

GUJARAT TECHNOLOGICAL UNIVERSITY

MECHATRONICS (47)

AUTOMATION AND COMPUTER INTEGRATED MANUFACTURING

SUBJECT CODE: 2744701

ME 4TH SEMESTER

Type of course: Engineering

Prerequisite: NA

Rationale: This course offers a broad understanding of automation in any manufacturing industry and projects the need of cost and time reduction for quality improvement. Also the concept of low cost production is also covered in this syllabus.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks						Total Marks
L	T	P		Theory Marks		Practical Marks				
			ESE (E)	PA (M)	ESE (V)		PA (I)			
					ESE	OEP	PA	RP		
3	2#	0	4	70	30	30	0	10	10	50

Content:

Sr. No	Contents	Teaching Hrs	Weightage (%)
1	Introduction Automation; Manufacturing operations and production facilities; production performance, Realizing CIM and future trends in manufacturing	7	17
2	Concurrent Engineering Serial versus concurrent engineering; benefits of concurrent engineering; characterization, difficulties and techniques of concurrent engineering	5	12
3	Manufacturing Planning and Control System Demand management; Material requirement planning; MRP lot sizing problem; capacity planning; shop floor control	5	12
4	Just-in-Time Manufacturing System Pull versus push system; types of Kanban; Alternative JIT systems; Just-in-Time purchasing; barrier and benefits of JIT	4	10
5	Group Technology and Computer Aided Process Planning Importance of Group Technology (GT), various classification and coding system used in GT, machine sequencing, machine grouping, Steps in developing process planning; process planning approaches; variant and generative process planning system	8	19.5
6	Flexible Manufacturing Systems and Automated Material Handling System Types of flexibilities; components of FMS; Layout consideration; FMS benefits, Analysis of automated storage and retrieval (AS/RS) system; automated guided vehicles (AGVs)	8	19.5
7	Assembly Lines Manual and Automated assembly lines; work station consideration; alternative assembly lines	4	10

Reference Books:

1. Systems Approach to Computer Integrated Design and Manufacturing Nanua Singh, John Wiley & Sons, Inc publication
2. Automation, Production System and Computer Integrated Manufacturing M.P. Groover, PHI publication

Course Outcomes:

After learning the course the students should be able to

1. Understand the fundamentals of production technology and shop floor planning used in industries.
2. Analyze the managerial decision taken to control production rate or cost of production for optimizing the problem on hand.
3. Judge the importance of Mechatronics Engineering, a multidisciplinary branch of engineering.
4. Finalize alternate method of manufacturing using the concept of automation.

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.