

CAD-CIM

VI Semester: AE (GROUP - IV)								
Course Code	Category	Hours / Week			Credits	Maximum Marks		
AAE521	Elective	L	T	P	C	CIA	SEE	Total
		3	-	-	3	30	70	100
Contact Classes: 45		Tutorial Classes: Nil		Practical Classes: Nil			Total Classes: 45	
<p>OBJECTIVES:</p> <p>The course should enable the students to:</p> <ol style="list-style-type: none"> I. Understand the basics of computer aided designing, computer aided manufacturing and computer integrated manufacturing. II. To study about group technology, computer aided process planning, material requirement planning (MRP) Enterprise resource planning (ERP). III. Gain knowledge about shop floor control and Flexible manufacturing systems (F.M.S). IV. Emphasizes the integration of manufacturing enterprise using computer integrated manufacturing (CIM) technologies. <p>COURSE OUTCOMES (COs):</p> <p>CO 1: Understand the basic foundation in computer aided design / manufacturing.</p> <p>CO 2: Understand the fundamentals used to create and manipulate geometric models.</p> <p>CO 3: Learn the working principles of machines, coding system and part programming.</p> <p>CO 4: Understand concept of FMS and CAPP.</p> <p>CO 5: Understand the concept of Computer integrated manufacturing.</p> <p>COURSE LEARNING OUTCOMES (CLOs):</p> <ol style="list-style-type: none"> 1. Describe basic structure of CAD workstation, Memory types, input/output devices and display devices and computer graphics. 2. Demonstrate the ability to create concepts design solutions through CAD tools that can be manufactured using CNC machinery. 3. Understand the Computers in industrial manufacturing, product cycle, CAD / CAM Hardware. 4. Generate and interpret engineering technical drawings of parts and assemblies according to engineering design standards. 5. Understand of the principles of CAD/CIM, including engineering drawing, geometric and surface modeling, and feature-based design. 6. Create accurate and precise geometry of complex engineering systems and use the geometric models in different engineering applications. 7. Compare the different types of modeling techniques and explain the central role solid models play in the successful completion of CAD/CIM-based product development. 8. Explain Synthetic curves and the concept of NURBS 9. Explain the basic concepts of G. T in CAD/CAM integration. 10. Classify the DCLASS and MCLASS and OPTIZ coding systems. 11. Explain the approaches to computer aided process planning. 12. Compare and contrast CAPP and CMPP systems. 13. Understand grouping of similar parts through group technology and developing automated process 								

<p>plans through computer aided process planning.</p> <p>14. Illustrate group technology, computer aided quality control.</p> <p>15. Understand different elements of robotic systems. Also understand the different components and design of FMS.</p> <p>16. Apply the contact and non-contact types inspection with computer aided testing with integration of computer aided quality with CAD/CIM.</p> <p>17. Understand automated material handling systems and integration of material handling and storage</p> <p>18. Analyze various automated flow lines and line balancing problem.</p> <p>19. Design automated material handling and storage systems for a typical production system</p> <p>20. Apply the concepts/components of computer integrated manufacturing and integrate them.</p> <p>21. Understand data management and its important for decision making in computer integrated manufacturing system.</p>		
UNIT-I	INTRODUCTION	Classes: 08
<p>Computers in industrial manufacturing , product cycle, CAD/CAM hardware, basic structure, CPU, memory types, input devices, display devices, hard copy devices, and storage devices, computer graphics, raster scan graphics coordinate system, database structure for graphics modeling, transformation of geometry, three dimensional transformations, mathematics of projections, clipping, hidden surface removal.</p>		
UNIT-II	GEOMETRICAL MODELLING	Classes: 10
<p>Requirements, geometric models, geometric construction models, curve representation methods, surface representation methods, modeling facilities desired, drafting and modeling systems, basic geometric commands, layers, display control commands, editing, dimensioning and solid modeling.</p>		
UNIT-III	GROUP TECHNOLOGY COMPUTER AIDED PROCESS PLANNING	Classes: 10
<p>History of group technology, role of G.T in CAD/CAM integration, part families, classification and coding, DCLASS and MCLASS and OPTIZ coding systems, facility design using G.T, benefits of G.T, cellular manufacturing.</p> <p>Process planning, role of process planning in CAD/CAM integration, approaches to computer aided process planning, variant approach and generative approaches, CAPP and CMPP systems.</p>		
UNIT-IV	COMPUTER AIDED PLANNING AND CONTROL, SHOP FLOOR CONTROL AND INTRODUCTION TO FMS	Classes: 09
<p>Production planning and control, cost planning and control, inventory management, material requirements planning (ERP), control, phases, factory data collection system, automatic identification methods, bar code technology, automated data collection system; FMS, components of FMS, types, FMS workstation, material handling and storage system, FMS layout, computer control systems, applications and benefits.</p>		
UNIT-V	COMPUTER AIDED PLANNING AND CONTROL AND COMPUTER MONITORING	Classes: 08
<p>Production planning and control, cost planning and control, inventory management, material requirements planning (MRP), shop floor control, lean and agile manufacturing, types of production monitoring systems, structure model of manufacturing, process control and strategies, direct digital control.</p>		
Text Books:		
<ol style="list-style-type: none"> 1. A. Zimmers, P. Groover, —CAD/ CAMI, Prentice- Hall India, 2008. 2. Zeid, Ibrahim, —CAD / CAM Theory and Practicel, Tata McGraw-Hill, 1997. 3. Mikell. P.Groover —Automation, Production Systems and Computer Integrated ManufacturingI, 		

Pearson Education 2001.

4. Ranky, Paul G., —Computer Integrated Manufacturing, Prentice hall of India Pvt. Ltd.,2005
5. Yorem Koren, —Computer Integrated Manufacturing, McGraw Hill, 2005.

Reference Books:

1. P. Groover, Automation, —Production Systems & Computer Integrated Manufacturing, Pearson Education.2nd Edition 1989.
2. Lalit Narayan, —Computer Aided Design and Manufacturing, Prentice-Hall India.3rd Edition 2002.
3. Radhakrishnan, Subramanian, —CAD / CAM / CIM, New Age.4th Edition 2016.
4. Jami J Shah, Martti Mantyla, —Parametric and Feature-Based CAD/CAM: Concepts, Techniques, and Applications, John Wiley & Sons Inc, 1995.
5. Alavala, —CAD/ CAM: Concepts and Applications, PHI Publications, 4th Edition, 2016.
6. W. S. Seames,- Computer Numerical Control Concepts and Programming, 4th Edition 1999.

Web References:

1. https://en.wikipedia.org/wiki/CAD/CAM_dentistry
2. https://en.wikipedia.org/wiki/Computer-aided_manufacturing
3. https://en.wikipedia.org/wiki/Computer-integrated_manufacturing

E-Text Books:

1. <https://books.google.co.in/books?id=8W0E9eK2raMC>
2. <https://books.google.co.in/books?id=mzm9WuuI4mQC>
3. <https://books.google.co.in/books?id=F5d6CwAAQBAJ>