Oregon State University
School of Mechanical, Industrial and Manufacturing Engineering

Aero Vehicles Components Design - AAE 413 - 4 credits lectures

Instructor / Office Hours
Roberto Albertani / TBD

Teaching Assistant
TBD

Textbook
Not required. Notes and slides from the instructor will be available.

Suggested Reading

Main References
• Federal Aviation Administration (FAA) Regulations: http://www.ecfr.gov/cgi-bin/text-idx?c=ecfr&tpl=/ecfrbrowse/Title14/14tab_02.tpl
• Bruhn, E. F.: Analysis and Design of Flight Vehicle Structures, Tri-State Offset Company

Useful References

Prerequisites: ME 316, ME 317, ME 331 and ME 373, or equivalent.

Course Description:
The objective of this course is to develop mechanical design of aircraft subcomponents. You will learn to analyze and model aircraft components and evaluate their integration on the aircraft. You will also experience actual applications through a real-world aircraft component design project with associated deliverables to customer. Furthermore, the design will include basic requirements for FAA certification.

Topics
• Fixed and rotary wing aircraft components nomenclature, their general configurations and functions
• General characteristics of aircraft propulsion systems, fuel system, landing gear, doors, payload accommodations, lifting surfaces
• US Federal Aviation Regulations
• Theoretical estimates of aerodynamic loads on subcomponents
• Mass properties of aircraft
• Mechanical characteristics of aerospace materials
• Design of modifications on primary aircraft components

Course Learning Outcomes
The student, upon completion of this course, will be able to:
1- Demonstrate proficiency in fixed and rotary wing aircraft components nomenclature, functions and operations
2- Apply mechanical analysis to aircraft subcomponents including loads estimation and mass properties analysis
3- Demonstrate an understanding of Federal Aviation Regulations specifically for obtaining an Airworthiness Certificate
4- Perform design and integration of an aircraft structural modification including the application for a FAA special airworthiness certificate
5- Perform design and integration of an aircraft performance upgrade including the application for a FAA special airworthiness certificate
6- Perform design and integration of an aircraft payload modification including the application for a FAA special airworthiness certificate
7- Demonstrate the ability to effectively work in team, manage project priorities and meet project deadlines

Electronic File Access
Files, assignments, examples, project material and announcements will be posted on Canvas.

Project
A team project and project reviews will be required.

Exams
Three midterm exams and one final will be assigned. Exams are closed book, except for one 8.5"x11" page of notes, written in any density on both sides (you may bring a magnifier if you wish to write very small). Notes sheet must be HANDWRITTEN and MUST be delivered with the exam. NO sheet NO grade.
Exams must show all appropriate steps to obtain final result. Intermediate and final result must have appropriate precision requirements (posted on Canvas). No make-up exams except for a medical emergency, e.g. illness or accident, in which case a physician’s certification is required.

**Grading**
- 60% three exams BEST of four (three midterms and final), 40% project report + presentation

Grades are on an absolute scale (A=94+, A-=91+, B+=87+, B=83+, B-=81+, C+=76+, C=71+, D+=66+, D=61+).

**Academic Dishonesty**
You will be expected to conduct yourself in a professional manner. Academic dishonesty such as plagiarism and cheating will not be tolerated. Therefore, students are expected to be honest and ethical in their academic work.

Academic dishonesty is defined as an intentional act of deception in one of the following areas:
- cheating- use or attempted use of unauthorized materials, information or study aids,
- fabrication- falsification or invention of any information,
- assisting- helping another commit an act of academic dishonesty,
- tampering- altering or interfering with evaluation instruments and documents, or
- plagiarism- representing the words or ideas of another person as one's own.

For more information about academic integrity and the University's policies and procedures in this area, please refer to the Statement of Expectations for Student Conduct, link at: http://studentlife.oregonstate.edu/studentconduct/offenses-0 and the section on Academic Regulations in the OSU Schedule of Classes.

**Statement Regarding Students with Disabilities:** Accommodations for students with disabilities are determined and approved by Disability Access Services (DAS). If you, as a student, believe you are eligible for accommodations but have not obtained approval please contact DAS immediately at 541-737-4098 or athttp://ds.oregonstate.edu. DAS notifies students and faculty members of approved academic accommodations and coordinates implementation of those accommodations. While not required, students and faculty members are encouraged to discuss details of the implementation of individual accommodations.

**Lectures Schedule**

TBD