GUJARAT TECHNOLOGICAL UNIVERSITY

MECHANICAL (PRODUCTION ENGINEERING) (28)

PRODUCT AUTOMATION AND CNC TECHNOLOGY

SUBJECT CODE: 2722808

SEMESTER: II

Type of course: MAJOR ELECTIVE - II

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	Examination Marks						Total Marks
L	T	P	C	Theory Marks		Practical Marks				
				ESE (E)	PA (M)	ESE (V)		PA (I)		
						ESE	OEP	PA	RP	
3	2#	2	5	70	30	20	10	10	10	150

Content:

Sr. No.	Content	Total Hrs	% Weightage
1	Concept and scope of industrial automation – automation strategies - devices, drives and control circuits in automation - Semi-automats, automats and transfer lines.	**05**	**14**
2	Mechanical, electrical, hydraulic, pneumatic, electronic & hybrid automation system. Comparative evaluation of automation system.	**05**	**14**
3	Concepts, features, fundamentals, advantages and classification of NC systems - input media - Design consideration of NC machine tools - machining centre – MCU functions.	**08**	**22**
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**	**22**
5	Graphical Numerical Control - part programming - design of post processor.	**06**	**16**
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	**04**	**12**

Reference Books:

1. Scrope Kalpakjian,, "Manufacturing processes for Engineering Materials", Addision 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 Outcome:

After learning the course the students should be able to:

1. Acquire the knowledge and practice regarding Production Automation and their control system.
2. To produce optimized product Quality.
3. Can be able to design / program automated system for the machine.

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

Open Ended Problems:

Major Equipments:

1. CNC Lathe Machine
2. CNC Milling Machine

Review Presentation (RP): The concerned faculty member shall provide the list of peer reviewed Journals and Tier-I and Tier-II Conferences relating to the subject (or relating to the area of thesis for seminar) to the students in the beginning of the semester. The same list will be uploaded on GTU website during the first two weeks of the start of the semester. Every student or a group of students shall critically study 2 papers, integrate the details and make presentation in the last two weeks of the semester. The GTU marks entry portal will allow entry of marks only after uploading of the best 3 presentations. A unique id number will be generated only after uploading the presentations. Thereafter the entry of marks will be allowed. The best 3 presentations of each college will be uploaded on GTU website.