GUJARAT TECHNOLOGICAL UNIVERSITY

Master of Engineering
Subject Code: 3722418
M.E. Semester – II
Subject Name: Plastic Mould and Die Design Simulations

Type of course: Program Elective III

Prerequisite:

Rationale:

Teaching and Examination Scheme:

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

Content:

Sr. No.	Content	Total Hrs
1	Advanced Injection Molding Techniques: Multimaterial molding Co injection molding Water Injection Technology Reaction Injection Molding Gas Assisted Injection Molding Plastic-Metal molding	**12**
2	CALENDERING : Basic process, Raw material preparation Calendaring plant layout Types of calendars Calender rolls Calender drive systems Calender heating systems Ancillary equipment for calendar Calendar operations : making sheet. Temperature gradient, friction ratios, friction ratio, start up Economics of calendar Calendering Faults and Remedies Testing of finished sheet Post processing of Calendered Sheet. End Uses of calendered Sheet	**10**

3	FOAM PROCESSES: Introduction, Definitions , General production methods, Types, Production methods & Usage of Specific foam materials- Flexible foams of Polyurethanes, Foamed Vinyls, Cellular Polyethylene, Crosslinked Polyethylene, Silicone Foam, Rigid foams of PU, Polystyrenes: Expanded PS foams amd Expandable PS foams, Cellular Cellulose Acetate Thermosetting Foams of Epoxy, Phenolics, UF foams Structural foams, Structural foam molding techniques Sandwich foam molding	**10**
4	Miscellaneous process: Casting, Encapsulation, Coloring, Coating, Decoration, Finishing, Machining, Screen and Pad Printing, foil embossing, Metallization, Electroplating.	**10**
5	Machinery & Joining of Plastics: Introduction – Importance of machining – methods viz. cutting, drilling, blending, filling, etc. Joining – principles – cohesion principle, adhesion principle – Solvent cementing of thermoplastics Dope cementing, Welding of thermoplastics – viz. High frequency welding thermal sealing, Hot Gas welding, Hot plate welding, Induction welding, Spin or Friction Welding, Ultrasonic welding, Mechanical Joints – Mechanical fasteners, Self tapping screws, Bolts & Nuts, Rivets, Springs, Clips & Nuts, Hinges	**12**

Reference Books:

1. Injection Mould Design by R.G.W Pye
2. Extrusion Die Design by M.V.Joshi
3. Mold Flow Design Guide[A resource for Plastic Engineers] by Moldflow Corporation

Course Outcomes:

Sr. No.	CO statement	Marks % weightage
CO-1	Identify and analyse various advance plastic processing techniques	15
CO-2	Understand working of various advance injection molding techniques	20
CO-3	Understand various foam techniques used for making cellular plastic products	15
CO-4	Identify , list and understand various Miscellaneous processes and methods of Machinery and Joining of Plastics.	20
CO-5	Decoration of final products: Methods and selection	15
CO-6	Apply the knowledge of various advanced plastic processing techniques in various end use applications	15

List of Experiments:

As per the above subject topics

Major Equipment:

1. **Calendering line**
2. **Foam manufacring machines**
3. **RIM machine**
4. **Decoration machines like Pad Printing, Screen Printing, Hot foil stamping etc.**
5. **Injection moulding machine**
6. **Metallizing chamber**

List of Open Source Software/learning website:

www.sciencedirect.com

www.google.com

www.plasticsnet.com