



AE 271 1st week of August to 3rd week of Dec (2:1)

Flight Vehicle Design

Instructor

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Teaching Assistant

None

Email: None

Department: Aerospace Engineering

Course Time: Tue, Thu , 2:00-5 pm

Lecture venue: Multimedia classroom in aerospace engg.

Detailed Course Page: <http://www.aero.iisc.ernet.in/academics/teaching/courses/flight-vehicle-design-21/>

Announcements

The first lecture of 2017 session was on August 1st ,2017 2:00pm in Aerospace Engineering

Brief description of the course

The course addresses the general design principals of aircraft. The course also includes UAVs designing programs which focuses on designing and fabricating the UAVs. The idea is to give hands on experience for the students in solving some of the critical issues faced by UAVs such as maximizing the range and endurance. The course not only focuses on building a flying vehicle but also on designing the payload associated with it. The Department has well equipped labs that includes state of the art CNC machine and laser cutting equipmentâ€™s which enables the students to build the prototype quickly and verify them. The institute also has low speed wind tunnel where the models can be tested for real time environmental conditions before flying.

Prerequisites

None

Syllabus

This course is an introduction to aircraft design emphasizing on the conceptual design of civil transport aircraft. The topics include design process, airworthiness, safety, environmental issues, requirements, overall

configuration and systems, fuselage layout, wing and tail design, mass and balance, power plant selection, landing gear layout, aircraft performance, cost estimation, and initial design and sizing.

Course outcomes

After taking the course the student would

1. Design and fabricate the UAVs from scratch
2. Experience in building different types of UAVs and payload associated with it.
3. Have insight in selecting the avionics (Motors, SC, servos) for the UAVs.
4. Thorough knowledge in manufacturing field (CNC machining and laser cutting)
5. Hands on experience in composite manufacturing techniques.
6. Design, fabrication and flying of seed dropping UAVs, which has good societal impact.

Grading policy

10% for assignments

15% for the midterm exam

50% for a course project

25% for the final exam

Assignments

The students are asked to come up with an innovative conceptual and preliminary design of a UAV , which as good civilian application . This year the theme is to develop a UAV for seed dropping. The design encompasses not only the UAV but also seed dispensing mechanism.

Resources

Daniel P Raymer, Aircraft Design: A Conceptual Approach, AIAA Education series.

Jan Roskam, Airplane Design, Part VIII, Roskam Aviation and Engineering Corporation.

Thomas C Corke, Design of Aircraft, University of Notre Dame, Prentice Hall.