GUJARAT TECHNOLOGICAL UNIVERSITY

Program Name: Engineering
Level: Undergraduate
Branch: Plastic Technology
Subject Code : BE05023031
Subject Name: Plastic Mold & Die Design

w. e. f. Academic Year:	2024-25
Semester:	5
Category of the Course:	Professional Core Course

Prerequisite:	Students should have basic knowledge of Injection Mold and Machine. Students should understand Extrusion Process.
Rationale:	A Plastic Engineer must plan and supervise operations and maintenance of injection molds and Extrusion Dies. To fulfill these responsibilities, engineers need a solid understanding of the different kinds of injection molds and extrusion dies. Hence the course has been designed to develop this competency and its associated cognitive, practical and affective domain learning outcomes.

Course Outcome:

After Completion of the Course, Student will be able to:

No	Course Outcomes
01	Design of Fully Automatic Injection Machine Split Mold.
02	Design the cooling system for the given mold.
03	Design mold for threaded parts.
04	Design mold for parts having Undercut.
05	Design and drawing of various types of Extrusion Dies.

Teaching and Examination Scheme:

Teaching - Learning Scheme (in Hours per Semester)					Total Credits = TH/30	Assessment Pattern and Marks					Total Marks
						Theory		Tutorial / Practical			
L	T	P	PBL	TH		ESE (E)	PA (M)	PA/ (I)	PBL(I)	ESE (V)	
45	00	30	15	90	03	70	30	20	30	50	200

Where L = Lecture, T= Tutorial, P= Practical, PBL=Problem Based Learning, TH = Total Hours, ESE = End- Semester Examination, PA = Progressive Assessment

Course Content:

Unit No.	Content	No. of Hours	% of Weightage
1.	Introduction of Injection Mold: Two-Plate Mold: Introduction of Two Plate Injection Mold, Constructional Details of Two Plate Mold. Three-Plate Mold: Introduction, Construction and Working: Stripper Plate Mold, Double Daylight Underfeed Mold, Double Daylight Underfeed-Stripper Plate Mold, Runner Ejection Techniques, Comparison with Two Plate Mold.	7	15
2.	Mold Cooling: General, Cooling integer type mold plates, Cooling insert-bolster assembly, cooling other mold parts.	5	10
3.	Split Mold: General, sliding splits, Angled –lift splits, Summary, Standard parts for the splits type mold.	7	15
4.	Side core and side cavities: General, Design Features, Types of Side core and side cavities, Standard mold parts. BIS Standard- IS 3703 (Code of Practice for Design and Construction of Injection Molds)	7	15
5.	Molding internal undercuts: General, Form pin, split cores, side cores, stripping internal undercuts, standard mold parts.	7	15
6.	Mold for threaded components: General, Molds for internally threaded components, Molds for externally threaded components, Mold construction, Standard unscrewing type mold systems	7	15
7	Design of Extrusion Dies: Parts of the Die, its functions, design formula for design of approach section, land, etc. Rheological considerations, Design of straight through dies with calculations. Design of crosshead dies.	5	15
	Total	45	**100**

Distribution of Theory Marks					
R Level	**U Level**	**A Level**	**N Level**	**E Level**	**C Level**
15	20	20	5	5	5

Suggested Specification Table with Marks (Theory):

Where R: Remember; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create (as per

Revised Bloom's Taxonomy)

References/Suggested Learning Resources:

(a) Books:

1. Injection Mould Design - R.G.W. Pye
2. Plastics Mold Manufacturing Handbook - Dubois & Pribble
3. Extrusion of Plastics- Fisher
4. Extrusion Dies for Plastics and Rubbers - Walter Michaeli

(b) Open source software and website:

1) https://nptel.ac.in/

Suggested Course Practical List: If any

Practical based on above topics.

Sustainable Development Goals:

The Plastic Mold & Die Design course advances SDG 9 (Industry, Innovation, and Infrastructure) and SDG 12 (Responsible Consumption and Production) by teaching students how to create high-efficiency manufacturing tools that minimize material waste and energy usage. Furthermore, it supports SDG 8 (Decent Work and Economic Growth) by developing the specialized competencies required for supervising modern, automated industrial production.

- **Problem Based Learning Activities**

Sr. No.	Activity	No. of hours	Total hours claimed	Evaluation Criteria
1	Seminar based on technical topics	Duration- 10 hrs	10	Based on content, report preparation and presentation
2	Mini project	Duration-10 hrs	10	Based on content, literature review, report preparation and presentation
3	Micro project	Duration-05 hrs	05	Based on content, literature review, report preparation and presentation
4	Industry/Research laboratory visit	Visit = 5h, Report preparation = 5h	10	Based on report submitted.

5	Poster/chart/power point preparation on technical topics	Duration = 10 h	10	Based on Poster/Chart/PPT preparation and presentation skills
6	Assignment writing.	5 assignments of 2h each.	10	Based on the assignment submitted.
7	Technical Video based learning related to the subject	Duration of video = 5h Report preparation = 5h	10	Report /presentation based on the video learning outcomes.
8	Group Discussion on emerging/trending technical topics based on subject	Duration = 1 h each	--	Based on performance in group discussion, technical depth, knowledge etc.
9	Attending Expert Lecture/Webinar/Seminar	Duration- 1hr each	--	Based on Short report
10	Self-learning on-line course	Minimum duration of the course should be 10h.	10	Examination based assessment at the end of course. Basedon the certificate produced
11	Exhibition/ Conference/ Trade Fair/ Industrial exposure for 2-3 days	Visit- 15 hr Report preparation- 5 hr	20	Based on learning, observations and short report.
12	Working model on technical topics	Working = 15 h	15	Based on design, understanding & presentation of the model
13	Non-working model on technical topics	Non- working = 5 h	5	Based on design, understanding & presentation of the model
14	Videos on Industrial safety aspects based on subject	Duration of video = 5h Report preparation = 5h	10	Based on report submitted

Above activities are suggestive, faculty can choose any of these activities and cover up the Problem based learning hours.. The number of hours is suggestive. Faculty can sub-divide the number of hours based on the activity. However, the total number of hours is fixed.

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