AUTOMATION IN MANUFACTURING

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

Course Outcomes		**Level**
After 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

Contribution of Course Outcomes towards achievement of Program Outcomes & Strength of correlations (3-High, 2: Medium, 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

Syllabus

Unit No.	**Contents**	**Mapped COs**
I	**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
II	**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, ways for improving line balance.	CO2
III	**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

IV	**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, Carousel Storage Systems, Carousel Applications.	CO3
V	**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 Recourse(s)

Text Book(s)

1. Mikell P.Groover, "Automation, Production Systems and Computer Integrated Manufacturing*"* 4th Edition, *Pearson Education*, 2003.
2. Assembly Automation and Product Design, by Geoffrey Boothroyd, 2nd Edition, Taylor and Francis

Reference Book(s)

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

1. https://nptel.ac.in/courses/112/104/112104288/