INSTITUTE OF AERONAUTICAL ENGINEERING
(Autonomous)
Dundigal - 500 043, Hyderabad, Telangana

COURSE CONTENT

AIRCRAFT PRODUCTION DRAWING LABORATORY								
V Semester: AE								
Course Code	**Category**	**Hours / Week**			**Credits**	**Maximum Marks**		
AAED23	**Core**	**L**	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
		-	-	2	1	40	60	100
Contact Classes: Nil	**Tutorial Classes: Nil**	**Practical Classes: 45**				**Total Classes: 45**		
Prerequisite: Computer Aided Engineering Drawing								

I. COURSE OVERVIEW:

This course will also provide the computer aided design laboratory provides a strong foundations of computer aided designing tool and students will learn the implementation of solid modelling using CATIA. It enables students to master the fundamentals of advanced modelling techniques, sketcher tools, base features, drafting, sheet metal and surface design workbenches. This course focuses on giving the foundations of engineering design and making it very useful for getting the student ready for product manufacturing industry.

II. COURSES OBJECTIVES:

The students will try to learn

I. The principles of isometric and orthographic conversions to create CAD models using CATIA software.
II. The profiles and subsequently generating three dimensional entities from the generated profiles.
III. The fundamentals of geometric dimensioning and tolerances and representing those using designing software's.
IV. The build various aircraft parts by selecting workbenches appropriate for designing those components.

III. COURSE OUTCOMES:

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

CO 1 Choose appropriate tools and profiles for developing the required sketch using the Sketcher workbench.
CO 2 Make use of wireframe elements, surfaces, trim elements and power copies for constructing the complex surfaces.
CO 3 Utilize different geometric and dimensioning symbols and industry standards for the preparation of technical mechanical drawings.
CO 4 Select appropriate tools available in assembly workbench for creating three-dimensional assemblies incorporating multiple solid models
CO 5 Build components using sketch Based features, perform sheet metal operations and correctly organize the tree for having maximum compatibility for editing or modifying the model
CO 6 Develop a model from drawing provided and draw conclusions for designing various aircraft components by utilizing different workbenches.

IV. COURSE CONTENT:

Week-1: INTRODUCTION TO CATIA V5
Introduction to CATIA V5 software and its interfaces.

Week-2: SKETCHER
Interface, Sketch Tools, View Tool bar, Profile Tool bar, Operation Tool bar, Tools, Constrain tool bar, Transformation Tool bar, User Selection Filter, Standards, Visualizations.

Week-3: PART DESIGN
Sketch Based Features Dress up Features, Transformation Features, Reference Elements, Measure, and Thickness.

Week-4: BOOLEAN OPERATIONS
Boolean Operations.

Week-5: SHEET METAL DESIGN
Walls, Cutting and Stamping, Bending, Rolled Walls.

Week-6: SURFACE DESIGN
Surfacer, Operations, Wireframe, Replication.

Week -7: ASSEMBLY
Product Structure Tools, Constrains.

Week-8: GD & T
Introduction to Geometric Dimensioning and Tolerance, Weld Symbols, GD and T Symbols, Types of Tolerances, Types of views, Roughness Symbols.

Week-9: DRAFTING
Views, Annotations, Sheet Background.

Week-10: DESIGN OF AIRCRAFT WING
Design of Two wing structures.

Week-11: DESIGN OF FUSELAGE
Design of fuselage with internal components.

Week-12: DESIGN OF NOSE CONE
Design of Nose cone structures.

Week-13: DESIGN OF LANDING GEAR
Design of Main landing gear and nose landing gear.

Week-14: DESIGN OF AIRCRAFT
Design of any two types of Aircraft structures.

V. TEXT BOOKS:

1. Peter Smid, CNC Control Setup for Milling and Turning: Mastering CNC Control Systems, Industrial Press Inc., 2010.
2. Stephen F. Krar, et al. Computer Numerical Control Simplified, Industrial Press Inc., 2001.

VI. REFERENCE BOOKS:

1. C. Elanchezhian, et al. Computer Aided Manufacturing, Firewall Media, 2007.
2. Chang, Tien-Chien, et al. Computer-aided manufacturing. United Kingdom, Pearson Prentice Hall, 2006.

VII. ELECTRONICS RESOURCES:

1. https://onlinecourses.swayam2.ac.in/nou22_me04/preview
2. https://onlinecourses.nptel.ac.in/noc22_me10/preview
3. https://faculty.etsu.edu/hemphill/entc3710/nc-prog/index.html

VIII. MATERIALS ONLINE

1. Course template
2. Lab Manual