



# GUJARAT TECHNOLOGICAL UNIVERSITY

**Bachelor of Engineering**

**Subject Code: 3172314**

**Semester – VII**

**Subject Name: Secondary Plastics Processing Techniques**

**Type of course: Professional Elective Course**

**Prerequisite: NA**

**Rationale:** At the end of the course, the student will understand various secondary plastic processing techniques. They will understand how to manufacture, decorate and assemble plastic products using secondary manufacturing processes. They can apply this knowledge for operating various machineries and equipments used in secondary manufacturing techniques.

**Teaching and Examination Scheme:**

Teaching Scheme			Credits C	Examination Marks				Total Marks
L	T	P		Theory Marks		Practical Marks		
				ESE (E)	PA (M)	ESE (V)	PA (I)	
3	0	2	4	70	30	30	20	150

**Content:**

Sr. No.	Content	Total Hrs
1.	<b>JOINING AND ASSEMBLING TECHNIQUES</b> - Solvent Cementing Technique: Basic principle of solvent bonding, Factors to be considered for good cementing, Types of solvents use for plastic solvent bonding, Different methods for applying solvents for solvent cementing  - Adhesive Bonding: Basic principle of adhesive bonding, Selection criteria for adhesives, Method of applying adhesives , Adhesive Forms  - Thermal Bonding Techniques: Introduction of plastic welding <ul style="list-style-type: none"><li>Welding Techniques: High-frequency or Dielectric Heat Sealing, Hot Gas Welding, Hot Plate welding Induction Welding Spin or Friction Welding Ultrasonic Assembly</li></ul>	10
2.	<b>-MECHANICAL FASTENERS FOR PLASTIC:</b> <ul style="list-style-type: none"><li>Screws- thread forming screws &amp; thread cutting screws</li><li>Inserts- Molded in inserts &amp; post-molding inserts</li><li>Bolts &amp; Nuts, Rivets, Hinges, Spring Clips and Nuts</li></ul>	4
3.	<b>DECORATING PLASTICS</b>  - Surface Treatment : Significance of surface treatment, Surface treatment methods - Washing and cleaning , Mechanical abrasion , Chemical etching, Priming, Flame	12

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	treatment, Corona discharge, Plasma treatment  - Printing: Types of printing techniques: Screen printing, Flexographic printing, Gravure printing, Pad printing  - Powdered Plastics Coating: Materials for powder coating, Techniques of Powder Coating -Fluidized Bed Coating, Electrostatic Spraying, Electrostatic fluidized bed coating	
4.	<b>FINISHING AND MACHINING PLASTICS</b>  - Finishing operations : Filing, Tumbling, Grinding & Sanding, Ashing, Buffing and Polishing  - Machining operations : Considerations and guidelines for tool geometry when machining plastics, Drilling, Reaming, Tapping & Threading, Turning & Milling, Sawing, Piercing, Trimming and Routing, Counter boring and Spotfacing, Laser machining, Jigs, Fixtures & Automatic Feeding devices	8
5.	<b>MISCELLANEOUS PROCESSES</b>  - Hot Stamping - Vacuum Metallizing - Electrolytic Plating - Labelling - Water Transfer process - In mold decorating - Flocking - Embossing and Surface Texturing	8

### Suggested Specification table with Marks (Theory): (For BE only)

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
20	20	20	5	3	2

**Legends: R: Remembrance; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create and above Levels (Revised Bloom's Taxonomy)**

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.



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## Reference Books:

1. Plastic Materials & Process by Schwartz & Goodmann
2. SPI Plastics Engineering Handbook by Michael L.Berins
3. Plastics Finishing And Decoration by Donatas Satas
3. Handbook of Plastic Technology Rosato/Rosato
4. Plastic Engineering Handbook J.L.Frados

## Course Outcomes:

The theory should be taught and practical should be carried out in such a manner that students are able to acquire required learning out comes in cognitive, psychomotor and affective domain to demonstrate following course outcomes.

Sr. No.	CO statement	Marks % weightage
CO-1	Identify the application areas of secondary plastic processing techniques	10
CO-2	Distinguish various secondary processes required for plastic products as per their end use applications.	20
CO-3	Explain the working and functions of various secondary plastic processing techniques	35
CO-4	Compare various processing techniques related to their end use applications.	15
CO-5	Apply the principles of secondary processing techniques in manufacturing, decorating and assembly of plastics.	20

## List of Experiments: - As per the syllabus topics

## Major Equipment:

## List of Open Source Software/learning website:

1. [nptel.ac.in](http://nptel.ac.in)
2. [bpf.co.uk](http://bpf.co.uk)