

Branch Name:	Mechanical Engineering (Production Technology)
Semester/Year:	Semester III / Second Year
Subject Title:	Computer Integrated Manufacturing
Subject Code:	1ET2010301
Pre-requisite:	UG level subjects on CAD, CAM and Industrial Engineering.

Course Objective:

This course provides

1. Use computers in the area of manufacturing to reduce manual processing and linking computers to all the manufacturing machines and increase the productivity, reduce the unnecessary costs.
2. Familiarize with Computer aided quality control and Flexible manufacturing systems.
3. Integrate all production and support process using computer network, cross-functional business software and other information technologies.

Teaching Scheme (Hours per week)				Evaluation Scheme (Marks)				
Lecture (L)	Tutorial (T)	Practical (P)	Credit	Theory (Marks)		Practical (Marks)		Total (Marks)
				University Assessment	Continuous Assessment	University Assessment	Continuous Assessment	
03	00	02	05	60	40	30	20	150

Subject Contents				
Sr. No	Topic	Total Hours	Weight (%)	
01	Introduction: The Scope of CAD/CAM and CIM, Computerized elements of a CIM System, Components of CIM, Database for CIM, Planning, Scheduling and Analysis of CIM Systems.	2	5	
02	Manufacturing Automation: Automated Manufacturing Systems, Computerized Manufacturing Support Systems, Reasons for Automation, Ten Strategies for Automation and Process Improvement, Automation Migration Strategy.	4	5	
03	Automated Flow lines: System Configurations, Work part Transfer Mechanisms, Storage Buffers, Control of Production Line, Analysis of Transfer Lines-Transfer Lines with No Internal Parts Storage, and Transfer Lines with Internal Storage Buffers.	4	5	
04	Automated Assembly Systems: System Configurations, Parts Delivery at Workstations, Applications, Quantitative Analysis of Assembly Systems- Parts Delivery System at Workstations, Multi-station Assembly machines, Single Station Assembly Machines, Partial Automation.	6	15	
05	Automatic Material Handling and Storage systems: Design Considerations in Material Handling, Material Transport Equipment-Industrial Trucks, Automated Guided Vehicles, Monorails and Other Rail-Guided Vehicles, Conveyors, Cranes and Hoists, Analysis of Vehicle Based Systems, Conveyor Analysis. Automated	6	15	

	Storage/Retrieval Systems, Carousel Storage Systems, Engineering Analysis of AS/RS and Carousel Systems.		
06	Automated Inspection systems: Overview of Automated Identification Methods, Bar Code Technology, Radio Frequency Identification, Other AIDC Technologies- Magnetic Stripes, Optical Character Recognition, and Machine Vision.	7	15
07	Cellular Manufacturing Systems: Part Families, Parts Classification and Coding, Features of Parts Classification and Coding Systems, Opitz of Parts Classification and Coding Systems, Production Flow Analysis, Composite Part Concept, Machine Cell Design, Applications Of Group Technology, Quantitative analysis of Cellular Manufacturing, Grouping of parts and Machines by Rank Order Clustering, Arranging Machines in a GT Cell.	8	20
08	Computer Aided Process Planning: Retrieval CAPP Systems, Generative CAPP Systems, Feature Identification- Algorithms, Graph Based Approach, Attribute Adjacency Graph, Benefits of CAPP.	4	10
09	Flexible Manufacturing Systems: Flexibility, Types Of FMS-A Dedicated FMS, A Random Order FMS, FMS Components-Workstations, Material Handling and Storage Systems, Computer Control System, Human Recourses, FMS Applications and Benefits.	4	10

Course Outcome:

The students shall be able to

1. Understand the effect of manufacturing automation strategies and derive production metrics.
2. Analyze automated flow lines and assembly systems, and balance the line.
3. Students will have an introduction to Computer Aided Process Planning (CAPP) Systems, Cellular Manufacturing Systems and Automated Inspection systems.
4. Students will cultivate understanding about Automated Material Handling Systems, Automated Inspection Systems, and Flexible Manufacturing Systems (FMS)

List of References:

1. Mikell P Groover, "Automation, production Systems and Computer Integrated Manufacturing", 3rd Edition, Prentice Hall Inc., New Delhi, 2007.
2. Nanua Singh, "System Approach to Computer Integrated Manufacturing", Wiley & Sons Inc., 1996.
3. Andrew Kusiak, "Intelligent Manufacturing System", Prentice Hall Inc., New Jersey, 1992.
4. David Bedworth, "Computer Integrated Design and Manufacturing", 1st Edition 1999, TMH, New Delhi,
5. Yorem Koren, "Computer control Manufacturing Systems", McGraw Hill, 1999.
6. Ranky, Paul G., "Computer Integrated Manufacturing", Prentice Hall International 1999

Practical Work:

- Students shall exercise some case studies and perform hands-on practice on new/existing production line system based on the topics of syllabus and submit report of the same.