

# GUJARAT TECHNOLOGICAL UNIVERSITY

M.E Semester: 2

**Mechanical Engineering (CAD/CAM)**

Subject Name Computer Aided Manufacturing

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Sr.No	Course content
1.	<p>NC / CNC MACHINES: Numerical Controls, types, evolution of controllers, Programmable Logic Controllers, components of NC/CNC system, specification of CNC system. Classification of NC /CNC machines, transducers used, salient features, Tape, Tape codes and tape readers used in NC machines constructional details of CNC machines, axis designation, NC/CNC tooling -Fundamentals of manual part programming , 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.</p> <p>-Computer assisted part programming: - Need, list of computer assisted programming languages, Automated Programmed Tools language- its types of statement, command and programming-CAD based CNC programming using CAM software.</p>
2.	<p>FLEXIBLE MANUFACTURING SYSTEM:</p> <p>-FMS definition and description need of FMS</p> <p>-General FMS Considerations, objective, management commitment and planning, types of FMS, main elements of FMS, flexibilities, their measurements , various mathematical techniques for flexibility measurements.</p> <p>-Manufacturing cells , cellular v/s flexible manufacturing</p> <p>-Systems planning, physical planning –human resources, Concepts of Quality, JIT and GT as applied to FMS</p> <p>-Processing and Quality assurance equipments- Turning centre, Machining centre, Cleaning and debarring equipment, co ordinate measuring machines- their types-working , capabilities etc.</p> <p>-System support equipment-Automated material movement and Automated Storage and Retrieval Systems (ASRS), scheduling of AGVs, cutting tools and tool management, work holding considerations</p> <p>-FMS computer hardware &amp; software-general structure and requirements.</p> <p>-FMS installation and implementation –acceptance testing, maintenance concern</p>
3.	COMPUTER INTEGRATED MANUFACTURING SYSTEMS:

	<p>-Introduction to CIMS, nature, types of manufacturing system, evaluation, CIMS hardware and software, benefits, scope and needs, CIMS wheel, elements of CIMS and their role, computer technology and manufacturing, database requirement, fundamentals of communication, data base management, database models, DBMS architecture, SQL -Steps to implement CIM, its management, personnel, emerging technologies like expert systems, computer vision, lasers in manufacturing (machinery and metrology), laser meets CNC, concurrent engineering, multimedia communications, best people practices.</p> <p>-CIM specification, application, development of experiments and facilities needed, economics, justification, case studies.</p> <p>-Expert systems and AI based scheduling in CIM environment.</p> <p>-CAD/CAM Integration: - Activities involved, case studies, software requirements, hardware requirements, factory automation, implementation issues economic justification</p>
4	MECHATRONICS : Digital Logic and Logic Families, Micro-controllers and Programming, Parallel I/O and Interrupt Mechanism, Sensors and their Interface.

#### REFERENCE BOOKS:-

1. Numerical control and computer aided manufacturing – T.K. Kundra, P.N.Rao and N.K.Tewari – Tata McGraw Hill Publishing company Ltd.
2. CNC Programming by Yorem Koran.
3. Computer numerical control machines –P.Radhakrishnan ,New Central Book Agency
4. CNC programming – Dr. S.K.Sinha – Galgotia publications.
5. Flexible Manufacturing Cells and System -William. W. Luggen Prentice Hall, England Cliffs, NJ.
6. CAD, CAM and CIM – P. Radhakrishan, S. Subramaniam , New Age International.
7. Mechatronics- Integrated Technologies for Intelligent Machines  
A. Smaili and F. Mrad - Publisher-Oxford University Press