INTELLIGENT MANUFACTURING SYSTEMS
(Elective - II)

Subject Code: 13ME2118

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Prerequisites: Computer Aided Manufacturing

Course Educational Objectives:

To provide students with the concepts of

1. planning manufacturing systems
2. computer integrated manufacturing and enterprise integration
3. group Technology
4. knowledge based systems

Course Outcomes:

The student will gain the knowledge and skills to

1. assess the performance of manufacturing systems
2. develop a systematic approach for design and implementation of manufacturing systems
3. suggest new procedures to improve the productivity of existing manufacturing systems
4. utilise online collaboration tools to work in complex teams

UNIT I

Computer integrated manufacturing systems – structure and functional areas of CIM system - AD, CAPP, CAM, CAQC, ASRS and advantages of CIM

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

UNIT II

Components of knowledge based systems – basic components of knowledge based systems, knowledge representation, comparison of knowledge representation schemes, interference engine, knowledge acquisition

Machine learning – concept of artificial intelligence, conceptual learning, artificial neural networks -biological neuron, artificial neuron, types of neural networks, applications in manufacturing

UNIT III:

Automated process planning – variant approach, generative approach, expert systems for process planning, feature recognition, phases of process planning

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

UNIT IV:

Group technology: models and algorithms – visual method, coding method, cluster analysis method, matrix formation – similarity coefficient method, sorting-based algorithms, bond energy algorithm, cost based method, cluster identification method, extended ci method.

UNIT V:

Knowledge based group technology - group technology in automated manufacturing system, structure of knowledge based system for group technology (KBSGT) – data base, knowledge base, clustering algorithm

TEXT BOOKS:

1. Mikell P. Groover, "*Automation, Production Systems and Computer Integrated Manufacturing*", 8th edition, PHI, 2008.
2. Yagna Narayana, "*Artificial Neural Networks*", PHI, 2009.

REFERENCES:

1. Andre Kusaic, " *Intelligent Manufacturing Systems*", PHI,1989
2. Hamid R. Parsaei and Mohammad Jamshidi, "*Design and Implementation of Intelligent Manufacturing Systems*", PHI, 2009