SEMESTER S7

FLEXIBLE MANUFACTURING SYSTEMS

Course Code	PEMET757	CIE Marks	40
Teaching Hours/Week (L: T:P: R)	3:0:0:0	ESE Marks	60
Credits	3	Exam Hours	2 Hrs. 30 Min.
Prerequisites (if any)	NONE	Course Type	Theory

Course Objectives:

1. Understand the basic components, layout configurations, and functions of Flexible Manufacturing Systems (FMS).

SYLLABUS

Module No.	Syllabus Description	Contact Hours
1	**Introduction**: Evolution of FMS, Basic Components of FMS, Types of FMS Layouts, -Inline layout, loop layout, loader layout, open field layout, robot configured layout, general FMS considerations, functions of FMS, FMS Justification, Cell/FMS Justification Flow chart.	9
2	Manufacturing cells: Introduction, Classification of manufacturing Cells- FMS Unattended Machining- Features and Requirement, Toyota Production System (TPS), Group technology- Part Classification and Coding, Production Flow Analysis. Machining Center- Types, Axes and Format Information, Automated Features and Capabilities of Machining Center, Cellular Vs Flexible manufacturing.	9
3	Computer aided programme generation & Product Manufacturing, Automated Material Movement and Storage System- Automated Storage and Retrieval Systems (AS/RS), Industrial Robots, Cutting Tools and Tool Management- Tool Preset, Identification and Data Transfer.	9
4	FMS Planning: CAD Considerations FMS planning, CAM Considerations for FMS planning. FMS Software Structure- General Structure and Requirements, Types of FMS Software Modules, FMS installation and	9

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	implementation- System Installation, acceptance testing.	

Course Assessment Method
(CIE: 40 marks, ESE: 60 marks)

Continuous Internal Evaluation Marks (CIE):

Attendance	Assignment	Internal Examination-1 (Written)	Internal Examination- 2 (Written)	Total
5	15	10	10	40

End Semester Examination Marks (ESE)

In Part A, all questions need to be answered and in Part B, each student can choose any one full question out of two questions

Part A	Part B	Total
• 2 Questions from each module. • Total of 8 Questions, each carrying 3 marks **(8x3 =24marks)**	• Each question carries 9 marks. • Two questions will be given from each module, out of which 1 question should be answered. • Each question can have a maximum of 3 sub divisions. **(4x9 = 36 marks)**	**60**

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Course Outcomes (COs)

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

Course Outcome		Bloom's Knowledge Level (KL)
CO1	Understand the basic components, layout configurations, and functions of Flexible Manufacturing Systems (FMS).	**K2**
CO2	Remember the classification of manufacturing cells, features and requirements of unattended machining, and principles of the Toyota Production System (TPS).	**K1**
CO3	Apply the knowledge of CAD and CAM considerations in planning and implementing FMS.	**K3**
CO4	Understand the automated material movement, storage systems, and tool management in FMS operations.	**K2**

Note*: K1- Remember, K2- Understand, K3- Apply, K4- Analyse, K5- Evaluate, K6- Create*

CO-PO Mapping Table:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	2	1	2	1	1	-	-	-	-	2
CO2	3	3	2	2	-	2	1	-	-	-	-	2
CO3	3	3	3	2	3	2	2	1	2	2	2	3
CO4	3	2	2	2	3	2	2	1	2	2	2	3

Text Books				
Sl. No	**Title of the Book**	**Name of the Author/s**	**Name of the Publisher**	**Edition and Year**
1	Flexible Manufacturing System	Shivanand H.K., Benal MM, Koti V	New age international (P) Limited, New Delhi	2006
2	Flexible Manufacturing Cells and System	William W Luggen	Prentice Hall of Inc New Jersey	1991
3	Flexible Manufacturing system	Reza A Maleki	Prentice Hall of Inc New Jersey	1991
4	Flexible Manufacturing	. John E Lenz D. Eppinger	marcel Dekker Inc New York	1989

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Reference Books				
Sl. No	**Title of the Book**	**Name of the Author/s**	**Name of the Publisher**	**Edition and Year**
1	Manufacturing Engineering and Technology	Kalpakjin	Addison Wesley Publishing	1995
2	Automation, Production Systems and Computer Integrated Manufacturing"	Mikell P. Groover	PHI,	2008

Video Links (NPTEL, SWAYAM…)	
Module No.	**Link ID**
1	https://archive.nptel.ac.in/courses/110/106/110106044/
2	https://archive.nptel.ac.in/courses/110/106/110106044/
3	https://archive.nptel.ac.in/courses/110/106/110106044/
4	https://archive.nptel.ac.in/courses/110/106/110106044/