

Subject Code: 01ME0821

Subject Name: Computer Integrated Manufacturing

B.Tech. IV Year-(Sem-VIII) Mechanical Engineering

Type of course: Science

Prerequisite: Basic Manufacturing

Rationale: The course is prepared to provide the detailed understating of Computer Integrated Manufacturing

Teaching and Examination Scheme:

Teaching Scheme(Hours)			Credits	Evaluation Scheme					Total Marks
Theory	Tutorial	Practical		Theory Marks			Practical Mar s		
				ESE (E)	IA	CSE	Viva (V)	Term Work (TW)	
4	0	2	5	50	30	20	25	25	150

Course Outcome

Students will be able to

1. Understand the basic concept of Computer Integrated Manufacturing
2. Application of Computer Integrated Manufacturing in process planning
3. Design the cell for batch production
4. Application of Flexible manufacturing
5. Application of industrial robots in manufacturing

Course Contents

Sr no	Contents	Total hour	Weightage
1	Introduction Brief introduction to CAD and CAM, Manufacturing Planning, Control of Manufacturing system: Concurrent Engineering, Computer integrated Manufacturing concepts, Computerized elements of CIM system, different Types of production, Manufacturing models and Metrics, Production Performance Mathematical models, Problems of Manufacturing Control, Elements of an Automated system, Levels of Automation, Lean Production and Just-In Time Production.	8	18

2	Production Planning And Control And Computerized Process Planning Process planning, Computer Aided Process Planning , Logical steps in Computer Aided Process Planning, Aggregate Production Planning and the Master Production Schedule, Material Requirement planning, Capacity Planning, Control Systems, Shop Floor Control Inventory Control, Manufacturing Resource Planning-II (MRP-II) & Enterprise Resource Planning (ERP)	10	23
3	Cellular Manufacturing Group Technology for production : Identification of Part Families, Parts Classification and coding, Problem solution using in Opitz Part Coding system, Production flow Analysis, Cellular Manufacturing, Composite part concept, Machine cell design and layout, Quantitative analysis in Cellular Manufacturing, Rank Order Clustering Method, Arranging Machines in a Group Technology cell.	10	23
4	Flexible manufacturing system and Automated guided vehicle System Different Types of Flexibilities, Components of Flexible Manufacturing System, FMS Application and Benefits, FMS Planning and Control, Quantitative analysis in FMS, Automated Guided Vehicle System, AGVS Application, Vehicle Guidance technology, Vehicle Management & Safety.	8	18
5	Industrial Robotics Robot Anatomy and Related Attributes, Classification of Robots, Control systems of Robot, End Effectors, Sensors used in Robotics, Robot Accuracy and Repeatability, Industrial Robot Applications, Robot Part Programming.	8	18

Distribution of Theory Marks

Remembrance	Understanding	Application	Analyze	Evaluate
15	20	25	25	15

Reference Books:

1. Computer Aided Manufacturing by Tien Chien Chang, Pearson Education
2. Automation, Production Systems and Computer Integrated Manufacturing by Mikell P Groover, Pearson Education
3. Robotics Technology and Flexible Automation, by S R Deb, S Deb, McGraw Hill Education Private Limited
4. Flexible Manufacturing Cells and System -William. W. Luggen Hall, England Cliffs, Newjersy

List of Experiments

1. Study of Computer Integrated System: Basics, Types of Manufacturing, role of management and CIM wheel
2. NC/CNC technology: Definition, Classification, Specification, Construction details, Sensors and Actuators, and different controllers.
3. CNC part Programming: Lathe and Milling jobs
4. Exercise on PLC for Simple problems.
5. Problems on GT and Industrial case problems on coding
6. Problems on CAPP and Industrial case problems
7. Study of Flexible Manufacturing system
8. Study of Robotics Technology
9. Problems on MRP-I, MRP-II
10. Study of Expert System in Manufacturing and MIS

List of Open Source Software/learning website:

1. nptel.ac.in