



**THE OHIO STATE UNIVERSITY**  
COLLEGE OF ENGINEERING

# Design of Atmospheric Flight Vehicles I

## AEROENG 4515

**Credit Hours:**

3.00

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**Course Levels:**

Undergraduate (1000-5000 level)

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**Course Components:**

Lecture

Lab

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**Course Description:**

Conceptual and preliminary design, methodology, case studies, introduction of design software, group planning for subsequent design effort: design of atmospheric flight vehicles and components.

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**Prerequisites and Co-requisites:**

Prereq: 3543 (543) and 3570 (530 and 570) and 3521 (521) and 3580 (580), and Sr standing, and enrollment as AeroEng-BS student (No AAE pre-majors can enroll in this class). Prereq or concur: 4550 (550).

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**Course Goals / Objectives:**

- Provide students with conceptual and preliminary aircraft design experience
  - Foster multidisciplinary thought processes and collaborations
  - Train students in effective teamwork
  - Refine students' technical communication skills through written reports and presentations
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**Course Topics:**

- Overview of the design process
  - Vehicle Specifications: Mission Profile / RFP / FAR specs
  - Preliminary weight estimation
  - Trade Studies
  - Sizing: Thrust-to-Weight Ratio and Wing Loading
  - Aerodynamics review, wing and airfoil selection
  - Sizing: Fuselage, Tail, Engine
  - Propulsion integration
  - Structural considerations in aircraft layout
  - Landing gear sizing and layout
  - Crew, passenger, and payload layout
  - Environmental impacts
  - Team Presentations
  - Structural design: Design variables, Objective functions, Constraints
  - Problem statements of Optimal Structural Design problems
  - Limit Analysis and Design of Structures
  - Minimum Stress Design: Fully Stress Design
  - Minimum Weight Design
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**Designation:**

Required