GUJARAT TECHNOLOGICAL UNIVERSITY

Bachelor of Engineering
Subject Code: 3174108
Semester – VII
Subject Name: Computer Integrated System

Type of course: Open Elective Course.

Prerequisite: Zeal to learn the course

Rationale: **C**omputer integrated manufacturing systems is highly demanded area now a day. Computer integrated manufacturing systems deals with Design of components to manufacturing and also includes Planning and controlling the processes. Industries widely use CNC, FMS and Robotics technology now a day. Students will be familiar with its hardware and software and also able to write programs for machining.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks				Total Marks
L	T	P	C	Theory Marks		Practical Marks		
				ESE (E)	PA (M)	ESE (V)	PA (I)	
3	0	0	3	70	30	0	0	100

Content:

Sr. No.	Content	Total Hrs
1	**Introduction:** Brief introduction to CAD and CAM Manufacturing Planning, Manufacturing control- Introduction to CAD/CAM Concurrent Engineering-CIM concepts Computerised elements of CIM system –Types of production Manufacturing models and Metrics – Mathematical models of Production Performance Simple problems ,Manufacturing Control, Simple Problems Basic Elements of an Automated system – Levels of Automation –Lean Production and Just-In-Time Production.	9
2	**Production planning and control and computerised process planning:** Process planning Computer Aided Process Planning (CAPP), 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 Brief on Manufacturing Resource Planning-II (MRP-II) & Enterprise Resource Planning (ERP) - Simple Problem	9
3	**Cellular manufacturing:** Group Technology(GT), Part Families Parts Classification and coding Simple Problems 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 GT cell Hollier Method Simple Problems.	9

4	**Flexible manufacturing system (FMS) and automated guided vehicle system:** Types of Flexibility, FMS Components, FMS Application & Benefits, FMS Planning and Control, Quantitative analysis in FMS, Simple Problems. Automated Guided Vehicle System (AGVS), AGVS Application Vehicle Guidance technology Vehicle Management & Safety	**9**
5	**Industrial robotics:** Robot Anatomy and Related Attributes Classification of Robots Robot Control Systems End Effectors, Sensors in Robotics, Robot Accuracy and Repeatability, Industrial Robot Applications, Robot Part Programming, Robot Accuracy and Repeatability, Simple Problem	**9**

Suggested Specification table with Marks (Theory): (For BE only)

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
26%	**22%**	**12%**	**20%**	**10%**	**10%**

Legends: R: Remembrance; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create and above Levels (Revised Bloom's Taxonomy)

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Reference Books:

1. Mikell.P.Groover "Automation, Production Systems and Computer Integrated manufacturing", Prentice Hall of India, 2008.
2. Radhakrishnan P, Subramanyan S.and Raju V., "CAD/CAM/CIM", 2nd Edition, New Age International (P) Ltd, New Delhi, 2000
3. Gideon Halevi and Roland Weill, "Principles of Process Planning – A Logical Approach" Chapman & Hall, London, 1995.
4. Kant Vajpayee S, "Principles of Computer Integrated Manufacturing", Prentice HallIndia
5. Rao. P, N Tewari &T.K. Kundra, "Computer Aided Manufacturing", Tata McGraw Hill Publishing Company, 2000.

Course Outcomes: After learning the course the students should be able to:

Sr. No.	CO statement	Marks % weight age
CO-1	Explain the basic concepts of CAD, CAM and computer integrated manufacturing systems.	20%
CO-2	Summarize the production planning and control and computerized process planning.	25%
CO-3	Differentiate the different coding systems used in group technology'	20%

CO-4	Explain the concepts of flexible manufacturing system (FMS) and automated guided vehicle (AGV) system	20%
CO-5	Classification of robots used in industrial applications.	15%

List of Experiments:

NA

Major Equipment:

NA

List of Open Source Software/learning website:

www.nptel.ac.in