RO8603 AUTOMATION SYSTEM DESIGN

DETAILED SYLLABUS

UNIT I FUNDAMENTAL CONCEPTS OF INDUSTRIAL AUTOMATION

Fundamental concepts in manufacturing and automation, definition of automation, reasons for automating. Types of production and types of automation, automation strategies, levels of automation.

UNIT II TRANSFER LINES AND AUTOMATED ASSEMBLY

General terminology and analysis, analysis of transfer lines without storage, partial automation. Automated flow lines with storage buffers. Automated assembly-design for automated assembly, types of automated assembly systems, part feeding devices, analysis of multi-station assembly machines. AS/RS, RFID system, AGVs, modular fixturing. Flow line balancing.

UNIT III DESIGN OF MECHATRONIC SYSTEMS

Stages in design, traditional and mechatronic design, possible design solutions. Case studies-pick and place robot, engine management system.

UNIT IV PROGRAMMABLE AUTOMATION

Special design features of CNC systems and features for lathes and machining centers. Drive system for CNC machine tools. Introduction to CIM; condition monitoring of manufacturing systems.:

UNIT V DESIGN FOR HIGH SPEED AUTOMATIC ASSEMBLY

Introduction, Design of parts for high speed feeding and orienting, high speed automatic insertion. Analysis of an assembly. General rules for product design for automation.

TEXT BOOKS:

1. Mikell P Groover, “Automation Production Systems and Computer- Integrated Manufacturing” Pearson Education, New Delhi, 2001.

2. Bolton W, “Mechatronics“, Pearson Education, 1999.

REFERENCES:

1. Mikell P Groover, "Industrial Robots – Technology Programmes and Applications" , McGraw Hill , New York, USA. 2000.

2. Steve F Krar, "Computer Numerical Control Simplified", Industrial Press, 2001.

3. Joffrey Boothroyd, Peter Dewhurst and Winston A. Knight, "Product Design for manufacture and Assembly", CRC Press, 2011

OBJECTIVES:

- To know about the basic concepts in industrial automation
- To design automated systems.
- To know about transfer lines and automated assembly
- Be exposed to pneumatic, electric, hydraulic and electronic systems in automation of mechanical operations.
- To know about the advancement in hydraulics and pneumatics