GUJARAT TECHNOLOGICAL UNIVERSITY

Bachelor of Engineering
Subject Code: 3163408
PLASTIC MOLD AND DIE DESIGN
6th SEMESTER

Type of Course: - Professional Elective

Pre-requisite:-

Rationale: The course aims to impart basic knowledge about plastic moulding and its die design.

Teaching and Examination Scheme:

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

CONTENT:-

Sr. No.	Course Content	Total Hours
1	**Plastic Mold:** Introduction, Basics Principles of mould design, selection of materials for moulds and dies, method of fabrication, economical consideration	06
2	**Material of Molds & Dies:** Steels, various types, selection criteria, ferrous & non ferrous material, alloys, heat treatment processes. Material selection for various parts of mould like cavity, core, back plates, inserts, and guide pins, guide bushes, ejector elements, etc. Material selection for various parts of Dies like approach section , land ,etc.	08
3	**Application of Different Machines for Mold and Die Making:** Lathe, milling, grinding, drilling, shaping, planning, spark erosion, honing, electroforming, EDM, CNC, etc.	06
4	**Injection Mold Design:** Introduction: Two plates, three plate, runnerless molds, parting lines, split molds, molds for threaded components. Feed system: Designs of various types of runners, gates, balancing of runners, runner efficiency calculations, requirements of runners and gates, positioning of gates, mold filling patterns, etc. Ejection system: Pin ejection, stripper plates, valve ejection, blade ejection, air ejection, etc. Cooling & heating arrangements: Design of cooling channels, layouts, etc. Numerical on shot capacity calculations, plasticizing capacity, no. of impressions, to be done. Actual sheet work showing design of hand moulds to be done. Calculations on gate, runners, etc.	08
5	**Design of Extrusion Dies:** Parts of the Die, its functions, design formulae for design of approach section, land, etc. Rheological considerations, Design of straight through dies with calculations.	06
6	**Design of Compression Molds:** Design of positive, semi positive and flash moulds in detail along with examples, sheet work, performs, etc.	04
7	**Design of Transfer Molds:** Pot type, plunger type, mould design, design of Pot, feed systems, etc.	04
8	**Practical Design of Molds, Dies :** Sheet work to be highlighted , third angle method of projection , bill of materials, etc.	03
	Total	**45**

Reference Books:

1. Injection Mould Design : An Introduction And Design For The Thermoplastics Industry Publisher: RGW PYE
2. Injection mould design fundamentals by Denton and Glanvill, Publisher Industrial Press, 1965, The University of California
3. Extrusion Dies for Plastics and Rubber Design and Engineering Computations, Walter Michael Publisher Hanser, 4th Edition
4. Dies for plastics extrusion : principles of design and construction. M. V. Joshi Publisher Macmillan India, 1984.

Distribution of marks weightage for cognitive level

Bloom's Taxonomy for Cognitive Domain	Marks % weightage
Recall	20
Comprehension	10
Application	30
Analysis	40
Evaluate	-
Create	-

Course Outcome:

After learning the course the students will be able to:

Sr. No.	CO statement	Marks % weightage
CO-1	Illustrate elements of plastic moulding process.	30
CO-2	Identify appropriate machines and processes for preparing molds and dies required in plastic molding.	30
CO-3	Examine various parameters of injection molds and extrusion dies.	30
CO-4	Analyze compression molds and transfer molds.	10

List of Experiments:

1. Design a hand Injection mould for any given product
2. Draw the above designed mould in a half imperial sheet.
3. Design and Draw a Hand Injection 2 impression mould for the given product. Show feed System calculations.
4. Draw a detailed sheet for sheet no.1
5. Show calculations for shot capacity for data given. [Based on shot capacity calculations for New material, calculations for required machine shot capacity, etc]
6. For the products given, suggest and design suitable feed system.
7. For the extruded product, design suitable die
8. Design and Draw a suitable compression for the product suggested.
9. Design and Draw a Pot type transfer mould.

Major Equipment:

1. Facility for plastic molding and different dies for plastic molding.

List of Open Source Software/learning website:

1. http://nptel.ac.in