

PLPC2007 PLASTIC WASTE MANAGEMENT & RECYCLING (3-0-0)

Course Objectives: After the course students will be able to understand major environment issues and their relationship with the polymer industry, understand of the stability of the polymeric materials in the environment, learn the various methods employed for recycling of polymers, explore the significance of recycling of plastics waste management, and analyze various recycled polymer for specific applications.

Module I

Plastic & environment value additions, global policy, regulations, waste energy management. Waste treatment of various plastic plants, estimations of power requirement & efficiency of size reduction operation of plastics, environment pollution.

Need for recycling – Sorting and segregation of waste – Plastics identification- Plastics production and composition – Plastics waste – Composition, quantities and disposal alternatives.

Module II

Primary recycling – Equipments for primary recycling. Specific recycling techniques – PE films, PP battery case – Crushing and separation – PET films. Recycling of plastics from urban waste – rheology, density, mechanical behavior. Secondary recycling Plastics wastes containing paper – hydrolytic treatment – processing methods – processing of mixed plastics waste – household waste – industrial sector.

Module III

Use of recyclable plastics in motor vehicles – recoverable materials – disposal of residuals – recyclable plastic components – virgin and recycled HDPE – Fluorinated and non-fluorinated HDPE – fuel tanks. Tertiary recycling – Reactors used – Advantages– Dry method wet method - use of recyclable plastics in automobiles.

Reference Books

1. "Plastic Waste Management" Marcel Dekker, New York, 1995, Edited by Nabil Mustafa, Plastic waste management, 1st edition
2. Bandrup, Dr. J. Ed. Recycling of plastics|| Carl Hanser Verlag 1995
3. Raymond D. Harbison Ed. — Hamilton & Hardy_s Industrial Toxicology|| 5th edition. Mosby Publisher, 1998.

Course outcomes: After the completion of this course, students will be able to:

- CO1 Receive the knowledge about diverse plastics waste recycling technologies
- CO2 Understand the recycling potential of plastics used in various industries
- CO3 Understand recycling methods of various waste plastics
- CO4 Evaluate and apply: The properties of recycled plastic and applications of recycled polymers for various applications
- CO5 Analyse various recycled polymer modification for specific applications