

GUJARAT TECHNOLOGICAL UNIVERSITY

BRANCH NAME: PLASTIC ENGINEERING
Subject Name: Bio-Degradable Plastics

SUBJECT CODE: 3712410

Type of course: Program Elective - I

Prerequisite: B.E. Plastics

Rationale:

Teaching and Examination Scheme:

Teaching Scheme			Credits C	Examination Marks				Total Marks
L	T	P		Theory Marks		Practical Marks		
				ESE(E)	PA (M)	PA (V)	PA (I)	
3	0	2	4	70	30	30	20	150

Content:

Sr. No	Content	Total Hrs	% Weightage
1	Introduction – Chemistry and biochemistry of polymer degradation – Enzymes chemical degradation initiates biodegradation – Hydrolysis of synthetic biodegradable polymers.	5	11
2	Starch filled plastic – thermoplastic starch – starch based materials in the market – other additives for biodegradation.	7	15
3	Photo-biodegradable plastics – need for degradable polymers – technical requirements of degradable polymers – Agricultural plastics – Packaging plastics – Control of bio- degradation by means of antioxidants.	7	15
4	Test methods and standards for bio-degradable plastics – Criteria used in evaluation of biodegradable plastics – Description of current test methods – Scanning test for ready biodegradability – Test for inherent biodegradability – Test for simulation studies – Other methods for assessing polymer biodegradability.	10	22
5	Recycling technology for biodegradable plastics – Conventional recycling – Degradable complicate recycling – reprocessing polyethylene starch/film scrap – Economics	10	23

	in in-plant recycling.		
6	<i>BIOCOMPOSTIBLE PLASTICS: Technology, raw materials, manufacture, testing, Corn Starch Biocompostibles: Advantages and Disadvantages. Biocompostible films</i>	6	14

Reference Books:

1. G.J.L. Griffin, Chemistry and Technology of Biodegradable Polymers, Blackie Academic Professional, 1994.
2. Gerald Scott & Dan Gilad, Degradable Polymers-Principles & Applications, Chapman & Hall, 1995.
3. Handbook of Biodegradable polymers – Abraham J. Domb, Joseph Kost & David M. Wiseman.
4. Polymer Photodegradation – Mechanism and experimental methods – Jain F. Rabek

Course Outcome:

1. Students should be find right recycling techniques for plastics wastes.
2. Understand handling of plastic waste
3. Have a right perspective on positive aspects of dealing with Plastic Waste.

List of Experiments:

1. To study Photo Bio degradable plastics in detail.
2. To study about conversion of plastic waste into fuel
3. To make Biodegradable plastics in lab with Corn, Starch, Maize
4. To study Bio compostable films
5. To make Biodegradable plastics in lab with Starch
6. To make Biodegradable plastics in lab with Maize
7. To make biodegradable plastics in lab using walnut shells
8. To understand Test methods and standards for bio-degradable plastics
9. To study Chemistry and biochemistry of polymer biodegradation
10. To study recycling of biodegradable plastics