



INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

Dundigal - 500 043, Hyderabad, Telangana

COURSE CONTENT

ADVANCED CAD								
I SEMESTER: CAD/CAM								
Course Code	Category	Hours /Week			Credits	Maximum Marks		
BCCD01	Core	L	T	P	C	CIA	SEE	Total
		3	0	0	3	40	60	100
Contact Classes: 48	Tutorial Classes: Nil	Practical Classes: Nil			Total Classes:48			
Pre requisites: CAD/CAM								

I. COURSE OVERVIEW:

The aim of this course is to impart the overview of advanced computer applications or design and manufacturing. The course covers the basics of geometric modeling, surface modeling and solid modeling. This course also deals with creation of synthetic curves and surfaces. It imposes the knowledge of 2D and 3D transformation, data exchange formats and dimensioning and tolerances.

II. COURSE OBJETIVES:

The students will try to learn:

- I. The basics, functional areas of CAD and efficient use of CAD software
- II. The requirement and parametric representation of Geometric modelling and synthetic curves.
- III. The classification of surface entities and surface representation methods.
- IV. The 2D and 3D transformations, different types of projections and data exchange formats of files.

III. COURSE OUTCOMES:

After successful completion of the course, students should be able to:

- CO1 Relate uses and Importance of CAD software in Industries for product design and development
- CO2 Apply Geometric modelling representations for various curves to synthetic design method.
- CO3 Develop the knowledge of surface modelling and parametric representation of analytic surfaces for creating part models
- CO4 Develop the parametric representation of solids for different transformations.
- CO5 Explain about the data exchange standards used to translate the data between CAD and other Computer aided technologies.

IV. COURSE CONTENT:

MODULE - I: Cad Tools, Basics of Geometric Modelling (09)

CAD Tools: Definition of CAD Tools, Graphics standards, Graphics software: requirements of graphics software, Functional areas of CAD, Efficient use of CAD software. Basics of Geometric Modelling: Requirement of geometric 3D Modeling, Geometric models, Geometric construction methods, Modelling facilities desired.

MODULE -II: Geometric Modelling (10)

Geometric Modeling: Classification of wireframe entities, Curve representation methods, Parametric representation of analytic curves: line, circle, arc, conics, Parametric representation of synthetic curves: Hermite cubic curve, Bezier curve, B-Spline curve wire, NURBS, Curve manipulations.

MODULE -III: Surface Modelling (09)

Surface Modeling: Classification of surface entities, Surface representation methods, Parametric representation of analytic surfaces: plane surface, ruled surface, surface of revolution, tabulated cylinder.

Parametric representation of synthetic curves: Hermite cubic surface, Bezier surface, B-Spline surface, Blending surface, Surface manipulations.

MODULE -IV: Solid Modelling (10)

Parametric representation of synthetic surfaces: Hermite Bicubic surface, Bezier surface, Bezier Spline surface,

COONs surface, blending surface Sculptured surface, Surface manipulation; Displaying, Segmentation, Trimming, Intersection, Transformations (both 2D and 3D).

MODULE -V: Transformations (10)

2-D and 3-D transformations: translation, scaling, rotation, reflection, concatenation, homogeneous coordinates, Perspective projection, orthotropic projection, isometric projection, Hidden surface removal, shading, rendering. Evaluation Criteria: Evaluation criteria of CAD software, Data exchange formats: GKS, IGES, PHIGS, CGM, STEP Dimensioning and tolerances: Linear, angular, angular dimensions, maximum material condition (MMC), Least material condition (LMC), Regardless of feature size (RFS).

V. TEXT BOOKS:

1. Ibrahim Zeid, "Mastering CAD/CAM", Tata McGraw Hill, 2nd edition, 2013.
2. P. N. Rao, "CAD/CAM Principles and Applications", Tata McGraw Hill, 3rd edition, 2010.
3. M. P. Groover, E. Zimmers, "CAD/CAM Computer-Aided Design and Manufacturing", Pearson, 1st edition, 2003.
4. R. Alavala Chennakesava, "CAD/ CAM Concepts and Applications", PHI, 1st edition, 2013.

VI. REFERENCE BOOKS:

1. Farid Amirouche, "Principles of Computer-Aided Design and Manufacturing, Pearson, 2nd edition, 2004.
2. P. RadhaKrishnan, "CAD/CAM/CIM", New Age International, 4th edition, 2016.
3. Warren. S. Seames, "Computer Numerical Control Concepts and Programming", Delmar Cengage Learning, 4th edition, 2013.

VII. WEB REFERENCES:

1. <http://nptel.ac.in/courses/112102101/>
2. <http://www.journals.elsevier.com/computer-aided-design>
3. <https://www.elsevier.com/books/surface-modeling-for-cad-cam/choi/978-0-444-88482-41>

VIII. E-TEXT BOOKS:

1. <http://sbmpme.blogspot.in/2011/01/cad-cam-cim-p-radhakrishnan.html>
2. <https://www.scribd.com/doc/228624725/cad-cam-text-book-by-P-N-RAO>

VIII. MATERIALS ONLINE

1. Course template
2. Tutorial question bank
3. Assignments
4. Model question paper – I
5. Model question paper – II
6. Lecture notes
7. PowerPoint presentation