4/4 B.Tech. EIGHTH SEMESTER

ME8T2B AUTOMATION IN MANUFACTURING Credits: 4

Lecture:- 4 periods/week **Internal assessment: 30marks**
Tutorial: -- **Semester end examination: 70 marks**

Objectives:

1. Describe the basic concepts of automation in manufacturing systems.
2. Acquire the fundamental concepts of automated flow lines and their analysis.
3. Classify automated material handling, automated storage and retrieval systems.
4. Illustrate adaptive control systems and automated inspection methods.
5. Extrapolate the concepts of Business Process Re-Engineering (BPE), Concurrent Engineering (CE) and techniques of Rapid Prototyping (RP).

Learning Outcomes:

At the end of course the students will be able to:

1. Illustrate the basic concepts of automation in machine tools.
2. Analyze various automated flow lines.
3. Interpret knowledge on assembly system and line balancing methods.
4. Explain the importance of automated material handling and storage systems.
5. Describe adaptive control systems.
6. Discuss the concepts of BPE, CE and techniques of RP.

Pre-Requisites:

CAD/CAM

UNIT – I
INTRODUCTION

Types and strategies of automation, pneumatic and hydraulic components circuits, Automation in machine tools. Mechanical feeding and tool changing and machine tool control transfer the automaton.Manufacturing automation principles and elements in product realization

UNIT – II

AUTOMATED FLOW LINES:

Methods or work part transport transfer Mechanical buffer storage control function,Design and fabrication consideration. Product Life-cycle Management (PLM).; Product Data Management (PDM); Enterprise Resource Management (ERP); others topics such as SCM, CRM; Lean manufacturing principles in contemporary product realization

UNIT – III

ANALYSIS OF AUTOMATED FLOW LINES:

General terminology and analysis of transfer lines without and with buffer storage, partial automation, implementation of automated flow lines.

UNIT – IV

ASSEMBLY SYSTEM AND LINE BALANCING:

Assembly process and systems assembly line, line balancing methods, ways of improving line balance, flexible assembly lines.

UNIT – V

AUTOMATED MATERIAL HANDLING:

Types of equipment, functions, analysis and design of material handling systems conveyor systems, automated guided vehicle systems Material handling systems and analysis of material transport systems; Manual and automated production lines; cellular manufacturing; flexible manufacturing systems; Process Planning; Material Requirements Planning (MRP)

UNIT -VI

AUTOMATED STORAGE SYSTEMS: Automated storage and retrieval systems; work in process storage, interfacing handling and storage with manufacturing.Single-Station Manufacturing Cells, Manual Assembly Lines.

UNIT – VII

ADAPTIVE CONTROL SYSTEMS:

Introduction, adaptive control with optimization, Adaptive control with constraints, Application of A.C. in Machining operations. Use of various parameters such as cutting force, Temperatures, vibration and acoustic emission. Integration of information technology tools and approaches in supporting modern manufacturing enterprise Systems

UNIT – VIII

BUSINESS PROCESS RE-ENGINEERING:

Introduction to BPE logistics, ERP, Software configuration of BPE,concurrent Engineering, Techniques of Rapid Proto typing.Sustainable manufacturing, Eco design, environmentally conscious manufacturing.

Learning resources

Text book:

1. Automation, Production Systems and Computer Integrated Manufacturing, (2nd Edition), by M.P. Groover, Prentice Hall international publisher.
2. Computer control of Manufacturing Systems, by Yoram Coreom, New Age International Publishers, 2006.

References books:

1. CAD/CAM / CIM, (2nd Edition), by Radhakrishnan and Subramanian, New Age Publications,
2. Automation, (3rd edition), by W. Buekinsham , PHI Publications, 2004.

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