C. U. SHAH UNIVERSITY
Wadhwan City

FACULTY OF: - Technology & Engineering
DEPARTMENT OF: - Mechanical Engineering
SEMESTER: - VII
CODE: -4TE07CAM1
NAME – Computer Aided Manufacturing

Teaching & Evaluation Scheme:-

Subject Code	Name of the Subject	Teaching Scheme (Hours)				Credits	Evaluation Scheme							Total
							Theory				Practical (Marks)			
		Th	Tu	Pr	Total		Sessional Exam		University Exam		Internal		University	
							Marks	Hrs	Marks	Hrs	Pr/Viva	TW	Pr	
4TE07CAM1	Computer Aided Manufacturing	3	0	2	5	4	30	1.5	70	3	---	20	30	**150**

Objectives:-

On completion of the course the students are expected to be knowledgeable in:
- Basic concepts of CAM systems.
- CAD/CAM integration, CNC machine tool building, and to develop machining programs for CNC equipment.
- Developing PLC-based control systems for manufacturing cells.
- Designing CAM systems to fulfill certain requirements.
- Identifying and solving problems in the operations of CIM systems.
- Enhancing performance of manufacturing systems by applying different CIM concepts and tools.

Prerequisites: -Basic knowledge of conventional machine tools used in workshop. Fundamentals of computers and programming.

Course outline:-

Sr. No.	Course Contents	Hours
01	**UNIT I** **Introduction to CAM:** Overview of Production Systems, the product cycle, Automation in Production Systems, computer's role in manufacturing, sources and types of data used in manufacturing. The Beginning of CAM: Historical Background, Numerical Control (NC): Basic components of an NC system, coordinate system and motions control systems. Computer Numerical Control (CNC): features of CNC, machine control unit, CNC software. Direct Numerical Control and Distributed Numerical Control. Applications, advantages and disadvantages of NC. Adaptive control of machining system.	**08**
02	**UNIT II** **NC Part programming:** Manual and computer assisted part programming, NC part	**10**

	programming using CAD/CAM software. NC/CNC tooling, Axis designation, types of format, word address format manual part Programming for drilling, lathe and milling machine operations, subroutines, do loops, canned Cycles, parametric sub routines, Macros. NC cutter path verification. Automated Programmed Tools.	
03	**UNIT III** **Computer Aided Process Planning:** Traditional Process Planning, Retrieval process planning system, Generative Process Planning, Machinability data systems, computer generated time standards. Group Technology: Introduction, part families, part classification and coding, coding system and machining cells.	**07**
04	**UNIT IV** Computer Aided Production Management Systems: Introduction to computer aided PPC, Introduction to computer aided inventory management, manufacturing requirement planning (MRPI), computer process monitoring and shop floor control, computer process control. Computer Aided Quality Control; Computer in quality control, contact inspection methods, Non contact inspection methods, optical and non optical computer aided testing.	**06**
05	**UNIT V** Computer Aided Material Handling; Computer control on material handling, conveying, picking. Ware house control, computerized material handling for automated inspection and assembly. Computer Integrated Manufacturing Systems: Introduction, types special manufacturing systems, flexible manufacturing systems (FMS). Collaborative Engineering: Introduction, Faster Design throughput, Web based design, Changing design approaches, extended enterprises, concurrent engineering, Agile and lean manufacturing.	**10**
06	**UNIT VI** **Programmable Logic Controllers:** Fundamentals, Programming, Applications. **CIM Advances:** Role of management in CIM, Expert system & participate management, Impact of CIM on personnel, Role of manufacturing engineers, CIM Wheel.	**04**

Learning Outcomes:-

- Apply knowledge of manufacturing engineering and management principles to design and evaluate automated manufacturing systems.
- Analyze problems of manufacturing and industrial systems to formulate the design requirements for CIM systems.
- Use state of the art IT tools and techniques for design and operation of advanced manufacturing systems.
- Function effectively, individually and in teams, on diverse and multidisciplinary environments to accomplish common goals.
- Communicate effectively with diversified groups to motivate and exhibit leadership qualities in the management of an enterprise.

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Text books:-
01 CNC Machines, **B. S. Pabla**, NewAge International Publication, New Delhi, 1994
02 CNC programming **– Dr. S. K. Sinha** – Golgotia publications, New Delhi, 2011
03 CNC Machines, **M. Adithan**, NewAge International Publication, New Delhi, 2012
04 Automation, Production Systems, and Computer-
    Integrated Manufacturing, 3rd ed., **Mikell P. Groover,** Pearson/Prentice Hall,

Reference Books:-
01 Computer-Integrated Manufacturing, 3rd ed, **James A. Rehg and Henry W. Kraebber**, Pearson/Prentice Hall, 2005.
02 CAD/CAM: Principles and Applications, **P.N. Rao**, McGraw Hill
03 Computer aided Manufacturing, **Rao, Tiwari and Kundra**, Tata McGraw Hill.
04 Computer Numerical Control: Machining and Turning Centres, **Quesada and Jeyepoovan**, Pearson Education.
05 Computer Control of Manufacturing Systems,**Y. Koren**, McGraw Hill.
06 CNC programming: Principals & Applications, **Mike Mattson**, Cengage Publication, New Delhi, 2012
07 CNC : Technology and Programming, **Steve F. Krar and Arthur Gill,** McGraw-Hill Education.

Research Reference:-
1. ASME – Journal of Manufacturing Science and Engineering
2. www.springer.com
3. www.sciencedirect.com
4. www.journals.elsevier.com
5. www.simflow.net