

AE6052 Flow Diagnostics and Control

Catalog Data AE6052 Flow Diagnostics and Control 2-3-3. Prerequisites: **AE3045 Experimental Fluid Dynamics** or consent of instructor.

Introduction to experimental techniques; flow visualization; statistical methods; pressure, velocity, temperature, density, particle size, reaction rate measurements. Experiment design, data acquisition, and interpretation. Flow Control.

Textbook: None. Monographs/ manuals may be used.

Cordinator: Dr. N.M. Komerath, Professor

Educational Objectives:

The students will have the experience of developing a modern flow diagnostic experiment in a research laboratory setting and team environment. S(he) will learn the fundamental principles and practical issues in designing, implementing and analyzing experimental projects involving advanced fluid dynamics and acoustics.

Expected Outcomes: Broader perspective of devices and results which can be developed using fluid mechanics, combined with other disciplines. Horizontal and vertical integration of knowledge in aerospace disciplines to make new advances. Experience of searching for technical solutions outside the traditional academic disciplines. Experience of team effort in developing experiments with high technical risk.

Lecture Areas

1. Flow Diagnostics

- A. Introduction to flow diagnostics, and general concepts
- B. Measurement Techniques for Pressure, Velocity, Temperature, Density, and Reaction Rates; techniques for measuring unsteady phenomena; techniques for visualizing flow phenomena
- C. Digital Signal Processing: statistical techniques for flow measurement
- D. Flow Imaging Techniques: quantitative multi-dimensional measurement

2. Flow Control

- A. Introduction & Obvious Applications
- B. Basic Concepts
- C. Theoretical Tools: summary

Laboratory Projects:

Each team of 2 to 3 students takes primary responsibility for one experiment. Each team then acts as "guides" for the other teams in using their experiment.

Prepared By: N.M. Komerath, Professor, November 17, 1997