



GUJARAT TECHNOLOGICAL UNIVERSITY

Bachelor of Engineering

Subject Code: 3172320

Semester – VII

Subject Name: Manufacturing Of Molds for Plastic Products

Type of course: Open Elective

Prerequisite:

Rationale: At the end of the course, the student will be able to choose the various materials required for the fabrication of various parts. Students can also understand how to make various parts of the mold with using various fabrication techniques. Students can also estimate the mold cost. Hence the course has been designed to develop this competency and its associated cognitive, practical and affective domain learning outcomes.

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	0	3	70	30	00	00	100

Content:

Sr. No.	Content	Total Hrs
1	Introduction : Mould making techniques, factors to be considered, machines for mould making like Lathe, Milling, Shaping, Grinding, EDM, etc. with applications	5
2	Material for Moulds: Selection of steels – Properties of steels – common steels used for moulds – strength of materials, calculation of wall thickness for cavity – Insert size – Life of mould Non-ferrous metals for mould construction: Application – Zinc base alloys – Aluminium alloys – Beryllium copper Non-metallic materials for mould construction: Advantages and its applications – epoxies - polyester – silicon	9
3	Surface Treatment of Mould Materials: Introduction – Heat treatment process – case hardening – through hardening – nitriding – tips on successful heat treatment – vacuum hardening – cryogenic heat treatment – Hard chrome plating – Nickel plating – chemical etching – Mould Polishing techniques	9
4	Mould Making Techniques: Pantograph engraving – Hydro copying – Jig boring – CNC machines – CNC Lathe – CNC Milling – CNC EDM – CNC programming- Programming codes like G Code, M codes etc. Advantages and its Applications – Assembly of moulds – Rapid prototyping techniques.	9
5	Inspection and Quality Control of Moulds: Introduction to Tool Room measuring instruments – Vernier – Micrometer – Height Gauge – Slip Gauge – Dial Gauge – Measuring tapers and angles – CMM	5



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6	Mould Estimation, Repair and Protection : Procedure for estimating, mould cost – General outline – Cost calculation – Basic moulds – Cavity – Basic functional components – Special functions etc. Introduction – Mould Repair and maintenance – scheduling mould maintenance – advantages – storage – corrosion protection – wear and lubrication – Special consideration.	5
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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	15	10	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.

Reference Books:

1. Elements of Workshop Technology : Hazra Choudhary
2. Injection Mould Design : RGW Pye
3. CNC Fundamentals and Programming: P.M.Agrawal
4. Machine Tool Practices : Richard R. Kibbe John E. Neele, Roland O Meyer, Warran T. White
- 5 Injection Molding Theory and Practice : Irwin Rubin

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 mold making techniques	15
CO-2	Study of Properties and selection of various fabrication materials for molds	25
CO-3	To select the techniques for Surface Treatment for the various parts of mold	25
CO-4	Inspection of various parts of mold and perform the assembly of the mold	15



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CO-5	Estimating Mold cost and Trouble shoot the problems related to mold making	20
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List of Experiments: - As per the syllabus topics

Major Equipment:

List of Open Source Software/learning website:

- i. <https://nptel.ac.in/>
- ii. <http://www.reliableedm.com>
- iii. <http://www.automationmag.com>