

# AE 4332 – Rotorcraft Design II: Preliminary Design

## CATALOG DESCRIPTION (25 words or fewer):

Preliminary design of traditional, urban air mobility, unmanned rotorcraft vehicles.

**Hours:** 1(lecture) + 4(studio) + 0(lab) = **3 credit hours**

## PREREQUISITES:

AE4311 Fixed Wing Design I or AE 4321 Space System Design I or AE 4331 Rotorcraft Design I

## TEXTBOOKS:

J. Leishman, *Principals of Helicopter Dynamics* (2nd ed.), Cambridge University Press, 2006.

## COURSE OBJECTIVES:

Implementation of rotary wing aircraft design methodology through lectures and applications.

## LEARNING OUTCOMES:

Students will complete projects culminating in the conceptual design of a relevant aircraft to meet given specifications. Specifically, students will:

1. Devise an analysis plan and conduct subsystem sizing, computational design, and performance evaluation
2. Integrate accepted design principles and methods with design needs and requirements, including ethical and societal obligations and trade studies, into the design process in application specific environments
3. Effectively communicate technical information in both written and oral formats
4. Strategize and implement a design project according to specifications using project and time management strategies
5. Demonstrate effective interpersonal communication, leadership, and constructive feedback skills in teamwork settings

## TOPICAL OUTLINE:

1. Introduction to Design; Course Logistics
2. Project overview and team forming
3. Socio-Economic and Ethical Considerations in Design; Professional Ethics
4. Regulatory Issues
5. Transmission Layout
6. Stability & Control
7. Structural Design, Loads, Fatigue
8. Team Endeavors
9. Flight Control System Design
10. Rotor Hub Design
11. Aircraft Sizing
12. Higher Fidelity Airloads Development
13. Other Topics (e.g., VFS Competition)
14. Prepare for Midterm
15. Midterm Presentations
16. Peer Debriefs
17. Guided work on semester project
18. Final Presentations