

## PMM214: ELECTRONIC POLYMERS

<b>L</b>	<b>T</b>	<b>P</b>	<b>Cr</b>
<b>3</b>	<b>1</b>	<b>0</b>	<b>3.5</b>

**Course Objective(s):** Study the basic properties of polymers, their fabrication techniques and classification schemes. Establish the structure property relationship in various types of polymers. Study the charge transport properties of various types of polymers.

**Introduction:** Classification and structure of polymers, Glass transition, Linear viscoelasticity, Stress relaxation and dynamic experiments, Mechanical models, Superposition principles, Effect of structure on mechanical properties, Rubber elasticity, Yield and fracture, Rheology, Polymer fabrication techniques.

**Types of Polymers** Electroactive polymers, Electronic structures in crystallographically ordered conjugated polymers, Ferroelectric polymers (PVDF, etc), Liquid crystal polymers, etc

**Properties and Applications of Polymers:** Electronic properties of polymers, Mechanisms of charge transfer, Electrical conducting polymers like poly pyrrole, Polythiophene, Polyaniline their properties and applications, Polymers for molecular electronics, Non-linear and electro-optic properties of polymers.

### **Course Learning Outcomes (CLO):**

Students will be able to:

1. Understand basics of polymer, their types and various methods of polymer synthesis;
2. Explain the structural dependence of electrical, optical and mechanical properties of polymers;
3. Explain charge transport in electronic polymers based molecular electronics.

### **Recommended Books:**

1. Prasad, P.N., and Ulrich, D.R., *Non-linear, Optical and Electroactive Polymers*, Plenum Press (1988).
2. Aldissi, M., *Intrinsically Conducting Polymers: An emerging Technology*, Kluwer (1993)
3. Skotheim, T.A., and Reynolds, J.R., *Handbook of Conducting Polymers*, CRC (2007).