ME619 Experiments in Materials Science

Credit: 3 Approval: Approved in 2nd Senate

Students intended for: B.Tech/MS/PhD

Elective or core: Elective Semester: Odd/Even

Course content:

Fabrication of various materials (metals, alloys, ceramics and composites) in various forms such as single crystals, thin films, and bulk materials using physical/chemical methods. Their structural and physical properties characterization using structural characterization (Diffraction, optical and electron microscopy), Thermal characterization (DTA/DSC/TGA) and miscellaneous materials characterization tools.Scanning probe microscopy, Scanning electron microscopy, Transmission electron microscopy and X-ray diffraction etc. Physical properties measurements such as VSM, Magnetoresistance, SQUID, impedance analysis, PES, IPES, X-ray absorption spectroscopy, AFM, STEM, P-E loop, piezoelectric measurements, thermoelectric measurements etc.

Suggested Books:

Kingery W. D., Bowen, H. K., Uhlhmen D. R., 'Introduction to Ceramics', 2nd Edition, John Wiley, 1976

J. Reed, Principles of Ceramic Processing, 2nd edition, John Wiley and sons,

Encyclopedia of Materials Characterization, C. R. Brundle, C.A. Evans and S.Wilson, Butterworth-Heinemann (1992)

A.R West, Solid State Chemistry, Wiley

Elements of X-Ray Diffraction, B.D. Cullity, Prentice Hall (2001)