

AUTOMATION IN MANUFACTURING

Course Code	19ME4801C	Year	IV	Semester	II
Course Category:	Program Elective	Branch	ME	Course Type	Theory
Credits:	3	L – T – P	3 – 0 – 0	Prerequisites:	Nil
Continuous Evaluation:	30	Semester End Evaluation:	70	Total Marks:	100

Course Outcomes

Upon successful completion of the course, the student will be able to

CO1	Describe the basic concepts of automation and automated flow lines	L2
CO2	Analyze automated flow lines and line balancing methods.	L2
CO3	Explain the importance of material handling, automated inspection systems in automated assembly.	L2

Course Articulation Matrix:

Contribution of Course Outcomes towards achievement of Program Outcomes														
Strength of correlations (3: High, 2: Moderate, 1: Low)														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3											1	3	1
CO2	3	3	2			2				2		1	3	1
CO3	3	2	2									1	3	1

Course Content		Mapped CO s
UNIT-1	INTRODUCTION TO AUTOMATION: Automation in Production Systems-Types of Automation, Automation Principles and Strategies, Basic elements of an automated system, Advanced automation Functions - Safety Monitoring, Maintenance and Repair Diagnostics, Error Detection and Recovery, Levels of automations-Five levels of automation and control in manufacturing. AUTOMATED FLOW LINES: Methods of work part transport, Work part Transfer Mechanisms, Storage Buffer	CO1
UNIT-2	ANALYSIS OF AUTOMATED FLOW LINES: General terminology, analysis of transfer lines with and without buffer storage, partial automation, implementation of automated flow lines. LINE BALANCING: Line Balancing Algorithms-Largest Candidate Rule, Kilbridge and Wester Method, Ranked Positional Weights Method, <i>ways for improving line balance.</i>	CO2
UNIT-3	AUTOMATED ASSEMBLY SYSTEMS: Types and configurations, Parts delivery at workstations, Applications, Calculation of feed rates, cycle time for single station assembly system, Partial Automation Product design for automated assembly.	CO3

UNIT-4	AUTOMATED GUIDED VEHICLE SYSTEMS: Types of Vehicles, AGVS Applications, Vehicle guidance technologies, Vehicle Management, Vehicle Safety, Rail guided vehicles, Conveyor systems AUTOMATED STORAGE SYSTEMS: Fixed-Aisle Automated Storage/Retrieval Systems, Types, AS/RS Applications, <i>Carousel Storage Systems, Carousel Applications.</i>	CO3
UNIT-5	AUTOMATED INSPECTION SYSTEMS: Overview of Automated Identification Methods, Bar Code Technology, Radio Frequency Identification, Other AIDC Technologies-Magnetic Stripes, Optical Character Recognition, and Machine Vision	CO3

Learning Resources	
Text Books:	<ol style="list-style-type: none"> 1. Mikell P.Groover, "Automation, Production Systems and Computer Integrated Manufacturing" 4th Edition, <i>Pearson Education</i>, 2003. 2. Assembly Automation and Product Design, by Geoffrey Boothroyd, 2nd Edition, Taylor and Francis
Reference Books:	<ol style="list-style-type: none"> 1. Morris, S.Brian (1994), "Automated Manufacturing Systems", (McGraw Hill) ISBN: 0-07-113999-0. 2. Automation by W. Buekinsham.
E-Resources & other digital Material:	https://nptel.ac.in/courses/112/104/112104288/