B.E Semester: 8 Mechanical Engineering
Subject Name: Design for Manufacturing & Assembly (ME804-N-D)
[Dept. Elect.-6]

A. Course Objective:

- The Design for Manufacturing and assembly is challenging subject, the aim of present course is to introduce and aware students about the basic design process which based on different aspects of manufacturing as well assembly.
- Student will have idea about different criteria made on design such as machining and casting. They also have knowledge on Environment factors.

B. Teaching / Examination Scheme:

Teaching Scheme				Total Credit	Evaluation Scheme					
L	T	P	Total		Theory		Mid Sem Exam	CIA	Pract.	Total
Hrs	Hrs	Hrs	Hrs		Hrs	Marks	Marks	Marks	Marks	Marks
3	0	0	3	3	3	70	30	20	0	120

C. Detailed Syllabus:

Unit No.	Details
1	**Introduction:** General design principles for manufacturability: strength and mechanical factors, mechanisms selection, evaluation method, Process capability: Feature tolerances, Geometric tolerances, Assembly limits, Datum features, and Tolerance stacks.
2	**Factors Influencing form Design:** Working principle, Material, Manufacture, Design- Possible solutions, Materials choice, Influence of materials on form design, form design of Welded members, forgings and castings.
3	**Component Design-I:** Machining Consideration: 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, Design for economy, Design for clampability, Design for accessibility, Design for assembly.
4	**Component Design-II:** Casting Consideration: 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, group technology, Computer Applications for DFMA
5	**Design for the Environment:** Introduction, Environmental objectives, Global issues, Regional and local issues, Basic DFE methods, Design guide lines, Example application, Lifecycle assessment, Basic method, Environmentally responsible product assessment, Weighted sum assessment method, Lifecycle assessment method, Techniques to reduce environmental impact, Design to minimize material usage, Design for disassembly, Design for recyclability, Design for remanufacture, Design for energy efficiency, Design to regulations and standards

Total hours (Theory):48
Total hours (Practical):00
Total hours:48

D. Lesson Planning:

Sr. No.	Date/Week	Unit	Weight age	Topic No
1	1^{st} ,2^{nd} ,3^{rd}	Unit 1	20%	1
2	4^{th} .5^{th} ,6^{th}	Unit 2	20%	2
3	7^{th} , 8^{th} ,9^{th}	Unit 3	20%	3
4	10^{th} .11^{th} . 12^{th}	Unit 4	20%	4
5	13^{th} , 14^{th} ,$15^{th,}$,16^{th}	Unit 5	20%	5

E. Instructional Method & Pedagogy

1	At the start of course, the course delivery pattern , prerequisite of the subject will be discussed
2	Lecture may be conducted with the aid of multi-media projector, black board, OHP etc. & equal Weight age should be given to all topics while teaching and conduction of all examinations.
3	Attendance is compulsory in lectures and laboratory, which may carries five marks in overall evaluation.
4	One/Two internal exams may be conducted and total/average/best of the same may be converted to equivalent of 30 marks as a part of internal theory evaluation.
5	Assignment based on course content will be given to the student for each unit/topic and will be evaluated at regular interval. It may carry an importance of ten marks in the overall internal evaluation.
6	Surprise tests/Quizzes/Seminar/Tutorial may be conducted and having share of five marks in the overall internal evaluation.
7	The course includes a laboratory, where students have an opportunity to build an appreciation for the concept being taught in lectures.

F. List of Practical:

1	Study and report on design principles for manufacturability
2	Study and report Influencing factors on Design.
3	Case study on Machining consideration
4	Case study on casting consideration
5	Case study on Life cycle assessment of product.
6	Case study on Environmental Aspects on Design of Product

G. Students Learning Outcomes:

1	Students will have knowledge on design principles for manufacturability
2	Students will have knowledge Influencing factors on Design.
3	Students will have knowledge on Machining consideration while design.
4	Students will have knowledge on casting consideration while design.
5	Students will have knowledge on environment consideration while design.

6	Students will have ability to understand contemporary issues and their impact on design for manufacturing and assembly.

H. Text Books & Reference Books:

1	Kevien Otto and Kristin Wood, Product Design. Pearson Publication, 2004.
2	Product design and development, by K.T. Ulrich and S.D. Eppinger, Tata McGraw Hill
3	Boothroyd, G, 1980 Design for Assembly Automation and Product Design. New York, Marcel Dekker.
4	Bralla, Design for Manufacture handbook, McGraw Hill, 1999.
5	Boothroyd, G, Heartz and Nike, Product Design for Manufacture, Marcel Dekker, 1994.
6	Dickson, John. R, and Corroda Poly, Engineering Design and Design for Manufacture and Structural Approach, Field Stone Publisher, USA, 1995.
7	Fixel, J. Design for the Environment McGraw Hill., 1996. 8. Graedel T. Allen By. B, Design for the Environment Angle Wood Cliff, Prentice Hall. Reason Pub.1996.