

I YEAR M. TECH (MACHINE DESIGN) FIRST SEMESTER

17MEMD1T6C

DESIGN FOR MANUFACTURING

Credits 4

Lecture: 4 periods/week

Internal assessment: 40 marks

Tutorial: - -

Semester end examination: 60 marks

COURSE OBJECTIVES:

Make the student enable to

- Various Design philosophies and material selection for various machine components, and process selection.
- Various machining processes, tolerances and their selection for various applications.
- Factors considered for designing of casting and weld joints appraisal of various process parameters.
- Design factor to be considered Forging and extrusion.

COURSE OUTCOMES:

At the end of this course the students will be able to

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

UNIT-I

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 material technology-criteria for material selection-material selection interrelationship with process selection-process selection charts.

UNIT-II

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.

UNIT-III

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.

UNIT-IV

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.

Learning Resources

Text Books:

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