

U24PT3E01	TITLE	CREDITS 2 (2Th)
To be decided	Plastics and Environment (Sem-III OE)	
Course Objectives:	1. Understand the role plastics play in the environment 2. Analyse the environmental impact of different packaging materials and methods. 3. Explore innovative and sustainable packaging design principles.	
Course Outcomes:	Learners will be able to: 1. Explain fundamental packaging principles and properties of plastics in packaging. 2. Describe the importance of LCA studies. 3. Elaborate on the environmental impact of packaging. 4. Apply sustainable design principles to develop environmentally friendly packaging solutions.	
Unit I: Introduction & Packaging Sustainability		Lectures 15
<ul style="list-style-type: none"> • Present Plastic Waste Scenario and Contribution of Packaging Industry in India and Globally. • Packaging hierarchy: primary, secondary, and tertiary packaging • Plastic Materials and their Properties in comparison with other packaging materials like paper, glass, metals, and textiles. • Material selection criteria: durability, recyclability, biodegradability, and compostability • Packaging Design Principles – Design for sustainability: reduce, reuse, recycle. Ergonomics and user experience in packaging. • Biodegradable and compostable packaging, Bio-based plastics and their applications • Smart packaging technologies for freshness monitoring and shelf-life extension • Eco-design strategies for minimizing environmental impact 		
Unit II: Environmental Impact		Lectures 15
<ul style="list-style-type: none"> • Environmental issues associated with packaging: waste generation, pollution, resource depletion. • Carbon footprint and greenhouse gas emissions of packaging • Case studies on the environmental impact of Plastics vs various packaging materials • Circular economy principles in packaging. • Packaging Waste Management Rules – Recycling processes and challenges • Extended Producer Responsibility (EPR) and product stewardship • Waste-to-energy technologies for packaging waste. • Case studies on successful packaging waste management initiatives 		

References:

1. Selke, S. E. M., Culter, J. D., Hernandez, R. J., “Plastics Packaging: Properties, processing, Applications and Regulation”, Carl Hanser Verlag, USA, 2004.
2. Yam K. L., “The Wiley Encyclopedia of Packaging Technology”, 3rdEd., Wiley, 2009.
3. Morris B., “The science and technology of flexible packaging - Multilayer Films from Resin and Process to End Use”, Elsevier, 2017
4. Hellstrom S., Olsson A. & Nilsson F., “Managing Packaging Design for Sustainable Development”, John Wiley & Sons 2016
5. Harrison R. M. & Hester R. E., “Plastics And The Environment”, Royal Society of Chemistry, 2018
6. DeArmitt C., “The Plastics Paradox: Facts for a brighter Future”, 2020

The scheme of examination shall be divided into two parts:

Internal Examination 40% i.e. 20 Marks

Semester-end Examination 60% i.e. 30 Marks

(A) Internal Assessment 20 Marks:

Description	Marks
Internal Test of 10 Marks	10
Q.1 MCQs or True / False - 5 Marks	
Q.2 Attempt one out of 2 question (5 Marks each) - 5 Marks	
Attendance & Class Behaviour	10
Total	20

(B) Semester end examination 30 Marks:

Duration - 1 Hour	Total Marks - 30
Q.1. (A) OR (B) – 10 Marks each	10
Q.2. (A) OR (B) – 10 Marks each	10
Q.3. (A) OR (B) – 10 Marks each	10
Total	30
Note: Q.1, 2 may be divided into sub-questions if required Q.3 may include theory (short notes) or case study in one of the options.	

Passing Criteria: Minimum 40% in Internal (8 out of 20) and 40% (12 out of 30) in end semester examination

