INTELLIGENT MANUFACTURING SYSTEMS

(Elective - II)

Course Code: 15ME2117

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

CO1: Summarize the concepts of computer integrated manufacturing systems and manufacturing communication systems

CO2: Identify various components of knowledge based systems

CO3: Demonstrate the concepts of artificial intelligence and automated process planning

CO4: Select the manufacturing equipment using knowledge based system for equipment selection

CO5: Apply various methods to solve group technology problems and demonstrate the structure for knowledge based system for group technology

UNIT I (10-Lectures)

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 (10-Lectures)

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 (10-Lectures)

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 (10-Lectures)

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 (10-Lectures)

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

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