FLEXIBLE MANUFACTURING SYSTEM
(Professional Elective -III)

II Semester

Course Code: 19ME2159

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Course Outcomes: At the end of the course, the student will be able to
CO1: Determine the concepts of PPC and GT to the development of FMS.
CO2: Discuss the planning and scheduling methods used in manufacturing systems.
CO3: Associate various workstations, system support equipments.
CO4: Interpret hardware and software components of FMS.
CO5: Summarize the concepts of modern manufacturing such as JIT, supply chain management and lean manufacturing.

UNIT-I **(10-Lectures)**

Types of production, production planning and control, manufacturing in a competitive environment, concept, automation of manufacturing process, numerical control, adaptive control, material handling and movement, industrial robots, flexible fixturing, design for assembly, disassembly and service. types of FMS, types of FMS layouts, advantages and disadvantages of FMS.
Group technology – composite part families - classification and coding - production flow analysis.
Learning outcomes:

1. Differentiate between different types of production in competitive manufacturing environment. (L2)
2. Classify the Flexible manufacturing systems. (L4)
3. classify and code the production flow analysis. (L4)

UNIT-II **(10-Lectures)**

Planning issues: components of FMS, types of flexibility, tradeoffs, computer control and functions, planning, scheduling and control of FMS, scheduling and knowledge-based scheduling.
Hierarchy of computer control, supervisory computer, introduction to turning center, machining center, cleaning and deburring equipment, coordinate measuring machines: types, working and capabilities.

Learning outcomes:

1. Determine different components of flexible manufacturing systems. (L3)
2. Explain the hierarchy of computer control and its function. (L2)
3. Explain the usage of coordinate measuring machine, and its capabilities. (L2)

UNIT-III **(10-Lectures)**

System support equipment, types, working capability, automated material movement and automated storage and retrieval systems, scheduling of AGVs, cutting tools and tool management, work holding considerations.
Learning outcomes:

1. Discuss the importance of material handling and storage systems in FMS. (L2)
2. Determine the usage of AGVS on industrial floor. (L3)
3. Interpret the importance of tool management. (L2)

UNIT-IV **(10-Lectures)**

FMS computer hardware and software, general structure and requirements, PLCs, FMS installation and implementation, acceptance testing.

Learning outcomes:

1. Explain the different hardware and software used in FMS. (L2)
2. Interpret the general structure and requirements of FMS. (L2)
3. Describe the installation and implementation of FMS. (L1)

UNIT-V **(10-Lectures)**

Characteristics of JIT pull method, small lot sizes, work station loads, flexible work force, line flow strategy. supply chain management Preventive maintenance - Kanban system, value engineering, MRD JIT, lean manufacture, quality concepts and management.

Learning outcomes:

1. Differentiate between the push and pull methods of JIT. (L2)
2. Discuss the strategy of line flow and interpret the importance of supply chain management. (L2)
3. Describe preventive maintenance, value engineering and lean manufacturing in management. (L1)

TEXT BOOKS:

1. Shivanand H.K.,Benal M M, Koti V, *Flexible Manufacturing System*, New Age International(P) Limited, New Delhi,2006.

REFERENCE BOOKS:

1. Mikell P. Groover, *Automation, Production Systems and Computer Integrated Manufacturing*, PHI,2018.
2. Kalpakjin, *Manufacturing Engineering and Technology*, Addison- Wesley Publishing Co.,1995.