SCHEME OF COURSE WORK

Course Title	: Flexible Manufacturing System		
Course Code	: 19ME2159	L P C	: 3 0 3
Program:	: M.Tech.		
Specialization:	: CAD/CAM		
Semester	: II		

Course Outcomes (COs):

At the end of the course, the student will be able to

1	Determine the concepts of PPC and GT to the development of FMS.
2	Discuss the planning and scheduling methods used in manufacturing systems.
3	Associate various workstations, system support equipments.
4	Interpret hardware and software components of FMS.
5	Summarize the concepts of modern manufacturing such as JIT, supply chain management and lean manufacturing.

Program Outcomes (POs)

At the end of the program, the students in CAD/CAM will be able to

1. acquire fundamentals in the areas of computer aided design and manufacturing
2. apply innovative skills and analyze computer aided design and manufacturing problems critically
3. identify, formulate and solve design and manufacturing problems
4. carry out research related to design and manufacturing
5. use existing and recent CAD/CAM software
6. collaborate with educational institutions, industry and R&D organizations in multidisciplinary teams
7. apply project and finance management principles in engineering projects
8. prepare technical reports and communicate effectively
9. engage in independent and life-long learning and pursue professional practice in their specialized areas of CAD/CAM
10. exhibit accountability to society while adhering to ethical practices
11. act independently and take corrective measures where necessary

Course Outcome versus **Program Outcomes:**

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO-1	M	M	S				S	M	M		
CO-2		M	M			M	M	M	M		
CO-3	M	M		M	M				M		M
CO-4			M	S	S				M		
CO-5		S	S			M	S		M	M	

S - Strongly correlated, *M* - *Moderately* correlated, *Blank* - *No correlation*

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Assessment Methods:	Seminar / Mid-Test / End Exam

Teaching-Learning and Evaluation

Week	TOPIC / CONTENTS	Course Outcomes	Sample questions	TEACHING-LEARNING STRATEGY	Assessment Method & Schedule
1	Types of production, production planning and control, Manufacturing in a competitive environment, Concept, Automation of manufacturing process , Numerical control, Adaptive control, Material handling and movement	CO-1	Write short notes on a) Manufacturing in a competitive environment b) Adaptive control	Lecture / Discussion	Seminar (Week 2 - 4) Mid-Test 1 (Week 9)
2	Industrial robots, Flexible fixturing, Design for assembly, Disassembly and service. Types of FMS, types of FMS layouts, advantages and disadvantages of FMS	CO-1	Discuss the types of flexibilities an FMS can offer.	Lecture / Discussion	Seminar (Week 2 - 4) Mid-Test 1 (Week 9)
3	Group Technology – composite part families - classification and coding - Production flow analysis; Planning issues: Components of FMS	CO-1	What is Group Technology? How are the parts classified by using Group technology?	Lecture Demonstration	Seminar (Week 2 - 4) Mid-Test 1 (Week 9)
4	Types of flexibility, tradeoffs, Computer control and functions, Planning, scheduling and control of FMS, Scheduling and knowledge-based scheduling	CO-2	Explain Computer control system in FMS with the help of a block diagram.	Lecture / Discussion	Seminar (Week 2 - 4) Mid-Test 1 (Week 9)
5	Hierarchy of computer control, Supervisory computer, Introduction to turning center, Machining center	CO-2	Explain machining centres used in FMS.	Lecture / Discussion Demonstration	Seminar (Week 5 - 8) Mid-Test 1 (Week 9)
6	cleaning and deburring equipment, coordinate measuring machines: Types, Working, Capabilities	CO-2	What is a Coordinate Measuring Machine? Discuss the advantages of using CMM over manual inspections methods.	Lecture / Discussion Demonstration	Seminar (Week 5 - 8) Mid-Test 1 (Week 9)
7	System support equipment - Types, working capability, Automated material movement and automated storage and retrieval systems	CO-3	What are the components of automated storage and retrieval system? Explain any one automated storage and retrieval system with figure.	Lecture Demonstration	Seminar (Week 5 - 8) Mid-Test 1 (Week 9)
8	Scheduling of AGVs, Cutting tools and tool management, Work holding considerations	CO-3	Discuss the four aspects of tool management	Lecture Demonstration	Seminar (Week 5 - 8) Mid-Test 1 (Week 9)
9	**Mid-Test 1**				
10	FMS computer hardware and software, General structure and requirements, PLCs	CO-4	Discuss the role of FMS software for Intrinsic and Extrinsic functions.	Lecture/ Discussion	Seminar (Week11-14) Mid-Test 2 (Week 18)
11	FMS installation and implementation, Acceptance testing	CO-4	What are the steps involved in FMS implementation?	Lecture / Discussion	Seminar (Week11-14) Mid-Test 2

					(Week 18)
12	Computer Software, Simulation and Database of FMS: System issues, Types of software, Specification and selection, Trends	CO-4	Discuss the purpose of Simulation Software in an FMS.	Lecture / Discussion	Seminar (Week11-14) Mid-Test 2 (Week 18)
13	Application of simulation, Software, Manufacturing data systems, Data flow, CAD/CAM considerations, Planning FMS database	CO-4	Write, in short, about CAD considerations in FMS Database. Draw Figure.	Lecture / Discussion	Seminar (Week11-14) Mid-Test 2 (Week 18)
14	Characteristics of JIT, Pull method, Small lot sizes, Work station loads	CO-5	List various characteristics of JIT and explain any two of them.	Lecture / Discussion	Seminar (Week15-17) Mid-Test 2 (Week 18)
15	Flexible work force, Line flow strategy. Supply chain management	CO-5	Explain key issues in Supply Chain Management.	Lecture / Discussion	Seminar (Week15-17) Mid-Test 2 (Week 18)
16	Preventive maintenance - Kanban system, Value engineering, MRD JIT	CO-5	Explain Kanban system	Lecture / Discussion	Seminar (Week15-17) Mid-Test 2 (Week 18)
17	Lean manufacture, Quality concepts and management	CO-5	Write notes on Lean Manufacturing	Lecture / Discussion	Seminar (Week15-17) Mid-Test 2 (Week 18)
18	**Mid-Test 2**				
19/20	**END EXAM**				