



SAMRAT ASHOK TECHNOLOGICAL INSTITUTE
 (Engineering College), VIDISHA M.P.
 (An Autonomous Institute Affiliated to RGPV Bhopal)
 Mechanical Engineering Department

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|------------------------|---------|---------------|------------|---------------|-----------------------------------|---------|-------------|---------------|---|---------------|---|
| Semester/Year | | VI/III | Program | | | B.Tech. | | | | | |
| Subject Category | DE-II | Subject Code: | ME-603 (B) | Subject Name: | Computer Integrated Manufacturing | | | | | | |
| Maximum Marks Allotted | | | | | | | | Contact Hours | | Total Credits | |
| Theory | | | | Practical | | | Total Marks | L | T | P | |
| End Sem | Mid-Sem | Assignment | Quiz | End Sem | Lab-Work | Quiz | | | | | |
| 60 | 20 | 10 | 10 | 30 | 10 | 10 | 150 | 3 | 0 | 2 | 4 |

Prerequisites (Only for open electives)

Course Objective:

This course provides a simple understanding of the basic components of Computer Integrated Manufacturing. The course contains CIM, automation, control strategies for automation, CAM, NC/DNC/CNC systems, Robot Technology, AS/RS, AGV systems, Group technology, FMS and Expert system.

Course Outcomes:

After completion of the course, students would be able to –

1. A knowledge of Computer Integrated System, CIM hardware and software, Modern Manufacturing.
2. An understanding of Automation and Production Systems, control strategies for automation systems.
3. An understanding of Computer Aided Manufacturing NC/DNC/CNC, Part programming.
4. An understanding of Robot and automated material handling and storage system, AGV, AS/RS, Robot programming.
5. An understanding of Group technology, Cellular manufacturing, Agile manufacturing, FMS.

| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|
| CO1 | 3 | 2 | | | 2 | 1 | 2 | 1 | 3 | | 3 | 3 |
| CO2 | 3 | 2 | 1 | 1 | 3 | | 2 | | 3 | | 3 | 2 |
| CO3 | 3 | 2 | 1 | 1 | 3 | 1 | 3 | | 3 | | 3 | 1 |
| CO4 | 2 | 3 | 3 | 3 | | | | 1 | 3 | | | 1 |
| CO5 | 2 | 2 | 3 | 3 | | | | | 3 | | | 1 |

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| Contents: | | | |
|-------------------------|--|------|------|
| UNITs | Descriptions | Hrs. | CO's |
| I | Introduction- Introduction, Modern manufacturing, Integration and rationalization, Elements of CIM system, CIM hardware and software, Implementating CIM, Advantages and limitations | 6 | 1 |
| II | Automation and Production Systems- History of automation, Building block of automation technology, Types of automation systems, Automation production economics, Viability appraisal for automated production Control Strategies for Automation System- Control process, Electrical and Mechanical Analogies, Laplace Transform, Transfer Function, Linear and Non-linear systems, Adaptive Control, Logical Sequence Control, PLCs and Networking for Automation | 10 | 2 |
| III | Computer Aided Manufacturing- Introduction, CAM hierarchy, Elements of CAM systems, CNC machine types, Classification, File Formats, Controllers, Hierarchical controls, Tooling on CNC, Fixtures on CNC, Rationale for CAD/CAM, NC, DNC, CNC and Adaptive control, Methods of Part-programming, CAM softwares | 8 | 3 |
| IV | .Robot, Automated Material Handling and Storage system- Robot anatomy, Robot Configuration, Robot control systems, Accuracy, Repeatability, End effectors, Robot programming, Robot languages, Robot applications, Automated material handling and storage system, Design of system, Automated guided vehicle systems, Automated retrieval systems. | 8 | 4 |
| V | Group Technology(GT),Computerized Manufacturing Planning System- Introduction, Part families, Part manufacturing and coding, Production flow analysis, Machine cell design, Cellular manufacturing systems, Agile manufacturing, Flexible manufacturing systems(FMS), Types of flexibility and uncertainty. Expert Systems- Introduction to expert systems, Need and classification,Artificial Intelligence | 8 | 5 |
| Guest Lectures (if any) | | | |
| Total Hours | | 40 | |

Suggestive list of experiments:

1. Study of equipment available in CIM lab.
2. Study of Process Planning and Part Programming.
3. Study of Preparatory Functions (G- Codes)
4. Study of Miscellaneous Functions (M- Codes)
5. Preparation of a part program for given parts on CNC Lathe machine.
6. Preparation of a part program for given part on CNC Milling machine.
7. Study and part program preparation of AS/RS.
8. Study and Location setting of AGV.
9. Study and Location setting of Robotic Arm.
10. Study of working of the FMS by using CNC Lathe, CNC Milling, Transfer Conveyor, Robotic Arm, AS/RS, and AGV.

Text Books:

1. Production System & CIM by Groover: PHI
2. Automation Production Systems and Computer Integrated Manufacturing by Mikell P Groover: PHI
3. Principle of Automation and Advanced Manufacturing Systems By Dr K C Jain and Sanjay Jain
4. Robotics- Control, Sensing, Vision and Intelligence by K S Fu, RC Gonzalez and C S E Lee: Tata McGraw Hills
5. CAD/CAM: Principles and Applications by P N Rao: Tata McGraw Hills
6. CIM: Principle of Computer Integrated Manufacturing by J B Waldner: John Wiley & Sons

Modes of Evaluation and Rubric

There will be continuous evaluation for during the semester for 40 sessional marks and 60 semester End term Marks. The practical marks are 50, out of which 30 marks will be awarded for viva voce and 20 marks for lab work. Out of 40 sessional marks, 20 shall be awarded for Mid semester, 20 marks to be awarded for day to day performance and Quiz/Assignments. For the 60 Marks, there will be a semester – End examination as per the norms of AICTE.

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| Recommendation by Board of studies on | Date: |
| Approval by Academic council on | Date: |
| Compiled and designed by | Prof Sanjay Jain |
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