

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

(Total Credits -7)

Paper 602: Recycling and Waste Management

1. Definition of plastic wastes and litter, basis for assessing plastic wastes, applications of plastics and their potential as sources of waste. Separation techniques (density - float sink and froth floatation methods, optical, spectroscopic, sorting by melting temperature etc.).
2. Thermoplastic waste management: 4 R's approach (reduce, reuse, recycle (mechanical and chemical), recover), recycling classification- - primary - secondary - tertiary - quaternary recycling with examples.
3. Disposal processes and Various waste treatment methods – controlled tipping, pulverization, compositing, Energy from waste –(incinerators- pyrolysis, factors affecting incineration), new developments in thermal disposal of refuse, on-site disposal methods, compacting and baling.
4. Recycling of Polyolefins, PVC, PET, Polystyrene, Polyamides (Nylon-6 and Nylon-6,6).
5. Recycling of Thermosets –reclaiming of rubber –pyrolysis, depolymerization of scrap rubber, tyre retreading, uses of recycled rubber.

Practical - Polymer VI:

1. Primary recycling of various waste collected from environment.
2. Secondary recycling of MSW by incorporating and blending the recyclable waste with virgin polymers.
3. Composting
4. Preparation of plasticizer from polyester waste.
5. Preparation of curing hardness for epoxy from polyester waste.
6. Preparation of reclaim from tyre waste.

Suggested Readings:

1. Rubber and Plastic Waste: Recycling, Reuse and Future Demand by R. Chandra and A. Adab, CBS Publisher (2004).
2. Medical, Municipal and Plastic Waste Management Handbook by NIIR Board of Consultant and Engineers, National Institute of Industrial Research (2007).
3. Polymer Recycling by J. Scheirs, John Wiley & Sons (1998).
4. Handbook of Rubber Technology by S. Blow, Hanser Gardner (2000).
5. Recycling and Recovery of Plastics by J. E. Bandrup, Hanser Gardner (1996).
6. Introduction to plastics recycling by V. Goodship, Rapra (2007).