GUJARAT TECHNOLOGICAL UNIVERSITY

Bachelor of Vocation (B.Voc)
Semester: III
Branch: Production Technology
Subject Name: CAD-CAM
Subject Code: 21130301

Type of course: Under Graduate

Prerequisite: None

Rationale: The course is intended to provide exposure of modeling techniques. It also includes topics on feature based modeling and assembly modeling. The manufacturing field has witnessed the development of major automation alternatives recently. CNC machines play a big role in manufacturing field. An attempt has been made to focus on CNC machine tools, related programming and their advanced features.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks				Total Marks
				Theory Marks		Practical		
L	T	P	C	ESE (E)	PA(M)	ESE (V)	PA (I)	
3	0	0	3	50	0	0	0	50

L- Lectures; T- Tutorial/Teacher Guided Student Activity; P- Practical; C- Credit; ESE- End Semester Examination; PA- Progressive Assessment

Contents:

Sr. No.	Content	Teaching Hrs.	Module Weightage
1	**Introduction to CAD:** A typical product cycle, CAD tools for the design process of product cycle, Concept of Coordinate Systems: Working Coordinate System, Model Coordinate System, Screen Coordinate System, Graphics exchange standards and Database management systems, CAD software packages.	4	10%
2	**Geometric Modeling and Geometric Transformations:** Geometry and Topology, Comparison of wireframe, surface and solid models, B-rep, CSG. Homogeneous representation: Translation, Scaling, Reflection, Rotation, Shearing in 2D and 3D	10	25%
3	**Introduction to CAM:** CAM Concepts, Objectives & scope, Benefits of CAM, Concepts of Computer Integrated Manufacturing, CIM Wheel to understand basic functions, NC and CNC Technology: Types, Classification, Specification and components.	4	10%
4	**Part Programming:**	10	25%

	Fundamentals of Part programming, Types of format, Part Programming for drilling, lathe and milling machine operations, subroutines, do loops, canned Cycles.		
5	**Group Technology and CAPP:** Introduction, part families, part classification and coding systems: OPITZ, MICLASS, Benefits of group technology. Approaches to Process Planning, Different CAPP system, application and benefits.	4	10%
6	**Flexible Manufacturing System & Robot Technology:** Introduction & Component of FMS, Objectives, Types of flexibility and FMS, FMS lay out and advantages. Automated material handling system: Types and Application, Automated Storage and Retrieval System, Automated Guided Vehicles. Introduction: Robot Anatomy, Laws of Robot, Coordinate system, Specifications of Robot, Power sources, actuators and Transducers, Robotic Sensors, Grippers, Robot Safety and Robot Applications.	8	20%
	Total	**40**	

Suggested Specification table with Marks (Theory):

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
10	20	20	0	0	0

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

Course Outcomes:

Students will be able to:

Sr. No.	CO Statement	Marks % Weightage
CO-1	Understand basic concept of computer aided design and its applications.	10
CO-2	Understand geometric modeling and analyze geometric transformation.	25
CO-3	Illustrate Computer Aided Manufacturing with NC and CNC.	10
CO-4	Prepare part programming for various geometry.	25
CO-5	Understand the concepts of group technology and CAPP.	10
CO-6	Understand concepts of flexible manufacturing system and robotics	20

Reference Books:

1. CAD / CAM: Theory and Practice by Ibrahim Zied, McGraw-Hill
2. CAD / CAM and Automation, Farazdak Haideri, Nirali Prakashan
3. CAD/CAM/CIM by P. Radhakrishnan, New Age International Publishers

List of Open Source Software/learning website:

1. www.nptel.ac.in
2. Videos on CNC programming