

DESIGN FOR MANUFACTURING

Course Code	22MEMD1T6C	Year	I	Semester	I
Course Category	Programme Elective	Branch	ME	Course Type	Theory
Credits	4	L-T-P	4-0-0	Prerequisites	Material Science and Metallurgy
Continuous Internal Evaluation:	40	Semester End Evaluation:	60	Total Marks:	100

Course outcomes: At the end of the course, the student will be able to:

CO	Statement	BTL	Units
CO1	Express design principles of design for economic production and material selection, and process selection.	L3	1
CO2	State design rules for machining, dimensional tolerance and specify design recommendation for machine parts.	L3	2
CO3	Illustrate various factors to be considered in design of casting and welding.	L3	3
CO4	List out design guide lines for forging and extrusion process.	L3	4

Contribution of Course outcomes towards achievement of programme outcomes & Strength of correlations (High:3, Medium: 2, Low:1)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO 1	3	3	3			1	1	2				2	3	2
CO 2	3	3	3			1	1	2				2	3	2
CO 3	3	3	3			1	1	2				2	3	2
CO 4	3	3	3			1	1	2				2	3	2

Syllabus		
Unit	Contents	Mapped CO
1	INTRODUCTION Design philosophy-steps in design process-general design rules for manufacturability-basic principles of designing for economical production MATERIALS: Selection of materials for design-developments in	CO1

	material technology criteria for material selection-material selection interrelationship with process selection process selection charts.	
2	MACHINING PROCESSES: Overview of various machining processes-general design rules for machining-dimensional tolerance and surface roughness-Design for machining – ease –redesigning of components for machining ease with suitable examples. General design recommendations for machined parts.	CO2
3	METAL CASTING: Appraisal of various casting processes, selection of casting process,- general design considerations for casting-casting tolerance-use of solidification, simulation in casting design product design rules for sand casting. METAL JOINING: Appraisal of various welding processes, factors in design of weldments – general design guidelines-pre and post treatment of welds-effects of thermal stresses in weld joints-design of brazed joints.	CO3
4	FORGING: Design factors for forging – closed die forging design – parting lines of dies – drop forging die design – general design recommendations. EXTRUSION & SHEET METAL WORK: Design guide lines extruded sections-design principles for punching, blanking, bending, and deep drawing-Keeler Goodman forging line diagram – component design for blanking.	CO4

Learning Resources

Text Book(s):

1. Design for Manufacture by Geoffrey Boothroyd.
2. Design for manufacture, John cobert, Adisson Wesley. 1995

References:

1. Product Design for Manufacturing and Assembly by Geoffrey Boothroyd, Peter Dewhurst, Winston Knight. Marcel Dekker,Inc
2. ASM Hand book Vol.20