

GUJARAT TECHNOLOGICAL UNIVERSITY

B.E Semester: 4 Plastic Technology

Subject Code: **142304**

Subject Name: **Plastics Packaging Technology (Institute Elective-I)**

Sr.No	Course Content
1.	INTRODUCTION: Need for packaging, packaging done by nature, Example of it, purpose of packaging, types of packaging (Primary, secondary, tertiary).
2.	MATERIALS USED FOR PACKAGING: Glass, metal, wood, plastics etc, complete detail of material selection criteria.
3.	PACKAGING ENGINEERING: New product development, market, self life, quality assurance, logistic, graphic design, regulation, temperature evidence packaging, child resistance packaging, quality management system, verification & validation protocols, life cycle assessment, waste hierarchy, importance of 3 R (Reduce, reuse & recycle)
4.	PACKAGE – DESIGN APPROACH: Product–Packaging relationship–Product–Package characteristics, compatibility factors, product type Vs packaging requirements. Product characteristics– Physical: state, centre of gravity, size / weight, volume. Product characteristics–Chemical: effect of gases, Moisture, atmospheric gases. Product characteristics – Biological: sensitivity to microbial factors. Product characteristics – Physico chemicals: effect of moisture vapour, oxygen & Other gases
5.	PACKAGING MATERIAL CHARACTERISTICS Packaging Material Properties – Physical: Influence of molecular / fibre directions, Tensile, Breaking load, Tension, Tear, Torsion, , Puncture , Burst, Packaging Material Properties – Chemical: pH, chloride / sulphate content, Imbedded and un-reacted chemicals. Packaging Material Properties – Biological: sensitivity to micro organisms. Packaging Material Properties - Physico Chemical: absorption & diffusion of moisture and gases – Barrier properties.
6.	PACKAGING MATERIALS EVALUATION Physical & Mechanical Properties: weight, dimensions, strength properties, stiffness, Tear, Tensile and others. Chemical properties: Alkalinity, Acidity, Resistance Biological properties: Sensitivity to Microbes, chemicals, presence of chloride, sulphate, lignin, Ash, flammability. Physiological properties – odour / flavours

7.	PACKAGING MACHINES: 7.1 bottle filling lines which includes bottle washing, sterilization, filling, screw capping/crown corking, induction sealing, labelling etc. 7.2 foam fill seal machines: types (vertical & horizontal), flow rap machine, retort machine. 7.3 tetra packs 7.4 wooden packaging
8.	MISCELLANEOUS PACKAGING TECHNIQUES: Bag in box, child resistance pack, packaging in canes etc
9.	BIODEGRADABLE AND ECO-FRIENDLY PACKAGING: Advantages and disadvantages, packaging used for export, advancements and developments

Reference Books:

1. Fundamentals Of Packaging Technology – F.A. Paine (Blackie & Sons Publication)
2. Packaging Materials And Containers – F.A. Paine (Blackie & Sons Publication)
3. Plastics In Packaging – A.S. Athalye, Tata Mcgraw Hill, New Delhi
4. Plastic Packaging- Susan E.M. Selke (Hanser Gardner Publication)
5. Plastics Packaging – Properties , Processing, And Applications.[2nd Edition] By Susan E.M.Selke, John Culter
6. Plastics Materials For Packaging By Barnetson [Rapra Publications]
7. Understanding Plastics Packaging Technology By Susan E.M.Selke, John Culter
8. Rifid Plastics Packaging – Materials , Processes And Applications By F.Hannay [Rapra Publicaions]
9. Understanding Plastics Packaging By Henser.