

Preface

The Laboratory for EAS 361, *Engineering Fluid Mechanics* complements the learning experience of the lecture. Laboratory exercises provide opportunities for direct study of fluid behavior. All of the laboratory experiments reinforce material presented during lecture. Some of the experiments will also expose material that is *not* presented during lecture. You are responsible for the union of the laboratory and lecture experience, not their intersection.

Use the laboratory as a chance to enhance your understanding of fluid statics and dynamics. The following *Learning Objectives* for the laboratory will guide you in taking an active role in your education.

1. Gain familiarity with physical manifestations of fluid mechanics.

You will perform experiments dealing with

- the basic fluid properties: viscosity and pressure;
- static fluid forces;
- dynamic fluid forces;
- the relation between pressure and velocity in a flowing fluid.

These experiments will give you first-hand experience with fluid behavior. As a result of performing these experiments you should be able to recognize the effects of fluid pressure and viscosity, to relate measurements of pressure to hydrostatic force in a stationary fluid, and to relate measurements of pressure to velocity in a moving fluid.

In addition to learning about fluid behavior, you should be able to recognize the physical equipment in the laboratory and explain the basic operating principles of the equipment. You should learn how to operate the equipment properly and safely.

2. Develop and reinforce measurement skills.

You should know how to read gages, manometers, flowmeters, spring scales, and balance scales. You should be able to time events with a stopwatch. You should strive to measure quantities with the maximum precision of the instruments provided in the laboratory.

3. Develop and reinforce skills in documenting observations.

You should develop good habits in the organization and recording of raw data in a notebook, and take care to document the data such that it can be analyzed at a later time. You should sketch the physical apparatus used in each experiment. In doing so, pay special attention to the specific mechanical and operational details that enable the apparatus to achieve the purpose for which it was designed. You should be able to list *and* describe the steps used to obtain the desired measurements. You should be able to identify whether any actions were taken to improve the outcome of the experiment. Likewise, you should be able to identify any actions that may have contributed to undesirable outcomes

4. Develop skills at writing laboratory reports.

You will create reports to document your measurements in the laboratory. You will use a writing style and format that is common to technical documentation used in Civil and Mechanical Engineering. Your reports should be complete, yet concise. By writing the report, you should develop a clear understanding of the laboratory exercise, and communicate that understanding in your written words.

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