

(4 Lect./Week)  
(4 hrs. Lab/Week)  
(1 Student's presentation /Week)

(Total Credits -7)

### **Paper 603: Conducting Polymers**

**Basic of conducting polymers-** Band structure, electrical conduction, resistance, capacitance and impedance of conducting polymers

**Synthesis of conducting polymers-** Chemical polymerizations, electro-chemical polymerizations of Polyaniline, Polypyrrole, Polythiophene etc, effect of chemical doping on properties of conducting polymers

**Blends of conducting polymers-** Nanoblends/Composites of Polyaniline, Polyaniline Derivatives and Their Blends, Comparison of the Morphological and Conductivity Characteristics of Polyaniline Blends, Blends of Polythiophene, Blends of Polypyrrole,

**Compositions of conducting polymers-** Properties and applications of conducting polymer compositions, Bio-components matrices and effect of compositions

**Applications-** Electronic devices, Chemical sensors, Solar cells, Light emitting devices, Biomedical devices, Bio-system, Organ transplant, Artificial mussels etc.

#### **PRACTICALS**

1. Synthesis of conducting polymers such as Polyaniline, Polypyrrole, Polythiophene etc,
2. Prepare film/ Sheet of Conducting polymers
3. Determination mechanical properties of conducting polymer films/sheet.
4. Testing thermal properties of conducting polymers
5. Testing the electrical properties of conducting polymer films/ sheet.

#### **Suggested Readings:**

1. Prasanna Chandrasekhar, Conducting Polymers, fundamentals and applications: A practical approach, Springer, 1999.
2. Hari Singh Nalwa, Handbook of Organic Conductive Molecules and Polymers: Conductive polymers: synthesis and electrical properties, Wiley, 1997.
3. Terje A. Skotheim, Ronald L. Elsenbaumer, John R. Reynolds, Handbook of Conducting Polymers, Taylor & Francis Group, 2007