AE 6343 Aircraft Design I

Catalog Data:

Stochastic approach to conceptual design of aerospace systems with emphasis on aircraft. Comprehensive methodologies for aerospace vehicle synthesis and sizing. Integration of technologies.

Textbook: Raymer, Daniel P. *Aircraft Design: A Conceptual Approach*.
AIAA Education Series, Inc. Washington D.C. 1992

References: Course notes and handouts

Coordinator: Dr. Dimitri Mavris, assistant professor of A.E.

Goals: The course exposes students to different aircraft design techniques and allows them to apply these techniques to vehicle design while in a team-oriented environment. The objectives are:

a) to familiarize the students with traditional design techniques and applications

b) to teach students modern design theory and techniques

c) to allow the student to apply the methods learned to the design of a vehicle, including sizing, synthesis, and analysis, as part of a team effort.

Prerequisites: AE 4400, 6360 or consent of school
Familiarity with the UNIX operating system environment
Familiarity with FORTRAN programming language

Topics:

1. Traditional Vehicle Design
   - customer requirements
   - mission profiles
   - synthesis vs. sizing vs. analysis
   - synthesis vs. MDO
   - discipline basics: propulsion, aerodynamics, structures, stability and control, vehicle performance

2. Modern Methods
   - robust design simulation
   - response surface methodology
   - risk and uncertainty
   - life cycle cost
   - overall evaluation criterion
   - manufacturing, affordability, producibility

3. Application of Methods to Vehicle Design
   - application of above methods to produce robust vehicle design, including configuration development, synthesis, and analysis.