## III B. TECH - I SEMESTER
## CAD/CAM

**Course Code: ME5T6**                                                  **Credits: 3**
**Lecture: 3 periods/week**                    **Internal assessment: 30 marks**
**Tutorial: 1 period/week**              **Semester end examination: 70 marks**
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### COURSE OBJECTIVES:

The objective of the course is to enable students to

- Provide basic foundation in computer aided design / manufacturing
- Understand the fundamentals used to create and manipulate geometric models
- Get acquainted with the basic  CAD software designed for geometric modeling
- Learn working principles of NC machines CNC control and part programming
- Understand  concept of  Group Technology, FMS and CIM

### COURSE OUTCOMES:
Upon completion of this course the student will be able to:
1. Describe basic structure of CAD workstation, Memory types, input/output devices and display devices and computer graphics
2. Acquire the knowledge of geometric modeling and Execute  the steps  required in CAD software for developing 2D and 3D models and perform transformations
3. Explain fundamental and advanced features of CNC machines
4. Illustrate Group Technology, CAQC and CIM concepts

**Pre Requisites:** Metal Cutting and Machine Tools

### UNIT I
**INTRODUCTION:** Computers in Industrial Manufacturing, Product cycle, CAD / CAM Hardware, Basic structure, CPU, Memory types, input devices, display devices, hard copy devices, storage devices.
**COMPUTER GRAPHICS:**
Raster scan graphics coordinate system, database structure for graphics modeling, transformation of geometry, 3D transformations, mathematics of projections, clipping, hidden surface removal.

### UNIT II
**GEOMETRIC MODELING:**
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, solid modeling.

**UNIT III**
**NUMERICAL CONTROL:**
NC, NC modes, NC elements, NC machine tools, structure of CNC machine tools, features of Machining center, turning center, CNC Part Programming: fundamentals, manual part programming methods, Computer Aided Part Programming.

**UNIT IV**
**GROUP TECHNOLOGY:**
Part family, coding and classification, production flow analysis, advantages and limitations, Computer Aided Processes Planning, Retrieval type and Generative type.

**COMPUTER AIDED QUALITY CONTROL:**
Terminology in quality control, the computer in QC, contact inspection methods, noncontact inspection methods-optical, noncontact inspection methods-non-optical, computer aided testing, integration of C AQC with CAD/CAM.

**UNIT V**
**COMPUTER INTEGRATED MANUFACTURING SYSTEMS:**
Types of Manufacturing systems, Machine tools and related equipment, material handling systems, computer control systems, human labor in the manufacturing systems, CIMS benefits.

## Learning Resources

**TEXT BOOKS:**
1. CAD / CAM A Zimmers & P.Groover/PE/PHI
2. CAD / CAM Theory and Practice / Ibrahim Zeid / TMH
3. CAD/CAM by P.N. Rao/TMH.

**References books:**
1. Automation, Production systems & Computer integrated Manufacturing/ Groover /P.E
2. CAD / CAM / CIM / Radhakrishnan and Subramanian / New Age
3. Principles of Computer Aided Design and Manufacturing / Farid Amirouche / Pearson
4. CAD/CAM: Concepts and Applications/Alavala/ PHI
5. Computer Numerical Control Concepts and programming / Warren S Seames / Thomson.