

ME429 Computer Integrated Manufacturing

L	T	P	Credit	Area		CWS	PRS	MTE	ETE	PRE
3	0/1	2/0	4	DEC/GEC		15/25	25	20/25	40/50	-

Objective: To enable the students to understand the fundamentals of computer integrated manufacturing. To understand fundamentals of basic concepts of CIM.

Syllabus										Contact Hours
Unit-1	NC/CNC/DNC terminology, Operations of NC/CNC machine tools. Control cycles in CNC machine tools and how do these reduce operator's activities, Central Processing Unit (CPU), Input Devices, Storage Devices, System Configuration, Feasible report to introduce CAM technology for the first time in the industry, advantages & limitations of using CNC technology.	6								
Unit-2	Parameters for adaptation of CAM technology, Advantages and disadvantages of CAM, Part programming, Manual & CAP, APT& its statements/programming with suitable examples to machine the components on CNC lathe, CNC milling machine, CNC jig boring machine, etc, Parallel programming& its advantages, Post etc.	6								
Unit-3	Canned cycles, linear/circular, parabolic interpolation, online/offline programming, unidirectional, bidirectional approach, point to point and continuous control, Buffer storage, adaptive control, Nesting, optipart, opti-route, precision sheet metal processing, CNC turret punch press, CNC press brake & its programming to machine the sheet metal components, Auto indexing, safety aspects in CNC machine tools. Tool length/ cutter compensation, Computer optimized manufacturing, etc	8								
Unit-4	Reverse engineering, Reasons for reverse engineering, importance of reverse engineering, Process of reverse engineering, Applications of reverse engineering. Integration of reverse engineering with CAM, Flexible Manufacturing System, Elements of FMS, tool management systems, FMS control, Typical layouts of FMS, Benefits of FMS in the industries. Production planning and operation of FMS, Computer Aided Design, Concept and Description, Origin of CAD, Representations & Simulations, Various models of CAD, Analytical programs, Different models of CAD, Advantages of CAD & its limitations, etc.	8								
Unit-5	CAPP, Types of CAPP, Group technology, Merit/ Demerits, Database management in the development of CAPP, CAD-CAM integration, Essential elements of CAPP, Future trends in CAPP, Importance of CAPP in CAM/CIM, etc. Introduction to Robots, its types, Laws of robotics, Symbolic modelling of robots, Robotic sensors, Configurations of robot, Applications of Robots in engineering industries.	6								
Unit-6	Basic concepts of CIM, Evolution of CIM, Unmanned manufacturing, Elements of CIM, CIM implementation, CIM hardware and CIM software. Product development through CIM, Sequential engineering, Concurrent engineering, Comparison of sequential and concurrent engineering, implementation of concurrent engineering, concurrent engineering and information technology, Characteristics of concurrent engineering. Soft computing in CIM: Artificial neural networks/Artificial intelligence, Fuzzy, Fuzzy AHP Benefits of CIM, Lean manufacturing, comparison of lean manufacturing with conventional manufacturing, applications of lean manufacturing, etc.	8								
	Total	42								

Reference Book:	
1	Automation, Production system and computer intergrated manufacturing by Groover
2	Computer Aided Design and Computer Aided Manufacturing by Groover Zimmer
3	Computer Aided Manufacturing by P.N. Rao
4	NC/CNC Technology by Kundra, Rao, Tiwari
5	Craig J John, Introduction to Robotics: Mechanics and Control, Pearson education, ISBN- 0201543613, 2003.
6	Y.Koren , Robotics for Engineers, , McGraw Hill Publications, ISBN-0070353999,1985

Course Outcomes	
CO1	Explain the knowledge about role of computer and automation in manufacturing.
CO2	Describe the automation, types of automation and automation strategies.
CO3	Explain computer based integration between various functions - manufacturing, sales, design, and materials.
CO4	Describe the application of computer in CAPP, Production Management and ERP.
CO5	Explain the concept of group technology, FMS, concurrent engineering, Simulation in CIM systems
CO6	Applications of CIM in industries

CO-PO/PSO Matrix

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	1	1	1	2	2	1	1	1	1	2	2	1	3
CO2	3	3	2	2	2	2	2	1	1	1	1	3	3	2	2
CO3	3	3	3	2	2	2	1	1	1	1	1	2	2	1	3
CO4	3	3	3	3	2	2	2	1	1	1	1	2	3	1	2
CO5	3	3	3	3	3	2	2	1	1	1	1	3	3	2	3
CO6	3	3	3	3	3	2	2	2	1	1	1	2	3	2	3