# GUJARAT TECHNOLOGICAL UNIVERSITY

**BRANCH NAME: MANUFACTURING ENGINEERING**
**SUBJECT NAME: PLASTIC MOLD & DIE DESIGN**
**SUBJECT CODE: 2173409**
**B.E. 7TH SEMESTER**

**Type of course: Theoretical + Practical (Regular)**

**Prerequisite:**Plastic materials and Basic manufacturing processes.

**Rationale:**To make the students understand the concepts & broad principles of the various techniques of molding.

**Teaching and Examination Scheme:**

| Teaching Scheme | | | Credits | Examination Marks | | | | | | Total Marks |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Theory Marks | | | Practical Marks | | | |
| L | T | P | C | ESE (E) | PA (M) | | PA (V) | | PA (I) | |
| | | | | | PA | ALA | ESE | OEP | | |
| 3 | 2 | 0 | 5 | 70 | 20 | 10 | 30 | 0 | 20 | 150 |

**Learning Objectives:**

- To learn about the various the design criteria, to enrich knowledge about theplastic mould & die.

| Sr.No. | Content | Total Hrs | % Weightage |
|---|---|---|---|
| 1 | **Introduction:** Basics, Principles of mould design, selection of materials for molds anddies, method of fabrication, economical consideration. | 04 | 05 |
| 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. | 04 | 05 |
| 3 | **Fabrication Techniques:** Lathe, milling, grinding, drilling, shaping, planning, spark erosion, honing, electroforming, EDM, CNC, etc. | 04 | 10 |
| 4 | **Injection Mold Design:** Introduction: Two plates, three plate, runner less molds, parting lines, split molds, molds for threaded components. Feed system: Designs of various types of runners, gates, balancing of runners, 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. | 09 | 20 |
| 5 | **Design of Extrusion Dies :** Parts of the Die, its functions, design formulae for design of approach | 07 | 20 |

| | | | |
|---|---|---|---|
| | section, land, etc. Rheological considerations. | | |
| **6** | **Design of Compression Moulds:**<br>Design of positive, semi positive and flash moulds in detail along with Examples, sheet work, perform etc. | **07** | **20** |
| **7** | **Design of Transfer Moulds:**<br>Pot type, plunger type, mould design, design of Pot, feed systems, etc. | **07** | **20** |
| | **Total** | **42** | **100%** |

**Suggested Specification table with Marks (Theory):**

| **Distribution of Theory Marks** | | | | | |
|---|---|---|---|---|---|
| **R Level** | **U Level** | **A Level** | **N Level** | **E Level** | **C Level** |
| 10 | 15 | 15 | 10 | 10 | 10 |

**Legends: R: Remembrance; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create andabove 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. Injection Mould Design by RGW PYE
2. Injection mould design fundamentals by Denton and Glanvill
3. Extrusion Dies Walter Michael
4. Dies for Plastic Extrusion: M. V. Joshi

**Course Outcome:**

At the end of this course the student should be able to understand about plastic mould & die design.

**List of Tutorials:**

1. To study about principles of injection mold and die design.
2. To study about Extrusion die design.
3. To study about Compression design.
4. To study about Transfer dies.
5. To study about Fabrication techniques.
6. To study about Material selection procedure for plastic molds and dies.

**Design based Problems (DP)/Open Ended Problem:**

1. Design Mould and prepare a CAD model. Verify the assembly in CAD software.

**Major Equipment:**

1. Design Data book.
2. Computer

**Review Presentation (RP):** The concerned faculty member shall provide the list of peer reviewedJournalsand Tier-I and Tier-II Conferences relating to the subject (or relating to the area

of thesisfor seminar) to thestudents in the beginning of the semester. The same list will be uploaded onGTU website during the firsttwo weeks of the start of the semester. Every student or a group ofstudents shall critically study 2 papers,integrate the details and make presentation in the last twoweeks of the semester. The GTU marks entryportal will allow entry of marks only after uploadingof the best 3 presentations.

**List of Open Source Software/learning website:**

1. www.nptel.ac.in/

**ACTIVE LEARNING ASSIGNMENTS**: Preparation of power-point slides, which include videos, animations, pictures, graphics for better understanding theory and practical work – The faculty will allocate chapters/ parts of chapters to groups of students so that the entire syllabus to be covered. The power-point slides should be put up on the web-site of the College/ Institute, along with the names of the students of the group, the name of the faculty, Department and College on the first slide. The best three works should submit to GTU.