



GUJARAT TECHNOLOGICAL UNIVERSITY

Master of Engineering

Subject Code: 3722808

Semester – II

Subject Name: Production Automation and CNC Technology

Type of course: Elective III

Prerequisite: Nil

Rationale:

This course provides the knowledge and practice regarding Production Automation and their computer Controlled Technology. This course gives practice for Various Production Machine Programming methods for Advancement of Product Quality and Quantity.

Teaching and Examination Scheme:

Teaching Scheme			Credits C	Examination Marks				Total Marks
L	T	P		Theory Marks		Practical Marks		
				ESE (E)	PA (M)	ESE (V)	PA (I)	
03	0	02	04	70	30	30	20	150

Content:

Sr. No.	Content	Total Hrs
1	Concept and scope of industrial automation – automation strategies -devices, drives and control circuits in automation - Semi-automats, automats and transfer lines.	07
2	Mechanical, electrical, hydraulic, pneumatic, electronic & hybrid automation system. Comparative evaluation of automation system.	08
3	Concepts, features, fundamentals, advantages and classification of NC systems - input media - Design consideration of NC machine tools - machining centre – MCU functions.	08
4	Controls and System devices - Control loops of NC system - CNC concepts, reference pulse and sampled data techniques – microprocessor and CNC adaptive control – ACO and ACC systems	08
5	Graphical Numerical Control - part programming - design of post processor.	06
6	Manual part programming. Computer aided part programming- post processor - APT programming - programming for CNC turning center, Machining center and CNC EDM and wire cut EDM	08



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Suggested Specification table with Marks (Theory):

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
10	25	25	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. Scrope Kalpakjian, "Manufacturing processes for Engineering Materials", Addison Wesley, 1997.
2. Radhakrishnan, P., "Computer Numerical Control Machines", New Central Book Agencies, 1997.
3. Yoram Korem., "Computer control of Manufacturing systems", Mc Graw Hill, 1986.
4. Engineering automation by solomon

Course Outcomes:

Sr. No.	CO statement	Marks % weightage
CO-1	Acquire the knowledge and practice regarding Production Automation and their control system.	30
CO-2	Acquire and apply knowledge of different automation system devices	20
CO-2	To produce optimized product Quality.	20
CO-3	Can be able to design / program automated system for the machine.	30

Term Work:

The term work shall be based on the topics mentioned above.

List of Experiments:

1. Introduction to CNC machines
2. Study Of Mechanical Component Of CNC Machines
3. Study of electrical and Mechatronics components of CNC machines.
4. Study of forces produced on bed and its analysis.
5. Study Of Manual Part Programming
6. Part programming using Automatically Programmed Tools (APT)
7. Study of Adaptive Control System



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8. Study of Manufacturing Automation System
9. Study of Interpolator and Control Loops for Manufacturing Systems

Major Equipment:

1. CNC Lathe Machine
2. CNC Milling Machine

List of Open Source Software/learning website:

NPTEL