

7 <sup>th</sup> Semester	RPL7D003	Conducting Polymers	L-T-P 3-0-0	3 Credits
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**Module-I:****(10 hours)****History and classification of conducting polymers**

Discovery of conducting polymers, linear and aromatic (homo- and hetero aromatics) conjugated polymers, intrinsically and extrinsically conducting polymers

**Electrochemistry of electronically conducting polymers**-source of electronic conduction in polymers, solitons, polarons and bipolarons.

**Semiconductors and conducting polymers, redox type polymers (electro - active polymers)**

**Module-II:****(10 hours)**

**Synthesis techniques;** Chemical, electrochemical and enzymatic methods

**preparation of conducting polymers** e.g. polyacetylene, polydiacetylene, polyphenylene, polypyrrole, polythiophene, polyaniline, poly(phenylene sulphide) and poly (1,6-heptadiyne).

**Module-III:****(10 hours)**

**Electro analytical techniques**– cyclic voltammetry, chronoamperometry and chronocoulometry, **spectral methods** - use of UV-vis, Raman, XRD and NMR

**Module-IV:****(10 hours)**

**Energy storage and sensors;** rechargeable batteries, lights emitting diodes, gas sensors, bio sensors, photo voltaic energy devices, super capacitors

**Microelectronics;** corrosion and ESD protection, EMI shielding and lithography. LED, artificial muscles, electrochromic devices.

**Recent trends in conducting polymers;**functionalised conducting polymers (second-generation polymers), super conductors (inorganic - organic hybrid structures), conducting polymers based on nano-composites.

**Books:**

- [1] Skotheim.T.A., Elsenbaumer.R.L. and Reynolds J.R., “Hand book of ConductingPolymers”, 2nd Edn, Marcel Dekker Inc., New York, 1998.
- [2] R. G. Linford, Electro Chemical Science and Technology of Polymers - 1&2, ed., elsevier
- [3] Skotheim T.A., Thompson B.C. and Reynolds, J.R. , Conjugated Polymers: Properties, Processing, and Applications, CRC Press
- [4] Goosey M.T., “Plastic for Electronics”, Elsevier, Applied Science Publishers