SCHEME OF COURSE WORK

Course Details:

Course Title	**: INTELLIGENT MANUFACTURING SYSTEMS**		
Course Code	**: 13ME2118**	**L P C**	**:4 0 3**
Program:	**: M.Tech.**		
Specialization:	**: CAD/CAM**		
Semester	**: II**		
Prerequisites	**:**		
Courses to which it is a prerequisite	**:**		

Course Outcomes (COs): At the end of the course, the student will be able to

1	Summarize the concepts of computer integrated manufacturing systems and manufacturing communication systems
2	Identify various components of knowledge based systems
3	Demonstrate the concepts of artificial intelligence and automated process planning
4	Select the manufacturing equipment using knowledge based system for equipment selection
5	Apply various methods to solve group technology problems and demonstrate the structure for knowledge based system for group technology

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	PO12
CO-1	S		M	M								M
CO-2	M			M								
CO-3	M	M				M						
CO-4	M											
CO-5						M						

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

Assessment Methods:	Assignment / Quiz / Seminar / Case Study / Mid-Test / End Exam

Teaching-Learning and Evaluation

Week	TOPIC / CONTENTS	Course Outcomes	Sample questions	TEACHING-LEARNING STRATEGY	Assessment Method & Schedule
1,2	Computer integrated manufacturing systems – structure and functional areas of CIM system - AD, CAPP, CAM, CAQC, ASRS and advantages of CIM	CO-1	What are the functional areas of CIM system?	▫ Lecture / Discussion/PPT	Assignment (Week 5 - 7) Mid-Test 1 (Week 9)
3,4	Manufacturing communication systems – MAP/TOP OSI model, data redundancy, top-down and bottom-up approach, volume of information. Intelligent manufacturing – system components, system architecture and data flow, system operation	CO-1	Differentiate between top-down and bottom-up approach	▫ Lecture / Discussion/ Seminars	Assignment (Week 5 - 7) Mid-Test 1 (Week 9)
5	Components of knowledge based systems – basic components of knowledge based systems, knowledge representation, comparison of knowledge representation schemes, interference engine, knowledge acquisition	CO-2	What are the basic components of knowledge based systems?	▫ Lecture / Discussion/PPT	Assignment (Week 5 - 7) Mid-Test 1 (Week 9)
6,7	Machine learning – concept of artificial intelligence, conceptual learning, artificial neural networks - biological neuron, artificial neuron, types of neural networks, applications in manufacturing	CO-2	Explain back propagation neural networks.	▫ Lecture / Discussion/PPT	Assignment (Week 5 - 7) Mid-Test 1 (Week 9)
8	Automated process planning – variant approach, generative approach, expert systems for process planning, feature recognition, phases of process planning	CO-3	How expert systems are used for process planning?	▫ Lecture / Discussion/PPT	Assignment (Week 5 - 7) Mid-Test 1 (Week 9)
9	**Mid-Test 1**				
10,11	Knowledge Based System for Equipment Selection (KBSES) – Manufacturing system design, equipment selection problem, modelling the manufacturing equipment selection problem, problem solving approach in KBSES, structure of the KBSES	CO-3	Explain the structure of Knowledge Based System	▫ Lecture ▫ Discussion	Seminar Mid-Test 2 (Week 18)
12	Group technology: models and algorithms – visual method, coding method, cluster analysis method, matrix formation – similarity coefficient method	CO-4	Explain cluster analysis method.	▫ Lecture	Seminar Mid-Test 2 (Week 18)
13,14	sorting-based algorithms, bond energy algorithm, cost based method, cluster identification method, extended ci method.	CO-4	Differentiate between sorting-based algorithms and bond energy algorithm.	▫ Lecture ▫ Seminars	Quiz/ Seminar

15,16	Knowledge based group technology - group technology in automated manufacturing system, structure of knowledge based system for group technology (KBSGT)	CO-5	Explain the structure of knowledge based system for group technology.	▫ Lecture ▫ Discussion ▫ Power Point Presentation	Seminar Mid-Test 2 (Week 18)
17	(KBSGT) – data base, knowledge base, clustering algorithm	CO-5	Explain clustering algorithm with example.	▫ Lecture ▫ Seminars	Seminar
18	**Mid-Test 2**				
19/20	**END EXAM**				