5th Semester	RPL5D001	Plastics Waste Management and Recycling Technology	L-T-P 3-0-0	3 Credits

MODULE I Introduction to plastic waste and generation of plastic waste(8 HOURS)

Plastic waste & 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. Sources of plastic waste (Industrial waste-Postconsumer waste-scrap waste)

MODULE II Plastic waste management and identification(10 HOURS)

Plastics production and composition – Plastics waste – Composition, quantities and disposal alternatives**,**Need for recycling, Sorting and segregation of waste, Plastics identification & separation technique (Density-Float sink & Froth floatation methods), Recycling codes,Plastic waste management, 4R's approach (Reduce-Reuse-Recycle-Recover), Recycling Classification-Primary, Secondary, Tertiary, Quaternaryrecycling with examples

MODULE III Primary & Secondary recycling techniques(8 HOURS)

Primary recycling – Equipments for primary recycling. Specific recycling techniques – Recycling olefins, PVC, polyester,PE films, PP battery case – Crushing and separation – post consumer PET bottles. Recycling of plastics from urban waste – rheology, density, mechanical behavior.

Secondary recycling (mechanical recycling), Plastics wastes containing paper – hydrolytic treatment – processing methods – processing of mixed plastics waste – household waste – industrial sector.

MODULE IV Tertiary & Quaternary recycling techniques(6 HOURS)

Tertiary/Feedstock recycling – Reactors used – Advantages– Dry method wet method

Quaternary recycling (energy recovery)from waste plastics- Pyrolysis, Incineration-advantage and disadvantages, factors affecting incineration.

MODULE V Application of waste plastics in commercial products(8 HOURS)

Application of recycled materials, 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.

Books:

[1] Marcel Dekker ,"Plastic Waste Management", New York, 1995.
[2] Edited by Nabil Mustafa, Plastic waste management, 1st edition.
[3] Francesco La Mantia., " Handbook of plastics recycling" Chem Tech Publishing, 2002
[4] Muna bitter, Johannes Brandup, George Menges "Recycling and recovery of plastics" 1996
[5] Nabil Mustafa –"Plastics waste management" Marcel Dekker Inc., 1998
[6] John Scheirs., - "Polymer Recycling" John Wiley and Sons., 1998.