Structural Analysis of Nanomaterials

Swayam Prabha Course Code – M80

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COURSE OUTLINE	Structural analysis of nanomaterials is an important part of Materials Science and Nanoscience & Nanotechnology which deals with the study of crystal structure of materials and their defects. It is a prerequisite for the understanding of properties of nanomaterials to have a detailed knowledge of the structure from the atomic/ molecular (local) level to the crystal structure and to the microstructure (mesoscopic scale and defect structure). The primary goal of structural analysis of nanomaterials is aiming at both investigating the structure-property relationship and discovering new properties, in order to achieve relevant improvements in current state-of-the art materials.

COURSE DETAILS

S. No	Module ID/ Lecture ID	Lecture Title/Topic
1.	M1_L1	Introduction : Fundamental Concepts of Atomic Structure and Interatomic Bonding
2.	M1_L2	Structure of Materials
3.	M1_L3	Imperfections in Structure of Materials
4.	M1_L4	Phase Diagram: Determination of Phases
5.	M1_L5	Transformation of Phases
6.	M2_L6	Basic Properties: Metals - I
7.	M2_L7	Basic Properties: Metals - II
8.	M2_L8	Basic Properties: Ceramics
9.	M2_L9	Basic Properties: Polymers

10.	M2_L10	Selection of Nanomaterials based on Applications
11.	M3_L11	Introduction to X-Ray Diffraction
12.	M3_L12	Diffraction Methods and Directions of XRD
13.	M3_L13	Determination of Crystal Structures by XRD Patterns
14.	M3_L14	Precise Parameter Measurements
15.	M3_L15	Orientation of Single Crystals
16.	M4_L16	Qualitative Analysis by Diffraction
17.	M4_L17	Quantitative Analysis by Diffraction
18.	M4_L18	Microscopic Structural Analysis of Nanomaterials - I
19.	M4_L19	Microscopic Structural Analysis of Nanomaterials - II
20.	M4_L20	Other Characterization Techniques

List of reference material/ books:

Name and contact details of two referees for the course: