Mechanical Engineering Dept. Department

Syllabus
ME 453: Polymer Sustainability (3-0-3)

Course Catalog Description:

Concepts of polymer sustainability, biodegradation of polymers, and approaches toward synthesizing biodegradable polymers. Health impact of polymers and various additives used in plastics. Managing plastic waste, recycling of polymers and circular economy of polymers.

Course Objectives:

1. Understanding the concept of polymer sustainability
2. Recognizing health impacts of polymers
3. Understanding biodegradation processes of polymers
4. Learning the circular economy of polymers

Course Learning Outcomes:

CLO1. Recall the concept of polymer sustainability

CLO2. Recognize the health impacts of polymers

CLO3. Explain the biodegradation processes of polymers.

CLO4. Explain the circular economy of polymers.

Learning Resources:

- “Plastics and environmental sustainability “by Anthony L. Andradey, John Wiley & Sons, Inc. 2015.
- • “Polymer recycling science, technology and applications “by John Scheirs, Chichester; New York: Wiley, 1998.

Lecture Assessment Plan:

Assessment Task	Week Due	Weight
Exam 2	10	25.0%
Final Exam	15	30.0%
Homework	2, 4, 7, 9, 12	10.0%
Quiz	2, 4, 7, 9, 12	10.0%

Assessment Task	Week Due	Weight
Exam 1	6	25.0%

Lecture Weekly Schedule:

Week#	Topics
1	1. General introduction to polymers and structure-properties correlation in polymers
2	1. General introduction to polymers and structure-properties correlation in polymers (Continue)
	2. Different aspects of sustainability in polymer science and technology
3	2. Different aspects of sustainability in polymer science and technology (Continue)
4	2. Different aspects of sustainability in polymer science and technology (Continue)
	3. Polymers from renewable resources
5	3. Polymers from renewable resources (Continue)
6	3. Polymers from renewable resources (Continue)
	4. Approaches toward biodegradable polymers
7	4. Approaches toward biodegradable polymers (Continue)
8	4. Approaches toward biodegradable polymers (Continue)
9	4. Approaches toward biodegradable polymers (Continue)
10	4. Approaches toward biodegradable polymers (Continue)
	6. Health impacts of polymers
11	6. Health impacts of polymers (Continue)
12	6. Health impacts of polymers (Continue)
	7. Recycling and disposal of polymeric materials
13	7. Recycling and disposal of polymeric materials (Continue)
14	7. Recycling and disposal of polymeric materials (Continue)
15	7. Recycling and disposal of polymeric materials (Continue)