GUJARAT TECHNOLOGICAL UNIVERSITY

PLASTIC TECHNOLOGY (23)
ADVANCED PLASTIC MOULD DESIGN
SUBJECT CODE: 2182307
B.E. 8TH SEMESTER

Type of course: CORE

Prerequisite: PMDD-I

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks						Total Marks
L	T	P	C	Theory Marks			Practical Marks			
				ESE (E)	PA (M)		PA (V)		PA (I)	
					PA	ALA	ESE	OEP		
3	0	3	6	70	20	10	20	10	20	150

Content:

Sr. No	Content	Total Hrs	% Weightage
1	**INTRODUCTION TO FULLY AUTOMATIC INJECTION MACHINE MOUL** Introduction to the concept of fully auto moulds, requirements of fully automatic injection machine mould, Design features, introduction to the concept of shrinkage calculations, introduction to cooling requirement, fully automatic ejection systems, tolerance , etc.	**04**	10%
2	**INTRODUCTION TO EJECTION SYSTEMS :** Fully automatic ejection systems' layout, pin ejection, sleeve ejection, air ejection, stripper plate ejection, valve ejection, stripper bush ejection, ejection systems for products with undercut like internal and external undercut; auto ejection systems for threaded products, layouts in detail, ejection systems for internal undercuts other than threads in detail; calculations for design of ejection systems.	**10**	15%
3	**COOLING SYSTEMS IN FULLY AUTOMATIC INJECTION MACHINE MO** Cooling system layouts, requirements of a cooling system, calculations of amount of heat to be extracted from the tool per hour, cooling for Insert and integer moulds, layouts for insert cooling of Cores and Cavities, cooling for shallow and deep cores and cavities, cooling for multi impression mould of Heat Rods, Heat Pipes, etc.	**15**	20%
4	**SPLIT MOULDS** : Design of finger cams, Dog leg cams, Cam Track actuation systems, spring actuation systems, hydraulic actuation systems., Angled Lift Splits	**08**	20%
5	**EXTERNAL UNDERCUT MOULDS**: Core withdrawal systems, Internal side core/Cavity assembly details, Guiding arrangement, locking details, Methods of actuation: Hydraulic, pneumatic, Cam, Spring.	05	10%
6	**INTERNAL UNDERCUT MOULDS :** Stripping internal undercuts, Collapsible cores , Unscrewing moulds Axially fixed rotating Core, Rotating Core plus Extractor plate, Power and transmission systems[Manual, Machine].	04	10%

7	**SHRINKAGE /TOLERANCE CALCULATIONS FOR MOULD PARTS C PROGRAMS for shot capacity, plasticizing capacity, no.of impressions, cooling ; projected area,etc.**	03	10%
8	**USE OF AUTOCAD FOR DRAWING OF FULLY AUTOMATIC MACHINE MOULDS**	03	5%

Suggested Specification table with Marks (Theory):

Distribution of Theory Marks					
R Level	**U Level**	**A Level**	**N Level**	**E Level**	**C Level**
10	15	20	15	10	-

Legends: R : Remembrance ; U = Understanding; A = Application 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. INJECTION MOULD DESIGN BY R.G.W.PYE
2. INJECTION MOULD DESIGN FUNDAMENTALS BY DENTON AND GLANVILL
3. INJECTION MOULDING HANDBOOK BY ROSATO AND ROSATO

Course Outcome:

After learning the course the students should be able to:

1. Design fully automatic injection machine moulds
2. Suggest suitable cooling layouts for all types of moulds
3. Suggest suitable ejection systems

List of Experiments:

1.Design and Draw a fully automatic injection machine mould for product drawing given[5 sheets of full size]

2. Calculations on shrinkage

3. C programs for : SHOT CAPACITY, PLASTICIZING CAPACITY, NO.OFIMPRESSIONS, COOLING PERIOD OF CYCLE.

Design based Problems (DP)/Open Ended Problem:

1. Design and Fabricate a split mould
2. Design a fully auto mould for complex articles as per sample given

List of Open Source Software/learning website:

1. **www.wikipedia.org**
2. **www.sciencedirect.com**

3. **www.mit.edu**

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 be submitted to GTU.