

GUJARAT TECHNOLOGICAL UNIVERSITY

M.E. Semester: III

Plastic Engineering

Subject Name: **Plastics Packaging Technology (Major Elective-IV)**

Sr.No	Course content
1.	<p>Introduction to Packaging –</p> <p>Functions of packaging – Major packaging materials viz. Polyolefins, Polystyrene, Polyvinylchloride, Polyesters, Polyamides (Nylons), Polycarbonate and Newer materials such as High Nitrile polymers, Polyethylene Naphthalate (PEN), Polyetherimide (PEI) and LCP – Properties and Applications in Packagings.</p>
2.	<p>Conversion Technology-I:</p> <p>Extrusion – Blown film, cast film, sheet, multi-layer film and sheet, lamination, stretch and shrink wrap and heat sealing – Injection moulding for manufacturing of packaging products – Influence of process variables and its effects. Blow moulding – Extrusion blow moulding, Die shaping, Programmed parison, Injection blow moulding and Stretch blow moulding.</p>
3.	<p>Conversion Technology-II :</p> <p>Thermoforming – Vacuum forming, Drape forming, Snap-back vacuum forming, Plug-assisted vacuum forming, Pressure forming, Matched mould forming, Scrap less thermoforming, Skin pack and blister packs, Thermoform/fill/seal systems (TFFS). Advantages and disadvantages of thermoforming.</p> <p>Printing – Surface treatment, Printing on films and containers viz. Flexographic printing, Rotogravier printing, Pad printing, Hot stamping, Reverse printing.</p>
4.	<p>Performance Evaluation of Packaging Products:</p> <p>Mechanical properties – Tensile properties, Impact properties, Tear strength, Burst strength, Stiffness, Crease or flex resistance, Co-efficient of friction, Blocking, Orientation and shrinkage.</p> <p>Optical Properties – Clarity, Haze and gloss</p> <p>Barrier Properties – Oxygen transmission, Water vapour transmission rate – Migration.</p>
5.	<p>Environmental Consideration:</p> <p>Plastic waste – Classification, Segregation, Sorting and Waste Management viz. source reduction, reuse/repair, recycling related to packaging films and constrainers.</p> <p>Pollutants an outline – Chloro Fluoro Carbon (CFC), Dioxin</p>

Reference Books:

1. Gordon L. Robertson, Food Packaging Principles and Practice, Marcel Dekker, Inc., New York 1993.
2. Louis T. Manzione, Plastic Packaging of Microelectronic Devices, Van Nostrand Reinhold, New York, 1990.