GENERIC ELECTIVES (GE-5)

CREDIT DISTRIBUTION, ELIGIBILITY AND PRE-REQUISITES OF THE COURSE

Course title & Code	Credits	Credit distribution of the course			Eligibility criteria	Pre-requisite of the course
		Lecture	Tutorial	Practical/ Practice		
POLYMERS FOR PACKAGING	4	2	0	2	Class 12th with Physics, Chemistry	----

Learning objectives

- To learn about the basic necessities and importance of packaging
- To acquire knowledge of various types of packaging materials

Learning outcomes

After studying this paper, students will be able to

- Apply the basic concepts of packaging and its utilization for desired applications
- Evaluate the quality of packaging material and packaged product

SYLLABUS OF GE-5

THEORY COMPONENT-

UNIT – 1 **(6 Hours)**

PACKAGING SYSTEMS

Types of packaging systems: box, bottle, tetra, pouch, shrink, vacuum, gas, controlled atmosphere packaging (CAP), modified atmosphere packaging (MAP), and aseptic packaging

UNIT – 2 **(8 Hours)**

POLYMERS IN PACKAGING

Properties and applications: LLDPE, LDPE, HDPE, HMHDPE, PP, PVC, nylons, polyester, polycarbonate, PS, EPS, PLA, PVA and Starch

UNIT – 3 **(8 Hours)**

PACKAGING PROCESS TECHNIQUES

Preparation of packaging materials by thermoforming, co-extrusion, extrusion-stretch blow molding, injection molding, BOPP films

UNIT – 4 **(8 Hours)**

TESTING OF POLYMER PACKAGING MATERIAL

Bursting strength, tensile strength, tear strength, puncture test, impact test (Drop, falling dart), permeability test (water vapour, oxygen), biodegradability, sealing strength

PRACTICAL COMPONENT **(60 Hours)**

- To identify packaging materials with the help of FT-IR, DSC, TGA etc.
- Determination of physico-mechanical properties (density, burst strength, tensile strength, tear strength, puncture test strength, impact strength etc).
- Determination of water vapor transmission rate of packaging material.
- To test sealing strength integrity of packaging materials.
- To check biodegradability of packaging material.
- Preparation biodegradable packaging film
- Determination of water vapor transmission rate of packaging material.
- To test seal strength integrity of packaging materials.
- To check biodegradability of packaging material.
- To determine compatibility of film.

ESSENTIAL/RECOMMENDED READINGS

- Robertson G.L., (2005) Food Packaging Principles and Practice, CRC press.
- Paine F.A. and Paine H.Y., (1992) A Handbook of Food Packaging, Blackie Academic and Professional.
- Sharma S., Aggarwal M., Sharma D., (2019), Food Frontiers, New Delhi Publisher
- N. C. Saha, M. Garg, S. Dey Sadhu, A. K. Ghosh(2022) Food Packaging-Materials, Techniques and Environmental Issues" by published by Springer.
- Garg, M., Meena, P.L., Sadhu, S.D., Alam, T. (2019). Food Packaging: A Practical Guide : Viba Press Pvt. Ltd.

SUGGESTIVE READINGS

- Robertson G.L., (2012) Food Packaging–Principles and Practice, CRC Press.

- Coles R, McDowell D., Kirwan M.J., (2003) Food Packaging Technology, Blackwell.
- Sukhareva L.A., Yakolev V.S., Legonkova O.A., (2008) Polymers for packaging materials for preservation of foodstuffs, VSP.

Note: Examination scheme and mode shall be as prescribed by the Examination Branch, University of Delhi, from time to time.

GENERIC ELECTIVES (GE-6)

CREDIT DISTRIBUTION, ELIGIBILITY AND PRE-REQUISITES OF THE COURSE

Course title & Code	Credits	Credit distribution of the course			Eligibility criteria	Pre-requisite of the course
		Lecture	Tutorial	Practical/ Practice		
POLYMERS FOR ELECTRICAL AND ELECTRONIC APPLICATIONS	**4**	**2**	**0**	**2**	**Class 12th with Physics, Chemistry**	**----**

Learning objectives

- To learn about basic concepts of polymer electrical and electronic properties
- To gain knowledge of electrical and electronics applications of polymers

Learning outcomes

After studying this paper, students will be able to

- Synthesize a conducting polymer for a specific application
- Apply the knowledge of properties of polymers required for electrical and electronics applications

SYLLABUS OF GE-6

THEORY COMPONENT-

UNIT – 1 (6 Hours)

INTRODUCTION TO POLYMERS