PPD7J005 DESIGN FOR MANUFACTURING & ASSEMBLY 3-0-0

Module-I (8 classes)

Introduction to DFMA: History of DFMA, Steps for applying DFMA during product design, Advantages and limitations of applying DFMA during product design, Introduction to Manufacturing Process: Classification of manufacturing process, Basic manufacturing processes, Mechanical properties of material: Tensile properties, Engineering stress-strain, True stress strain, Compression properties, Shear properties, Introduction to materials and material selection: Classification of engineering materials, Material selection for product design.

Module-II (10 classes)

Design for casting: Introduction to sand casting, Typical characteristics of a sand cast part, Design recommendation for sand casting, Investment casting: Introduction, Steps in investment casting, Design consideration of Investment casting, Typical characteristics and applications, Die casting: Introduction to die casting, Advantages, Disadvantages and Applications of the die casting process, Suitable material consideration, General design consideration, Specific design recommendation, Injection moulding: Introduction to injection moulding, Typical characteristics of injection moulded parts, Effect of shrinkage, Suitable materials, Design recommendations.

Module-III (14 classes)

Design for machining and welding: Introduction to machining, Recommended materials for machinability, Design recommendations, Design for tuning operation: Process description, Typical characteristics and applications, Suitable materials, Design recommendations, Design for milling operation: Process description, Characteristics and applications of parts produced on milling machines, Design recommendations for milling, Dimensional factors and tolerances, Parts produced by planning, shaping and slotting: Process description, Design recommendation planning, Design for broached parts: Process description, Typical characteristics of broached parts, Suitable materials for broaching, Design recommendations. Design for welding: Design recommendation for welding processes, Design for solder and brazed assembly: Process, Typical characteristics, Suitable materials, Detail design recommendations, Design for adhesively bonded assemblies: Introduction, Typical characteristics, Suitable materials, Design recommendations for adhesive joint.

Module-IV (8 classes)

Introduction to Assembly: The assembly process, Characteristics and applications, Example of common assembly, Economic significance of assembly, Design for Assembly: Introduction, Design consideration, Design for Fasteners: Introduction, Design recommendation for fasteners. Design for Assembly using CAD: Introduction, Assembly features, Definition of assembly feature attributes, Characterization of assembly feature, Examples of Assembly feature, Examples of assembly feature: Aircraft wing and automotive chassisassembly.

Text Books:

1. Product Design for Manufacture and Assembly by Geoffrey Boothroyd, Peter Dewhurst and Winston Knight, CRC press, Taylor & Francis, Florida,USA.
2. Design for Manufacturing and Assembly by O. Molloy, S. Tilley and E.A.Warman,
   Chapman &Hall, London, UK.

References Books:

1. Engineering Design - a materials and processing approach by G Dieter, McGrawHill.
2. Materials and Processes in Manufacturing by E. P. DeGarmo, J. T. Black, R. A. Kohser, Wiley.
3. Design for Manufacturability Handbook by James G. Bralla, McGraw-Hill companies, New York,USA.
4. Fundamentals of modern manufacturing: materials, processes and systems by M. P. Groover, John Wiley &Sons.

TENTATIVE
Likely to be Modified