



FUNDAMENTALS AND APPLICATIONS OF DIELECTRIC CERAMICS

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PRE-REQUISITES : Basic understanding of physics and materials science fundamentals of crystallography and defects.

INTENDED AUDIENCE : Undergraduate and postgraduate students of engineering and sciences who work in the area of electronic ceramics and dielectrics.

INDUSTRY SUPPORT : Companies which make dielectric capacitors.

COURSE OUTLINE :

This is a course on dielectric ceramics which focusses on fundamentals and applications of such materials. Dielectrics are important class of materials which are useful for many applications including sensors, actuators, capacitors etc. This course will stress on understanding their structure, defect chemistry, and theory of both linear as well as nonlinear dielectrics followed by a brief discussion of their applications.

ABOUT INSTRUCTOR :

Ashish Garg is Professor of Materials Science and Engineering at IIT Kanpur. Details of his research and teaching can be accessed on home.iitk.ac.in/~ashishg/

COURSE PLAN :

Week 1: Bonding and Structure of Ceramics

Week 2: Defects in Dielectric Ceramics

Week 3: Linear Dielectrics (Basic Mechanisms, Polarization mechanisms and polarizability, Frequency dependence)

Week 4: Linear Dielectrics (Frequency Dependence, Impedance analysis, Applications of linear dielectric materials)

Week 5: Non-linear Dielectrics (Basics and Piezoelectrics)

Week 6: Non-linear Dielectrics (Piezoelectrics and pyroelectrics)

Week 7: Non-linear Dielectrics (Ferroelectrics)

Week 8: Ferroics and multiferroics, Processing methods