

3ME08: COMPUTER AIDED MANUFACTURING
CREDITS - 4 (LTP: 3,0,1)

Course Objective:

1. To impart the knowledge of CNC technology.
2. To illustrate the computer aided techniques used in manufacturing.

Teaching and Assessment Scheme:

Teaching Scheme (Hours per Week)			Credits	Assessment Scheme				
L	T	P		Theory Marks		Practical Marks		Total Marks
			ESE	CE	ESE	CE		
3	0	2	4	60	40	20	30	150

Course Contents:

Unit No.	Topics	Teaching Hours
1	Introduction: CAM Concepts, objectives and scope, nature and type of manufacturing system, evolution, benefits of CAM, role of management in CAM	2
2	NC/CNC Machine Tools: Types, classification, specification and components, construction details, controllers, CNC hardware: re-circulating ball screw, linear motion guide ways, stepper and servo motors, sensors and actuators, axis designation, NC/CNC tooling, fundamentals of part programming, part programming for turning center and machining center, canned cycles, advanced part programming, CAD/CAM integration.	17
3	Robot Technology: Introduction: robot anatomy, specifications of robot, power sources, actuators and transducers, sensors, grippers, robot safety, programming, applications, forward and inverse kinematics, concepts of computer vision and machine intelligence.	6
4	Group Technology and Computer Aided Process Planning (CAPP): Introduction, part families, part coding systems, cell design, composite part concepts, benefits of group technology. Approaches to process planning, variant and generative CAPP, application and benefits.	7
5	Flexible Manufacturing System: Concept of FMS, types of flexibility, FMS lay out and advantages. Automated material handling systems, ASRS, AGVs, Cellular manufacturing, tool management, flexible assembly systems.	6
6	Integrated Production Management System: Introduction, PPC fundamentals, problems with PPC, MRP-I, MRP-II, concept of JIT, concepts of Expert System in Manufacturing and Management Information System.	4
Total		42

List of References:

1. Mikell P. Groover, “*Automation, Production System and CIM*”, 3rd edition, Prentice Hall.
2. Tien Chien Chang, *Computer Aided Manufacturing*, Pearson Education
3. N. K. Tiwari, P. N. Rao, T. K. Kundra, “*Computer Aided Manufacturing*”, McGraw-Hill Education
4. P. M. Agrawal, V. J. Patel, “*CNC fundamentals and programming*”, Charotar Publishing House Pvt, Ltd.

Course Outcomes (COs):

At the end of this course students will be able to ...

1. Outline Computer Aided Manufacturing
2. Identify the working of the CNC machine tool elements
3. Prepare part program for CNC machines to manufacture geometrical features.
4. Apply the fundamentals of robotics for manufacturing
5. Design manufacturing process plan in the context of CAPP.
6. Apply part and/or product variation for manufacturing.
7. Identify application of PPC, JIT, MRP I , MRP II and expert system to CAM