PLPE3004 PLASTIC PACKAGING TECHNOLOGY (3-0-0)

Course Objective:
To make the students aware about the basic concepts of packaging technology, understand marketing as an integral tool to packaging, recognize the importance of product-package interaction & its quality aspects in packaging, the overall perspective of the packaging industry, and apply and examine the knowledge of properties for selection of packaging materials.
Syllabus

MODULE – I: (08 Hours)
Introduction to plastic packaging
Introduction to plastics packaging: functions of packaging, advantages of plastic packaging, distribution hazards, special requirements of food and medical packaging, packaging legislation and regulation. Packaging as a system: Elements, approach, package, design, relation criteria for packaging materials, packaging equipment checklist, case histories Major packaging plastics Introduction – PE, PP, PS, PVC, polyesters, PVA, EVA, PA, PC, ionomers &fluoro polymers.

MODULE – II: (09 Hours)
Conversion process
Conversion process – Compression & transfer for moulding, Injection moulding, Blow moulding, Extrusion, roto moulding, thermoforming, Lamination, metallizing, decoration process, Shrink wrapping, Pallet & stretch wrapping, sealing methods, Plasma barrier coatings. Energy requirement for conversion

MODULE – III: (09 Hours)
Flexible packaging
Extrusion, film and flexible packaging – extrusion, cast film & sheet, Blown film, Multi-layer film & sheet coatings, laminations & co-extrusions, stretch and shrink wrap, pouching, sealing, evaluation of seals in flexible packages, advantages of flexible packaging – flexible packaging products. Specialized packaging for food products.

MODULE – IV: (10 Hours)
Decoration Processes
Cutting, sealing, welding, adhesive bonding, Printing, metallising, embossing, labelling, painting, lacquering, foil in lay moulding, hot stamping, In-mould decoration.
Packaging & Hazardous & their controls: Types – static charge problems, damaging factors & effects Pollution factors, Toxicity of Materials.

MODULE – V: (09 hours)
Evaluation of plastic packages
Physical characteristics of product – physical state, weight, center of gravity, symmetry, fragility, rigidity, surface finish, etc.
Physico-chemical characteristic – susceptibility to water, water vapour, gases, odour, heat, light – mechanism of spoilage.
Principles of corrosion & prevention.
Compatibility – permissible plasticizers in plastics & coating media, their migration to food – can lining compounds & lacquers for containers for fruit & vegetables, fish, meat & other products.
Package design – factors influencing design / product package relationship. Role of nano technology in packaging.

Course outcomes:
After the completion of this course, students will be able to:
CO1: Remember: Effectively observe and compare different package forms, identifying their unique characteristics and functionalities in the context of packaging materials.
CO2: Understand: Understand the importance of compatibility studies and associated parameters, describing their significance in ensuring the integrity and safety of packaging materials.

CO3: Apply: Apply knowledge to select suitable types of packaging material for specific application(s), considering factors such as product requirements, environmental conditions, and regulatory standards

CO4: Analyze various hazards, environmental concerns, and aesthetic considerations associated with packaging materials, assessing their impact on product protection, sustainability, and consumer appeal.

CO5: Evaluate and judge the appropriate packaging material based on quality parameters, demonstrating the ability to make informed decisions to ensure product integrity, safety, and market competitiveness.

Books

1. Susan E.M. Seleke, Understanding plastic packaging Technology, Hanser publications – Munich
2. A.S. Altalye, Plastics in packaging, Tata McGraw – Hill publishing Co. Ltd., New Delhi.
3. Briston; John H. and Katan; Leonard L., Plastics in Contact with Food, Food Trade Press Ltd., London (1974).
4. Briston; John, Advances in Plastics Packaging, Pira International, Leatherhead (1992).