

ABET Course Syllabus**ENAE 464 Aerospace Engineering Laboratory (sections 0201, 0202)****Credits & Contact Hours:** 3 credits (2 hours of lecture and 3 hours of lab)**Course Status:** Required**Schedule:** Offered every Spring semester**Course Description:** Application of fundamental measuring techniques to measurements in aerospace engineering. Includes experiments in aerodynamics, structures, propulsion, flight dynamics and astrodynamics. Correlation of theory with experimental results.**Pre-Requisites:** ENAE 311, ENAE 324, ENAE 362 and ENAE 432**Co-Requisites:** None**Textbooks:** None**Other Required Material:** Course lecture notes and handouts**Course Oversight:** Design/Lab Committee**Syllabus Prepared By/Date:** Dr. Kenneth Yu on June 21, 2011**Course Objectives/Student Learning Outcomes:**

1. Perform an data error analysis
2. Perform uncertainty propagation analysis
3. Perform statistical analysis
4. Have an understanding of probability distributions
5. Understand flow property measurements
6. Possess the ability to setup, perform, and analyze an aerospace related experiment involving measurements, data, collection, technical report writing

**Topics Covered:**

1. Aerodynamics
  - Incompressible Flow Experiment
  - Compressible Flow Experiment
  - Viscous Flow Experiment
  - Wind Tunnel Testing
2. CFD
  - Application of Computational Fluid Dynamic
3. Flight Dynamics & Control
  - System Identification Experiment
4. Diagnostics & Measurements
  - Application of Particle Imaging Velocimetry
5. Propulsion
  - Reacting Flow Experiment
6. Space Systems
  - Ion Energy Measurements
  - Human Factors Testing

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7. Other Topics Planned During Lectures and Labs
  - Error Analysis, Uncertainty Propagation
  - Statistical Analysis, Probability Distributions
  - Flow Property Measurements: pressure, temperature, and velocity
  - Flow Visualization Techniques: density variation, species concentration
  - Laser-Based Diagnostics

**Relationship of Course Objectives to Program Outcomes**

This course addresses program outcomes: 3, 6, 7, 9, 10