GUJARAT TECHNOLOGICAL UNIVERSITY

BRANCH NAME: MANUFACTURING ENGINEERING
SUBJECT NAME: FACTORY AUTOMATION
SUBJECT CODE: 2173410
B.E. 7TH SEMESTER

Type of course: Theoretical + Practical (Regular)

Prerequisite: Zeal to learn the Subject

Rationale:

- To make the students understand the concepts & broad principles of automation in Factories/industries.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks						Total Marks
				Theory Marks			Practical Marks			
L	T	P	C	ESE (E)	PA (M)		PA (V)		PA (I)	
					PA	ALA	ESE	OEP		
3	2	0	5	70	20	10	30	0	20	150

L- Lectures; T- Tutorial/Teacher Guided Student Activity; P- Practical; C- Credit; ESE- End Semester Examination; PA- Progressive Assessment; OEP-Open Ended problem; AL-Active learning;

Learning Objectives: To learn about the various automation principles for factory/industrial.

Sr. No.	Content	Total Hrs	% Weightage
1	**Introduction:** Introduction: Automation in Production System, Principles and Strategies of Automation, Basic Elements of an Automated System, Advanced Automation Functions, Levels of Automations. Flow lines & Transfer Mechanisms, Fundamentals of Transfer Lines.	**08**	**20**
2	**Material handling and Identification Technologies:**	**10**	**20**
	Overview of Material Handling Systems, Principles and Design Consideration, Material Transport Systems, Storage Systems, Overview of Automatic Identification Methods.		
3	**Automated Manufacturing Systems:** Components, Classification and Overview of Manufacturing Systems, Manufacturing Cells, GT and Cellular Manufacturing, FMS, FMS and its Planning and Implementation. Quality Control Systems: Traditional and Modern Quality Control Methods, SPC Tools, Inspection Principles and Practices, Inspection Technologies.	**10**	**20**
4	**Control Technologies in Automation:**	**08**	**20**

	Industrial Control Systems, Process Industries versus Discrete-Manufacturing Industries, Continuous Versus Discrete Control, Computer Process and its Forms.		
5	**Computer Based Industrial Control:** Introduction & Automatic Process Control, Building Blocks of Automation Systems: LAN, Analog & Digital I/O Modules, SCADA Systems& RTU. Distributed Control System: Functional Requirements, Configurations & some popular Distributed Control Systems.	**06**	**20**
		42	**100%**

Suggested Specification table with Marks (Theory):

Distribution of Theory Marks					
R Level	**U Level**	**A Level**	**N Level**	**E Level**	**C Level**
10	15	15	10	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. Automation, Production Systems and Computer Integrated Manufacturing: M.P. Groover, Pearson Education.
2. Computer Based Industrial Control- Krishna Kant, EEE-PHI,2nd edition,2010
3. An Introduction to Automated Process Planning Systems- Tiess Chiu Chang &Richard A. Wysk
4. Performance Modeling of Automated Manufacturing Systems,- Viswanandham

List of Tutorials:

1. To study about fundamental of automations.
2. To study about Material handling and Identification Technologies.
3. To study about Automated Manufacturing Systems.
4. To study about Control Technologies in Automation.
5. To study about Computer Based Industrial Control.

Course Outcome:

After the successful completion of this course, the student will be able:

1. To identify potential areas for automation and justify need for automation
2. To select suitable major control components required to automate a process or an activity
3. To translate and simulate a real time activity using modern tools and discuss the benefits of automation.
4. To identify suitable automation hardware for the given application.

Design based Problems (DP)/Open Ended Problem: NA

Major Equipment: NA

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.

List of Open Source Software/learning website:

1. www.nptel.ac.in/

ACTIVE LEARNING ASSIGNMENTS: Preparation of power-point slides, which include videos, animations, pictures, graphics for better understanding theory and practical work – The faculty will allocate chapters/ parts of chapters to groups of students so that the entire syllabus to be covered. The power-point slides should be put up on the web-site of the College/ Institute, along with the names of the students of the group, the name of the faculty, Department and College on the first slide. The best three works should submit to GTU.