**AE 6051 Flow Diagnostics and Control**

**Catalog Data: AE6051 Flow Diagnostics and Control** 2-3-3.

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.

**Prerequisites**: AE3045 Experimental Fluid Dynamics or equivalent

**Textbook:** None. Monographs/ manuals may be used.

**Coordinator**: Dr. N.M. Komerath, Professor

**Educational Objectives**

* Students will have the experience of developing a modern flow diagnostic experiment in a research laboratory setting and team environment.
* Students 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 in searching for technical solutions outside the traditional academic disciplines. Experience of team effort in developing experiments with high technical risk.

**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

**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. The team subsequently acts as "guides" for the other teams in using their experiment.