

COURSE CODE	COURSE TITLE	L	T	P	C
1152AE246	AIRCRAFT COMPONENT DESIGN	1	0	4	3

Course Category:

Programme elective.

Preamble:

This course is a lab oriented course, which deals with the basic tools and methodology in drawing and drafting 3D components using CAD software. This will enrich the students performance in research and academic performance.

Prerequisite courses:

Engineering graphics

Course educational objective:

To incorporate the knowledge of fundamental aircraft design procedure along with the touch of computer aided modeling.

Course outcomes:

Upon the successful completion of the course, students will be able to:

CO No	Course Outcomes	Knowledge level
CO1	Explain the phases of design procedure	K2
CO2	Compute the parameters for weight estimation and performance parameters for a propeller driven aircraft	K2
CO3	Explain the procedures for design of subsonic aircraft and its engine performance parameters.	K2
CO4	Analyze the performance characteristics of airplane.	K2
CO5	Model aircraft components using CAD software.	K3

Course Contents

Unit I: Introduction

Introduction; Phases of airplane design- Conceptual design, Preliminary design and detailed design; Stages of conceptual design-Requirements

Unit II: Aircraft Wing Components

Wing spar – Rib – stringers - Skin in surface design

Unit III: Aircraft Fuselage Components

longerons, struts, bulkheads and stringers.

Unit IV: Landing Gear

Trunnion - Strut body - Torque links - Truck or bogie - Drag link or drag strut - Side brace link

Unit V: Overview of computer aided design software

Modeling software overview: Part design & Assembling; Generative Drafting; Wireframe and Surface Design; Sheet Metal.

Analysis software Overview: Pre Processing, Solution , & Post processing; Application of Ansys to Stress Analysis, Nodal Analysis and Flow Analysis; Tools for Thermal Analysis; Advanced mesh generation tools.

List of experiments

1 Design of individual components of wing and assembly of wing structure.

- ✓ Ribs
- ✓ Spars
- ✓ stringers
- ✓ Skin in surface design

2 Design of landing gear components and assembly.

- ✓ Trunnion
- ✓ Strut body
- ✓ Torque links
- ✓ Truck or bogie
- ✓ Drag link or drag strut
- ✓ Side brace link

3 Aircraft fuselage design with longerons, struts, bulkheads and stringers.

4 Propeller blade and compressor blade design with appropriate airfoil

5 Finding the CG location of individual system of the aircraft.