Gautam Buddha University, Greater Noida

School of Engineering (Mechanical Engineering)

Degree	Course Name	Course Code	Marks:100
M. Tech.	Design for Manufacturing & Assembly	MEM 524	SM+MT+ET 25+25+50
Semester	**Credits**	**L-T-P**	**Exam.**
II	3	3-0-0	3 Hours

Unit - I

Introduction: Design philosophy steps in design process; General design rules for manufacturability; Basic principles of design Ling for economical production; Creativity in design; Materials; Selection of materials for design ; Developments in Material technology; Criteria for material selection; Material selection interrelationship with process selection process selection chart. **(07 Hours)**

Unit - II

Machining Process: 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. **(08 Hours)**

Unit - III

Metal Casting: Appraisal of various casting processes; Selection of casting process; General design considerations for casting; Casting tolerances; Use of solidification simulation in casting design; Product design rules for sand casting.

(08 Hours)

Unit - IV

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; 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 guidelines for extruded sections; Design principles for Punching; Blanking; Bending; Deep Drawing — Keeler Goodman Forming Limit Diagram — Component design for blanking. **(08 Hours)**

Unit - V

Automatic Assembly Transfer Systems: Development of the assemble process; Choice of assemble method; Assemble advantages; Social effects of automation; Continuous transfer; Intermittent transfer; Indexing mechanisms and operator - paced free – transfer machine. **(06 Hours)**

Unit - VI

Design Of Manual Assembly: Design for assembly fits in the design process; General design guidelines for manual assembly; Development of the systematic DFA methodology; Assembly efficiency; Classification system for manual handling; Classification system for manual insertion and fastening; Effect of part symmetry on handling time; Effect of part thickness and size on handling time; Effect of weight on handling time; Parts requiring two hands for manipulation; Effects of combinations of factors; Effect of symmetry effect of chamfer design on insertion operations; Estimation of insertion time. **(08 Hours)**

Recommended Books:

1. Assembly, Automation and Product Design; Geoffrey Boothroyd; Marcel Dekker Inc.; NY; 1992.
2. Engineering Design – Material & Processing Approach; George E. Deiter; McGraw Hill Intl. 2nd Ed. 2000.
3. Hand Book of Product Design; Geoffrey Boothroyd; Marcel and Dekken; N.Y. 1990.
4. Computer Aided Assembly; A. Delbainbre; London; 1992.