

GUJARAT TECHNOLOGICAL UNIVERSITY

PLASTIC ENGINEERING (24)

BIODEGRADABLE PLASTICS

SUBJECT CODE: 2712405

M.E. 1st SEMESTER

Type of course: Theoretical + Tutorials

Prerequisite: Basic knowledge of degradable plastics and plastic materials

Rationale: Make a biodegradable plastic and ecofriendly materials

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)			
					ESE	OEP	PA	RP		
4	2	0	5	70	30	30	0	20	0	150

Content:

Sr. No.	Topics	Teaching Hrs.	Module Weightage
1	Introduction – Chemistry and biochemistry of polymer degradation – Enzymes chemical degradation initiates biodegradation – Hydrolysis of synthetic biodegradable polymers.	4	10
2	Starch filled plastic – thermoplastic starch – starch based materials in the market – other additives for biodegradation.	4	10
3	Photo-biodegradable plastics – need for degradable polymers – technical requirements of degradable polymers – Agricultural plastics – Packaging plastics – Control of biodegradation by means of antioxidants.	10	30
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	30
5	Recycling technology for biodegradable plastics – Conventional recycling – Degradable complicate recycling – reprocessing polyethylene starch/film scrap – Economics in inplant recycling	8	20

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:

After learning the course the students should be able to: the present research as well as future materials are expected to be ecofriendly as well as bio degradable. Hence the study of bio degradable polymer is very essential with respect of future prospects