

20FT011 - ADVANCES IN FOOD PACKAGING

Hours per week				Total hours:								
L	T	P	C	L	T	P	WA/RA	SSH/HSB	CS	SA	S	BS
3	-	3	5	45	-	45	15	30	-	5	5	-

Course Description and Objectives:

This course deals with types and functions of packaging materials and their application in food industries along with its various methods and equipment used for packaging. The objective of this course is to impart knowledge to students on applications of food packaging materials and methods effectively in accordance with relevant standard regulations, environment protection and ethical principles.

Course Outcomes:

Upon successful completion of this course student should be able to:

- Understand various methods of packaging, factors affecting the shelf life of packaged foods
- Know about hazards and toxicity associated with packaging materials
- Understand various testing methods used for packaging materials
- Understand the design flow from simulation to synthesizable version
- Develop knowledge on laws and regulations involved in safety and labelling of foods

SKILLS

- ✓ Measure and evaluate properties of packaging materials.
- ✓ Define the packaging requirements for a given food product
- ✓ Suggest suitable labelling requirements for a food package

ACTIVITIES

- ✓ Prepare database for packaging materials with their functional properties
- ✓ Report on national and international packaging standards

UNIT-I

Introduction to principles of food packaging, Types of packaging. Functions of packaging; Type of packaging materials; Selection of packaging material for different foods. Selective properties of packaging film; Environmental and cost consideration in selecting packaging materials. Barcodes & other marking;

UNIT-II

Testing of packaging; Rigid and semi rigid containers; Flexible containers; Sealing equipment; Labelling; Aseptic and shrink packaging; Secondary and transport packaging. Developments in modified atmosphere packaging (MAP) and Controlled atmospheric packaging: Novel gases, applications. Recycling packaging materials: The recyclability of packaging plastics, Improving the recyclability of plastics packaging, Testing the safety and quality of recycled material, using recycled plastics in packaging. Green Plastics for food packaging: The problem of plastic packaging waste, The range of biopolymers, Biodegradable packaging materials.

UNIT-III

Active and intelligent packaging techniques: Current use of novel packaging techniques, Consumers and novel packaging. Oxygen, ethylene and other scavengers: Oxygen scavenging technology, Selecting the right type of oxygen scavenger, Ethylene scavenging technology, Carbon dioxide and other scavengers. Antimicrobial food packaging: Antimicrobial agents, constructing an antimicrobial packaging system, Factors affecting the effectiveness of antimicrobial packaging.

UNIT-IV

Non-migrating bioactive polymers (NMBP) in Food Packaging: Advantages of NMBP, Inherently Bioactive synthetic polymers: types and application, Polymers with immobilized bioactive compounds, Applications of polymers with immobilized bioactive compounds. Time-temperature indicators (TTIs): Defining and classifying TTIs, Requirements for TTIs, the development of TTIs, Maximizing the effectiveness of TTIs, Using TTIs to monitor shelf- life during distribution. The use offreshness indicator in packaging: Compounds indicating the quality of packaged food products, Freshness indicators, Pathogen indicators. Packaging-flavor interactions: Factors affecting flavor absorption, The role of the food matrix, The role of differing packaging materials, Flavor modification and sensory quality. Moisture regulation: Silica gel, Clay, Molecular sieve, Humectant salts, Irreversible adsorption.

UNIT-V

Food packaging and law, shelf life testing, modern and traditional packaging material, physical and chemical properties, production, storage and recycling of packaging materials, regulation and equipment analysis of various existing packaging system and standards. Integrating intelligent packaging, storage and distribution: The supply chain for perishable foods.

REFERENCE BOOKS:

1. Food Packaging and Preservation (theory & practice) by M.Mathlouthi Elsevier Applied science publisher, London and New york.
2. Plastics in packaging by forwarded by H.B Ajmera & M.R Subramanium – Indian institute of packaging. Published by A.P.Vaidya, Secretary IIP, E2, MIDC, Industrial Area.
3. Food and Packaging Interactions by Joseph H. Hotchkiss, (ACS symposium series - 365, April 5-10, 1987, American chemical society, Washington DC, 1988.)
4. Packaging foods with plastics by winter A. Jenkins & James P Harrington – Technomic publishing co. Inc, Lancaster. Basel.
5. Flexible food packaging (Question &Answers) by Arthur Hirsch VNB – Van Nostrand Reinhold, New York (An AVI Book), ISBN 0-442-00609-8.