



# MARRI LAXMAN REDDY INSTITUTE OF TECHNOLOGY AND MANAGEMENT

(AN AUTONOMOUS INSTITUTION)

(Approved by AICTE, New Delhi & Affiliated to JNTUH, Hyderabad)

Accredited by NAAC with 'A' Grade & Recognized Under Section 2(f) & 12(B) of the UGC act, 1956

## COURSE CONTENT

INTELLIGENT MANUFACTURING SYSTEMS								
II Semester: ME								
Course Code	Category	Hours / Week			Credits	Maximum Marks		
2224017	Foundation	L	T	P	C	CIA	SEE	Total
		3	0	0	3	40	60	100
<b>Contact Classes: 45</b>	<b>Tutorial Classes: Nil</b>	<b>Practical Classes: Nil</b>			<b>Total Classes: 45</b>			
<b>Prerequisites: Manufacturing processes and production systems</b>								

### Course Overview:

This course introduces the concepts, structure, and applications of intelligent technologies in modern manufacturing environments. It focuses on the integration of computer-based tools and artificial intelligence techniques to enhance productivity, decision-making, and automation in manufacturing systems.

### Course Objectives:

1. To understand the computer integrated manufacturing systems
2. To provide an in-depth understanding of components of knowledge-based systems
3. To provide an understanding of artificial intelligence
4. To design and develop automated process planning
5. To develop group technology for intelligent manufacturing systems

### Course Outcomes: After Completion of the Course, Students should be able to

1. Select the necessary tools for computer integrated manufacturing systems
2. Use appropriate knowledge of components of knowledge-based systems
3. Use machine learning techniques for intelligent manufacturing systems
4. Apply the concepts of automated process planning
5. Apply the group technology for intelligent manufacturing systems

### UNIT-I:

Computer Integrated Manufacturing Systems Structure and functional areas of CIM system, - CAD, CAPP, CAM, CAQC, ASRS. 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, Inference Engine, Knowledge Acquisition.

### UNIT-III:

Machine Learning - Concept of Artificial Intelligence, Conceptual Learning, Artificial Neural Networks - Biological Neuron, Artificial Neuron, Types of Neural Networks, Applications in Manufacturing.

### UNIT-IV:

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 KRSES.

#### **UNIT-V:**

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. Knowledge Based Group Technology - Group Technology in Automated Manufacturing System. Structure of Knowledge based system for group technology (KBSCIT) — Data Base, Knowledge Base, Clustering Algorithm.

#### **TEXT BOOKS:**

1. Intelligent Manufacturing Systems/ Andrew Kusiak/Prentice Hall.
2. Artificial Neural Networks/ Yagna Narayana/PHI/2006

#### **REFERENCE BOOKS:**

1. Automation, Production Systems and CIM / Groover M.P./PHI/2007
2. Neural networks: A comprehensive foundation/ Simon Haykin/ PHI.
3. Artificial neural networks/ B. Venkataramani/PHI

#### **ELECTRONIC RESOURCES:**

1. <https://swayam.gov.in/>
2. <https://arxiv.org/abs/2005.06037>
3. <https://ocw.mit.edu>
4. <https://nptel.ac.in>

#### **MATERIALS ONLINE:**

1. Course template
2. Tutorial question bank
3. Tech talk and Concept Video topics
4. Open-ended experiments
5. Definitions and terminology
6. Assignments
7. Model question paper – I
8. Model question paper – II
9. Lecture notes
10. E-Learning Readiness Videos (ELRV)