profile fit, indexing, peak broadening 5. Quantitative analysis, residual stress analysis
4	6. Instrumentation details and demo experiments
5	7. Introduction to transmission electron microscopy
6	8. Diffraction and image formation
7	9. Various imaging techniques and spectroscopy
8	10. Sample preparation and applications 11. Instrumentation details and demo experiments

References:

1.,,, 'Elements of X-ray diffraction' B.D. Cullity and S.R. Stock, 2001, Prentice Hall, Inc. USA
2.,,, 'Transmission electron microscopy" D.B. Williams and C. Barry Carter, 4 volumes, Springer, 1996. USA