GUJARAT TECHNOLOGICAL UNIVERSITY

Syllabus for Bachelor of Vocation (B.Voc), 5th Semester
Branch: Production Technology
Subject Name: CAD & CAM
Subject Code: 1150304

With effective from academic year 2018-19

Type of course: Engineering Science

Prerequisite: Zeal to learn the subject

Rationale: The course is intended to provide exposure of modelling techniques for curves, surfaces and solids. It also includes topics on feature based modelling and assembly modelling. 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 Marks		
L	T	P	C	ESE (E)	PA (M)	ESE (V)	PA (I)	
3	0	0	3	50	0	0	0	50

Sr. No.	Topic	No. of Hours	Weightage %
01	**Introduction CIM and CAD & Analysis:** CIM: Introduction of CIM– concept of CIM - evolution of CIM – CIM wheel –Benefits –integrated CAD/CAM. CAD: Introduction– CAD definition – Shigley's design process – CAD activities – benefits of CAD. Types of CAD systems, CAD software packages, 2D & 3D transformations, Geometric modeling: Techniques: Wire frame modeling – surface modeling – solid modeling	5	15
02	**Computer aided Manufacturing** CAM: Definition, functions, benefits. Group technology – Part families - Parts classification and coding - coding structure – Optiz system, MICLASS system and CODE System - process planning – CAPP – Types of CAPP : Variant type, Generative type – advantages of CAPP – production planning and control – computer integrated production management system – Master Production Schedule (MPS) – Capacity planning – Materials Requirement Planning (MRP) –Manufacturing Resources Planning (MRP-II)	7	20
03	**CNC Machine and Components:** CNC Machines: Numerical control – definition – components of NC systems – development of NC – DNC – Adaptive control systems – working principle of a CNC system – Features of CNC machines - advantage of CNC machines – difference between NC and CNC – Construction and working principle of turning centre – Construction and working principle of machining centers – machine axes conventions turning centre and machining centre – design considerations of NC machine tools.	5	25
04	**Part Programming** NC part programming – methods – manual programming – conversational programming – APT programming - Format: sequential and word address	7	20

	formats - sequence number – coordinate system – types of motion control: point-to-point, paraxial and contouring – Datum points: machine zero, work zero, tool zero NC dimensioning – reference points – tool material – tool inserts - tool offsets and compensation - NC dimensioning – preparatory functions and G codes, miscellaneous functions and M codes – interpolation: linear interpolation and circular interpolation.		
05	**FMS, Integrated Material Handling and Robot:** Types of manufacturing - introduction to FMS – FMS components – FMS layouts – Types of FMS: flexible manufacturing cell – flexible turning cell – flexible transfer line – flexible machining systems – benefits of FMS - introduction to intelligent manufacturing system – virtual machining. Computer Integrated material handling – AGV: working principle – types, benefits – Automatic Storage and Retrieval Systems (ASRS).ROBOT – definition – robot configurations – basic robot motion – robot programming method – robotic sensors - industrial applications: characteristics, material transfer, machine loading, welding, spray coating, assembly and inspection.	6	20

Distribution of marks weightage for cognitive level:

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

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. Engineering AutoCAD, Pradeep Jain & A.P. Gautam, Khanna Publishing House
2. Engineering Graphics and Design, Pradeep Jain & A.P. Gautam, Khanna Publishing House

Course Outcome:

Sr. No.	CO statement	Marks % weightage
CO 1	To learn basic design and manufacturing concepts of computer aided systems	15
CO 2	To understand the concepts of group technology and production planning and control	20
CO 3	To study various components of CNC machine.	25
CO 4	To prepare part programming for various geometry.	20
CO 5	To understand concepts of flexible manufacturing system and robotics.	20

List of Open Source Software/learning website:

https://nptel.ac.in,