FUNDAMENTALS AND APPLICATIONS OF DIELECTRIC CERAMICS

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TYPE OF COURSE : New | Elective | UG/PG
COURSE DURATION : 8 weeks (26 Aug’19 - 18 Oct’19)
EXAM DATE : 16 Nov 2019

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
INDUSTRIES APPLICABLE TO : Companies which make dielectric capacitors

COURSE OUTLINE :
This is a course on dielectric ceramics which focuses 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 :
Prof. Ashish Garg is Professor of Materials Science and Engineering at IIT Kanpur. He works on electronic materials and devices and his current research is in the area of energy materials.

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