

# GANPAT UNIVERSITY

## FACULTY OF ENGINEERING & TECHNOLOGY

Programme	Bachelor of Technology	Branch/Spec.	Automobile Engineering						
Semester	VII	Version	1.0.0.0						
Effective from Academic Year		2020-21	Effective for the batch Admitted in						
			July 2017						
Subject code	<b>2AE704PE3</b>	Subject Name	<b>Computer Integrated Manufacturing</b>						
Teaching scheme			Examination scheme (Marks)						
(Per week)	Lecture(DT)		Practical(Lab.)		Total		CE	SEE	Total
	L	TU	P	TW					
Credit	3	0	1	0	4	Theory	40	60	100
Hours	3	0	2	0	5	Practical	30	20	50

### Pre-requisites:

A student has to understand following subjects before learning these subjects:

1. Basic knowledge of part modelling.
2. Basic knowledge of Lathe and Milling machine operations and tools.
3. Basic knowledge of operation management

### Objectives of the Course:

1. Recognize the Importance of CIM in Today Technology And Its Impact On Market Competition.
2. Automate Tasks For Preparing Most Appropriate Manufacturing And Assembly Processes And Their Sequences.
3. Understand Robot Programming.
4. Analyze The Engineering And Economical Aspects Of Automatic Storage And Retrieval System

### Theory syllabus

Unit	Content	Hrs.
1	<b>Introduction to CIM &amp; Its Components:</b> CIM Concept, Objective of CIM Implementation, CIM Construction. Architecture, layout and component standards, systems, LAN, workstations, software, integration, decision support system, Brief review of Different types of drives in automation like servo, stepper & DC drive	4
2	<b>NC/CNC Machines, Controls &amp; Peripherals:</b> Introduction, components, NC procedure, coordinates and motion control. Brief introduction to latest CNC controllers and leading brands of machine tools, Turn-Mill centers, Twin spindle and Multi-spindle machines, Gantry loaders, Conveyor and transfer lines, Five axis machining and HEXAPOD. Introduction to CNC, DNC, VNC and adaptive control. Automatic tool changer (ATC), Auto work changer (APC), automated jigs & fixtures, coolant system, chip conveyor system, Auto part loading devices. In process measuring system, touch probes and Non-contact type measurements.	7
3	<b>Basic Part Programming:</b> Axes movements and interpolation with other axis. Application of rotary axis. Manual programming-offline. Programming formats, Tool offsets Type of compensations and cutting Parameters. G-codes and M-codes Introduction .to Computer Assisted part programming.	8
4	<b>Group Technology &amp; Flexible Manufacturing:</b> Introduction, engineering parts with design and manufacturing attributes composite part, methods and algorithms for grouping, role of group technology in automation. Introduction flexibility, measures of flexibility, flexible machines, cells and systems.	6
5	<b>Material Handling and Storage:</b> Types, characteristics, Automated Guided vehicle systems (AGVS), guidance, routing and control, Automated Storage/Retrieval Systems (AS/RS), Components, controls and applications; Integration of automated material handling and storage systems to manufacturing environment.	7
6	<b>CIM Management, Customer-Supplier Communication &amp; MIS:</b> Need for CAPP, types, benefits, Management of CIM resources, introduction to SAP ERP package, Electronic trading, voice text data, purchasing strategies. MIS for manufacturing systems, Intelligent manufacturing, CIM Future	6
7	<b>Automation:</b> Different types of production systems and automation, hard/ fixed automation including process	7

	automation, Transfer machines, Special purpose machine and Walking beam, Flexible Automation and Programmable Automation, Production and automation economics etc.	
<b>Practical content</b>		
Practical assignments and tutorials are based on above syllabus.		
<b>Text Books</b>		
1	S.S. Rao, "Engineering Optimization", New age international publication, 3rd edition.	
2	T. J. Ross, "Fuzzy logic with Engineering Application", McGraw-Hill.	
<b>Reference Books</b>		
1	J. Arora, "Introduction to Optimum Design"	
2	P. Y. Papalambros and D. J. Wilde, "Principles of Optimal Design"	
3	Rich and Knight, "Artificial Intelligence", McGraw-Hill.	
4	Dukipatti, "Matlab programming"	
5	B. Yeganarayana, "Artificial Neural Network", PHI	
<b>ICT/ MOOCs references</b>		
1	NIL	
<b>Course Outcomes:</b>		
<p>After completion of this course, student will be able to</p> <ol style="list-style-type: none"> <li>1. Describe basic concepts of CIM application and benefits.</li> <li>2. Understand the basic principles of part programming for CNC machining.</li> <li>3. Understand the CAM software for part programming and interface with CNC machine.</li> <li>4. Create and optimize a part program using programming concepts for practical applications.</li> <li>5. Appreciate the role of computers in managing shop floor.</li> <li>6. Understand the components and application of FMS and Robots.</li> </ol>		