Lesson Plan- 8th, ME, Flexible Manufacturing System (Theory)

Course In charge: Dr.Vikas Gupta, Assistant Professor

Course Name & Code: Flexible Maufacturing System (Theory), PEC-ME462-T

Course Category: Professional Core Course **Semester:** 8th, ME

Course Credits: 3.0 **Contact Hours:** 3 hours/week (L: 3; T: 0)

Mode: Lectures **Examination Duration:** 3 hours

Course Assessment Methods (internal: 30; external: 70): Two minor tests each of 20 marks, Class Performance measured through percentage of lectures attended (4 marks) Assignment and quiz (6 marks), and end semester examination of 70 marks.

Course Objectives: Students will be able to recall basic automation, types of automation and transfer Mechanism, able to classify different automated assembly systems, quantitative and operational analysis of assembly machine, able to apply the technology, optimum machine arrangement & benefits of group technology, able to examine robotics, material handling, computer-controlled system with their application & benefits and able to formulate a flexible manufacturing.

Sr. No.	Topic	No. of days	Book
1.	Automation: Types of automation, reasons for automating, automation strategies,	1	T1, T2
2.	Detroit-type automation: Automated flow lines,	1	T1, T2
3.	Methods of work part transport, Transfer mechanisms,	1	T1, T2
4.	Buffer storage, automation for machining operations.	1	T1, T2
5.	Automated assembly systems: Design for automated assembly, types of automated assembly systems, part feeding devices,	1	T1, T2
6.	Quantitative analysis of the delivery system operation, analysis of a single-station assembly machine,	1	T1, T2
7.	Group Technology: Part families, parts classification and coding,	1	T3, R1
8.	Types of classification and coding systems.	4	T3, R1
9.	Machine cell design: The composite part concept, types of cell designs,	4	T3, R1
10.	Determining the best machine arrangement, benefits of group technology.	3	T3, R1
11.	Flexible Manufacturing Systems: Components of an FMS, types of systems, where to apply FMS technology, work stations.	1	T3, R1
12.	Material handling and storage system: Functions of the handling system, FMS layout configurations.	1	T3, R1
13.	Material handling equipment.	1	T3, R1
14.	Computer control system: Computer function, FMS data file, system reports. Planning the FMS, analysis methods for FMS, applications and benefits.	2	T3, R1
15.	Robotic technology: Joints and links,	2	T1, R1
16.	Common robot configurations, work volume,	2	T1, R1
17.	Types of robot control, accuracy and repeatability,	2	T1, R1
18.	Other specifications, end effectors,	2	T1, R1
19.	Sensors in robotics	2	T1, R1
20.	Robot programming: Types of programming	2	T1, R1
21.	Lead through programming, motion Programming, interlocks,	2	T1, R1
22.	Advantages and disadvantages.	1	T1, R1
23.	Robot languages: Motion programming,	2	T1, R1
24.	Simulation and off-line programming,	2	T1, R1
25.	Work cell control	2	T1, R1
26.	Robot applications: Characteristics of robot applications:	2	T1, R1
27.	Robot cell design,	2	T1, R1
28.	Types of robot applications, Material handling, processing operations, assembly and inspection.	1	T1, R1

Text and Reference Books:

T1: Automation, Production Systems and Computer Integrated Manufacturing. Groover M.P, Prentice Hall of India.
T2: CAD/CAM – Groover M.P, Zimmers E.W, Prentice Hall of India..
T3: Approach to Computer Integrated Design and Manufacturing Nanua Singh, John Wiley and Sons, 1998.
R1: Production Management Systems: A CIM Perspective Browne J, Harhen J, Shivnan J, Addison Wesley, 2nd Ed. 1996