

Spring 2009

A&AE 490/AT490 Flight Testing

(Aviation Technology students register for AT490 Aviation Project with Prof. Wulle)

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Purposes of the Course

The purposes of this course are to study experimental methods for determining aircraft performance and flying qualities and to provide students with actual flight test experiences.

The course will be designed to utilize the special skills of both aviation technology students and aerospace engineering students. This will be accomplished by teaming technology students (who are often pilots) with engineering students to perform, analyze and document flight test experiments.

Targeted Student Population

AAE senior undergraduates, Aviation Technology junior or senior undergraduates (register for AT490). Graduate engineering students may occasionally take the course as AAE590 with special arrangement with the Professor Andrisani.

Special Features of the Course:

Students will fly flight test experiments in both general aviation aircraft (4 hours in a Cessna 180) and in Purdue's flight simulators (3 hours in the Frasca 242 (Beech Baron 58), 2 hours in B727-200).

Students will pay a lab fee of roughly \$265 to cover the cost of flight and simulator time.

The course will be team taught by Professor Dominick Andrisani of the School of Aeronautics and Astronautics with assistance from Professor Bernard Wulle of the Department of Aviation Technology. Grades for engineering students will be determined by Professor Andrisani and for technology students by Professor Wulle.

All students will attend the same lectures. Assignments differ for engineering (AAE) and technology (AT) students. AT students get 1 credit for AT490 while AAE students get 3 credits for AAE490).

The course schedule lists this course as meeting MWF at 2:30PM. However, much of the course activity will be in simulators and airplanes on a schedule to be arranged.

Textbook

Flight Testing of Fixed Wing Aircraft, Ralph D. Kimberlin, AIAA Education Series, 2003.

Course Outline

Properties of the Atmosphere, Sensors Used in Flight Testing
Data Acquisition and Reduction Methods, Airspeed Calibration
Drag, Power Required and Power Available
Climb Performance, Stall Velocity and Maximum Lift Coefficient
Takeoff and Landing Performance, Maximum Speed, Range
Methods of Determining Aircraft Stability Parameters from Flight data
Aircraft Flying Qualities
Static Longitudinal Stability, Dynamic Longitudinal Stability
Aircraft Stall