COURSE CONTENT

CAE/CAM								
V Semester: AE								
Course Code	**Category**	**Hours / Week**			**Credits**	**Maximum Marks**		
AAED20	Elective	**L**	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
		3	-	-	3	40	60	100
Contact Classes: 48	**Tutorial Classes: Nil**	**Practical Classes: Nil**			**Total Classes: 48**			
Prerequisite: Aerospace Materials and Production Technology								

I. COURSE OVERVIEW:

This course on Computer Aided Engineering (CAE) and Computer Aided Manufacturing (CAM) is designed to provide you with a comprehensive understanding of the principles, methodologies, and applications of CAE and CAM in the field of engineering and manufacturing. The learner will have gained the skills and knowledge necessary to apply CAE and CAM techniques in solving engineering and manufacturing challenges, making you well-prepared for a successful career in this dynamic and evolving field.

II. COURSES OBJECTIVES:

The students will try to learn

I. The basics of computer aided designing, computer aided manufacturing and computer integrated manufacturing.
II. The group technology, computer aided process planning, Material Requirement Planning (MRP) Enterprise Resource Planning (ERP).
III. The knowledge about shop floor control and Flexible Manufacturing Systems (F.M.S).
IV. The integration of manufacturing enterprise using Computer Integrated Manufacturing (CIM) technologies.

III. COURSE OUTCOMES:

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

CO 1 Generalize the basic structure of CAD and graphical modeling for transformation of geometry in CAD.
CO 2 Organize various geometry models, methods and commands for generating solid models in CAD.
CO 3 Discover the use of group technology in computer aided process planning for design a new facility for manufacturing.
CO 4 Relate the role of process planning in CAD/CAM for an effective process integration while manufacturing.
CO 5 Formulate the use of computer aided planning and control of shop floor by the use of flexible manufacturing system.
CO 6 Plan the use of computer monitoring to control various aspects related to an efficient manufacturing system.

IV. COURSE CONTENT:

MODULE-I: INTRODUCTION (08)

Computers in industrial manufacturing, product cycle, CAD/CAM hardware, basic structure, CPU, memory types, input devices, display devices, hardcopy devices, and storage devices, computer graphics, raster's can graphics coordinate system, database structure for graphics modeling, transformation of geometry, three dimensional transformations, mathematics of projections, clipping, hidden surface removal.

MODULE-II: GEOMETRIC MODELLING (10)

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.

MODULE-III: GROUP TECHNOLGY COMPUTER AIDED PROCESS PLANNING (10)

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.

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.

MODULE-IV: COMPUTER AIDED PLANNING AND CONTROL, SHOP FLOOR CONTROL AND INTRODUCTION TO FMS (09)

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.

MODULE-V: COMPUTER AIDED PLANNING AND CONTROL AND COMPUTER MONITORING (08)

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.

V. TEXT BOOKS:

1. Zimmers, P. Groover, "CAD/CAM", Prentice-Hall India, 3rd Edition, 2008.
2. Zeid, Ibrahim, "CAD/CAM Theory and Practice", Tata McGraw-Hill, 4th Edition, 1997.
3. Mikell. P.Groover "Automation, Production Systems and Computer Integrated Manufacturing, 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.

VI. 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. Alavala, "CAD/CAM: Concepts and Applications", PHI Publications, 4th Edition, 2016.

VII. ELECTRONICS RESOURCES:

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

VIII. MATERIALS ONLINE

1. Course template
2. Tutorial question bank
3. Tech talk topics
4. Open end experiments
5. Definitions and terminology
6. Assignments
7. Model question paper – I
8. Model question paper - II
9. Lecture notes
10. E-learning readiness videos (ELRV)
11. Power point presentation