



COURSE TITLE

Electrical, Dielectric and Electro-optical Properties of Liquid Crystals, Molecular Glasses and Polymers for Applications

OVERVIEW OF THE COURSE

Liquid Crystals are materials having properties intermediate between isotropic (disordered) liquids and anisotropic (ordered) crystals. Because of the dual properties such materials are very useful in physical (high definition displays, lenses, electronic switches, light shutters, sensors) and biological (artificial muscles, heart valve, thermal imaging of the body etc) applications. Molecular glasses are useful for various photonic applications. Polymers are chemically inert in almost all environments, excellent electrical properties; low coefficient of friction; may be used at high temperatures; good mechanical strength, abrasion resistance, and toughness; low coefficient of friction; Polymers find range of applications like anticorrosive seals, chemical pipes and valves, bearings, anti-adhesive coatings, high temperature electronic parts. Anticorrosive seals, chemical pipes and valves, bearings, high temperature electronic parts bearings, gears, cams, bushings, handles, and jacketing for wires and cables.

OBJECTIVES

- (i) Introduction to Liquid Crystals, Molecular Glasses and Polymers
- (ii) Relevant properties and principles important for application
- (iii) Important application of the above smart materials
- (iv) Experimental methods for the determination of physical parameters
- (v) Demonstration of some of the applications

TEACHING FACULTY

1. **Prof. J. K. Vij (JKV)- Trinity College, The University of Dublin, Dublin 2, Ireland.**
2. **Prof. Ravindra Dhar (RD)- University of Allahabad, Allahabad.**



Course Coordinator (s)

Principal Course Coordinator

Prof. Ravindra Dhar
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Date	6 th November 2017 to 10 th November 2017 (5 days)
	<u>COURSE SCHEDULE</u>
06/11/2017	Day 1: Lecture 1 (1 hour) : Introduction to Molecular Glasses and Polymers- JKV Lecture 2: (1 hour): Introduction to Liquid Crystals-RD Tutorial 1 (2 hrs.): Testing of basic understandings of the above materials-RD
07/11/2017	Day 2: Lecture 1 (1 hour): Mimicry of Glass-softening thermodynamics-JKV Lecture 2: (1 hour): Applications of Molecular Glasses and Polymers-JKV Tutorial 1 (2 hrs.): Testing/demonstration of basic understandings of the applications-JKV
08/11/2017	Day 3: Lecture 1 (1 hour): Electric and Magnetic field effects in Liquid Crystals-JKV Lecture 2: (1 hour): Liquid Crystals-Nano composites-RD Tutorial 1 (2 hrs): Experiments/demonstration of Electric and Magnetic field effects forthe applications-RD
09/11/2017	Day 4: Lecture 1 (1 hour): Electro-optical effects in Liquid Crystals-JKV Lecture 2: (1 hour): Liquid crystals for organic photovoltaic-RD Tutorial 1 (2 hrs): Experiments/demonstration of electro-optical effects for the applications and testings-JKV
10/11/2017	Day 5: Lecture 1 (1 hour): Display application of Liquid Crystals-RD Lecture 2: (1 hour): Non display application of Liquid Crystals-JKV Tutorial 1 (2 hrs): Experiments/demonstration of display and testing-JKV
Who can attend:	PG Students, Research Scholars for Ph. D. in Physics, Chemistry and Materials Science and People involved in Industry
Fees	<p>One-Time GIAN Registration: Please visit http://www.gian.iitkgp.ac.in/GREGN/ and register by paying Rs. 500/- (those who have already paid, need not to pay again).</p> <p>The participation fees for taking the course is as follows:</p> <p>Participants from abroad: US \$400</p> <p>Industry/ Research Organizations: Rs. 10000/-</p> <p>Academic Institutions:</p> <p>Institute Faculty: Rs. 1500/-</p> <p>Ph.D. Students: Rs. 1000/-</p> <p>Students: Rs 500/-</p> <p>The above fee include all instructional materials, computer use for tutorials and assignments (if any). No TA, DA will be provided to the participants. Participants have to arrange their own accommodation and food.</p>

Venue: **Centre of Materials Sciences , University of Allahabad, Allahabad.**