

MSE 861 Engineering Ceramics and Glasses

CHs: 3

Pre-requisites: Nil

Course Objectives:

- At the end of the course student should be clear about the following
 - Crystal structures of different inorganic substances.
 - Ceramic synthesis and processing.
 - Types of sintering processes.

Course Contents:

- Physical, Thermal, Electrical and Mechanical Properties of Ceramics,
- Ceramic Crystal Structures, Processing of Ceramic Powders, Sintering Kinetics,
- Hot pressing, Hot Isostatic Pressing, Over pressure sintering,
- Phase Transformation in Ceramics, Engineering Ceramics in Chemical Processes,
- Filters, Machining of Ceramics and Near Net Shape Manufacture,
- Kinetics of Glass Transition, Fictive Temperature & Phase Transformation in Glasses,
- Factors influencing glass transition, Viscous and Visco-elastic behavior,
- Glass production Techniques and Heat Treatment of Glasses.

Course Outcomes:

- After having thorough understanding of the course, the student will be able to use that knowledge to do research in the field of synthesis of different high level ceramic materials for special purpose applications e.g. synthesis and characterization of different inorganic materials for development of solar cells, fuel cells, spark plugs e.tc

Recommended Text / Reference Books:

- Fundamentals of Ceramics (Michel Barsoum)
- Modern Ceramic Engineering (David Richerson)
- Introduction to Ceramic Materials (W. D. Kingery)
- Principles of Ceramic Processing (James Reed)
- Fundamentals of Inorganic Glasses (A. K. Varshneya)