PE453: FLEXIBLE MANUFACTURING SYSTEMS
CREDITS = 4 (L=2, T=0, P=2)

Teaching and Assessment Scheme:

Teaching Scheme			Credits	Marks Distribution				
L	T	P	C	Theory Marks		Practical Marks		Total Marks
				ESE	CE	ESE	CE	150
2	0	2	4	70	30	30	20	

Course Contents:

Sr. No.	Topics	Teaching Hours
1	**FMS Introduction and Description** Limitations of conventional manufacturing, significance of FMS & need for FMS, definition, basic component of FMS, general layout and configuration of FMS, principles & objectives of FMS, positive features of FMS, applications of FMS in industry, various hardware and software required for FMS, Introduction to CIM technology.	04
2	**Manufacturing Cell** Introduction, description and classification of cell, methods of formation of cell, unattended machining, comparison of cellular and flexible manufacturing.	04
3	**Turning and Machining Centres** Introduction, types, construction and operation performed on turning center, automated features and capabilities of turning centres, introduction to horizontal & vertical machining centers, positive features & limitations of vertical and horizontal machining centers, pallet & part loading, programming options in machining centers, automated features and capabilities of machining centers.	04
4	**Cleaning and Deburring Equipment** Introduction to cleaning & deburring, wash station and operation description, deburring station and operation description, importance of cleaning and deburring in automated manufacturing.	03

5	**Coordinate Measuring Machines** Introduction, types, construction and general functions of CMM, operational cycle description, CMM applications, linear, angular & profile measurement by CMM.	06
6	**Automated Material Movement and Storage System** Introduction, types of AGV and their principle of working, positive features & limitations, AGV guided path, robots, benefits of using industrial robots, basic components and benefits of automated storage and retrieval systems, conveyors and pallet flotation system, queuing carrousels and automatic work changers, coolant and chip disposal and recovery system.	04
7	**Cutting Tools and Tool Management** Introduction, control of cutting tools, tool management, tool strategies, tool preset, identification and data transfer, tool monitoring and fault detection.	03
	TOTAL	**28**

Reference Books:

1. H. K. Shivanand, M. M. Benal, V. Koti, *"Flexible Manufacturing System"*, New Age Publication.
2. Groover M.P, *"Automation, Production Systems and Computer Integrated Manufacturing"*, Prentice Hall of India.
3. Groover M.P, Zimmers E.W, "*CAD/CAM",* Prentice Hall of India.
4. Nanua Singh, *"Approach to Computer Integrated Design and Manufacturing",* John Wiley and Sons, 1998.
5. Vajpayee, *"Principles of CIM*", Prentice Hall of India.
6. Luggen W. W., *"Flexible Manufacturing Cells and Systems*", Prentice Hall.