



INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

Dundigal - 500 043, Hyderabad, Telangana

COURSE CONTENT

CAD / CAM								
VII Semester: ME								
Course Code	Category	Hours / Week			Credits	Maximum Marks		
		L	T	P		C	CIA	SEE
AMEC38	CORE	3	1	0	4	30	70	100
Contact Classes: 45		Tutorial Classes: 15		Practical Classes: Nil		Total Classes: 60		
Prerequisite: Design and Manufacturing								
I. COURSE OVERVIEW:								
<p>Computer aided Design/ Computer aided Manufacturing (CAD/CAM) is a course primary important to mechanical engineering students. The aim is to impart the overview of computer applications or design and manufacturing the discrete engine components, assemblies and final product to meet the global competition. The course covers the life cycle of a product describes the product model generation, analysis structural, thermal, dynamic behaviors. This course also deals with creation of synthetic curves and surfaces. It imposes the knowledge o latest manufacturing techniques using CNC/DNC Machines centers with different CNC programming methods, Manufacturing processes, Group Technologies. It makes the student to understand the modern inspection methods and concepts of CIM.</p>								
II. COURSE OBJECTIVES:								
The students will try to learn:								
I. The product designs, manufacturing processes, and production plant as critical base for the interface and integration of CAD/CAM.								
II. The assimilation of all product life cycle systems using computer controlled networks, integrated systems software and secondary information technologies.								
III. Implementation of computer aided design techniques, digital in seamless way in the manufacturing automation for product life management systems.								
IV. Identify the quality parameters by adopting the contact and non-contact type of inspection techniques.								
III. COURSE SYLLABUS:								
MODULE-I: Introduction to CAD and Computer Graphics (10)								
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.								
MODULE –II: Geometrical Modelling and Drafting Systems (08)								
Requirements, geometric models, geometric construction models, curve representation methods, surface representation methods, solid modeling, modeling facilities desired, Basic geometric commands, layers, display control commands, editing, dimensioning.								
MODULE –III: Introduction to Computer Aided Manufacturing (10)								
Introduction: Need of NC technology, Fundamental concepts in numeric control: structure and functions of NC System, advantages of NC technology over conventional manufacturing. NC Machine Tools: Types, Definition and designation of control axes, Special constructional and design characteristics of NC machine tools, Standard tooling used for NC turning and milling centres.								
Computer Numerical Control of Machine Tools: Types and functions of computer numeric control (CNC), Types and functions of direct numeric control (DNC), Need of adaptive control types, functions and types of adaptive control, its uses & benefits, Advantages of combined CNC/DNC systems								

MODULE –IV: NC Part Programming (08)

Work holding and tool setting procedure for NC turning and milling centres, Tool zero presetting, Block formats and introduction to ISO based G & M codes for NC part programming, Concepts of tool length and radius compensation, Standard canned cycles used in CNC turning and milling centres, Introduction to automatic NC part program generation from CAD models using standard CAD/CAM software for machining of surfaces, moulds and dies etc.

MODULE –V: Computer Aided Engineering (09)

Group technology: Part family, coding and classification, production flow analysis, advantages and limitations, computer Aided Processes Planning, Retrieval type and generative type, terminology in quality control, the computer in QC, contact inspection methods, non-contact inspection methods, optical, computer aided testing, integration of CAQC with CAD/CAM. Types of manufacturing systems, machine tools and related equipment, material handling systems, computer control systems, human labor in the manufacturing systems, CIMS benefits.

V. TEXT BOOKS

1. Ibrahim Zeid, “Mastering CAD/CAM”, McGraw-Hill, 1st Edition, 2007.
2. William M Neumann and Robert F. Sproull, “Principles of Computer Graphics”, McGraw-Hill Book Co. Singapore, 1st Edition, 1989.
3. Groover M. P, Zimmers. E. W., “CAD/CAM: Computer Aided Design Manufacturing”, Pearson Education India, 1st Edition, 2006.

VI. REFERENCE BOOKS:

1. Yoram Koren, “Computer Control of Manufacturing Systems”, McGraw-Hill, 1st Edition, 1983.
2. K. Lalit Narayan, K. Mallikarjuna Rao and M.M.M. Sarcar, “Computer Aided Design Manufacturing”, PHI, 1st Edition, 2008.

VII. WEB REFERENCES:

1. <https://nptel.ac.in/courses/112/102/112102101/>
2. <https://nptel.ac.in/courses/112/102/112102103/>