

SYLLABUS :-

Introduction:Definition, importance, principles of crystallography, concept of crystal symmetry and sample symmetry. Description of orientations: the orientation matrix, stereographic projection, pole-figure and inverse pole figure, Euler space, Rodrigues space. Determination of macro-texture: Bragg's law, pole figure measurement by texture goniometer, representation of macro-texture data; orientation distribution function (ODF), overview on texture measurement by different techniques. Determination of micro-texture: The Kikuchi diffraction pattern, pattern indexing and orientation determination by EBSD, representation of micro-texture data, orientation imaging microscopy (OIM), measurement of strain distribution by OIM, overview on SAD and SAC. Effect of texture on the properties: texture based engineering design; effect of crystallographic texture on modulus, strength, ductility, toughness, formability and various other properties. Evolution of texture during metal processing: deformation texture, transformation texture, recrystallisation texture; concept of fibre textures (RD, ND and TD fibres). Typical textures in materials: BCC, HCP and FCC metals, thin steel sheets and high silicon electrical iron, thin film and coatings, composite materials, ceramic and geological materials, high temperature superconductors.