

Branch Name:	Mechanical Engineering
Program Code:	ET101
Course Name:	Design for Manufacturing and Assembly
Course Code:	2ET1010507T
Pre-requisite Course:	Manufacturing Processes

Course Objectives:

1. To understand the different criteria made on design such as machining and casting.
2. To acquire the knowledge on design principles for manufacturability
3. To learn the machining consideration while design.
4. To understand contemporary issues and their impact on design for manufacturing and assembly.

Teaching and Examination Scheme:

Credit	Teaching Scheme Hours per week				Evaluation Scheme (Marks)								
					Theory (Marks)				Practical (Marks)				Total (Marks)
	L	T	P	Total	SEE		CCA		SEE		CCA		
					Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	
03	03	-	-	03	24	60	16	40	-	-	-	-	100

Course Contents:

Sr. No	Topic	Total Hours	Weightage (%)
1	Introduction: Design Philosophy - steps in design process - General design rules for manufacturability - Basic principles of designing for economical production-creativity in design Materials: Selection of materials for design - Developments in materials technology - Criteria for materials selection - Material selection inter relationship with process selection.	08	20
2	Design for Forming: Working principle, Material, Manufacture, Design - Possible solutions - Materials choice - Influence of materials on form design - form design of welded members, forgings and castings.	08	20
3	Design for Machining: Design features to facilitate machining - drills - milling cutters - keyways – Doweling procedures, counter sunk screws - Reduction of machined area- simplification by separation - simplification by amalgamation - Design for machinability.	08	20
4	Design for Casting: Redesign of castings based on Parting line considerations - Minimizing core requirements, machined holes, redesign of cast members to obviate cores. Identification of uneconomical design - Modifying the design.	08	20
5	Design for Assembly: Design guidelines for manual assembly, large assemblies, analysis of an assembly, rules for product design for automation, design for robot assembly, Design for manufacture and Computer aided design.	08	20

Reference Books:

1. James G. Bralla, Design for Manufacturability handbook, McGraw hill, 1999.
2. George E. Dieter, Engineering Design - A material processing approach, 5/e, McGraw Hill International, 2003.
3. ASM Handbook, Design for manufacture, 2000.
4. M F Ashby and K Johnson, Materials and Design - the art and science of material selection in product design, Butterworth-Heinemann, 2003.
5. K G Swift and J D Booker, Process selection: from design to manufacture, London: Arnold, 1997

Course Learning Outcomes (CLO):

CLO	Description	Bloom's Taxonomy Level
CLO1	Understand the Design Philosophy and material selection	3 Applying 4 Analyze
CLO2	Apply design rules for ease of machining	2 Understanding 3 Applying
CLO3	Apply design rules for ease of casting	3 Applying
CLO4	Understand the principles of design for manufacturing processes manual and automated	3 Applying
CLO5	Apply design rules for ease of forming	2 Understanding 3 Applying
CLO6	Analyze components using design features to facilitate forming, machining and casting.	4 Analyzing

Mapping of CLOs with POs & PSOs:

Course Learning Outcomes	Program Outcomes (POs)												Program Specific Outcomes(PSOs)	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CLO1	M					L					M		M	
CLO2		M	L					M				M		L
CLO3	H	H		M	L		L						H	
CLO4	M			L				L				M		L
CLO5	M	L				L			M	M			M	
CLO6		M	M	L	M		L				M		M	

H: High, M: Medium, L: Low