

## **ENGR 3345 / 050 – Fluid Mechanics Laboratory – Spring 2013**

**Instructor:** Kevin McFall, PhD

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**Office Hours:** 12:00-1:00 MWF, 2:00-3:00 TH, or by appointment

**E-mail:** kmcfall@spsu.edu

**Location:** Q 240

**Meeting times:** W 2:00-4:50 pm

**Start Date:** 01/16/2012

**Co-requisites:** ENGR 3343 Fluid Mechanics

**Textbook:** No textbook is required, but a fluids reference text such as the one from ENGR 3343 is desirable. Those without a book can refer to [Engineering Fluid Mechanics](#) or [A First Course in Fluid Mechanics for Engineers](#) which are both available for free download online.

**Course Catalog Description:** The laboratory reinforces the principles of fluid mechanics, studied in [ENGR 3343](#), as they apply to hydraulic and pneumatic power, and fluid flow. Developing experimental data into effective laboratory reports is emphasized.

### **Learning Outcomes:**

- Understanding proper operation of pumps, fans, turbines, etc.
- Understanding the appropriate safety precautions of a laboratory environment
- Ability to properly collect reliable experimental data
- Proficiency in performing basic data analysis with the use of appropriate software tools
- Ability to generate high quality technical reports

### **Topics Covered Include:**

- Material properties of fluids
- Fluid statics topics including hydrostatic and buoyant forces
- Flow measurement
- Major and minor losses in piping systems
- Forces produced by fluid flow such as on immersed bodies and/or by free jets
- Pump and turbine performance

### **Grading Policy**

All students will contribute to data collection during class, and then break into groups of no more than three members to compile the results. Each laboratory exercise will be graded from a report submitted electronically by email to [ksmcfall@spsu.edu](mailto:ksmcfall@spsu.edu). Some reports will be informal in nature, requiring simply answering the requested questions and producing relevant calculations. Informal reports still must be submitted electronically, and received before the beginning of the next laboratory session. Other

reports will require a professional quality technical report, which is graded 10% on a draft report, 70% on content, 10% on report formatting, and 10% on the written text. Groups must bring a hardcopy of the draft report to the next laboratory session, when instructor feedback will be provided and a grade of 0, 5, or 10 assigned depending on the effort made in producing it. The final report will then be due electronically before the beginning of the lab session following when the draft is presented.

All reports will be weighted equally in determining the final grade, which uses the scale as follows:

- A 90-100
- B 80-89
- C 70-79
- D 60-69
- F 0-59

#### **Attendance Policy**

Attendance during laboratory sessions is mandatory, even when reviewing draft reports. Students missing a laboratory session but collaborating with their group on the report will earn half credit on the report for that topic. A zero will be assigned for a missed session when no contribution is made on writing the report. Extenuating circumstances can warrant exceptions to these rules, but the student must come to an agreement with the instructor before the missed session or report due date.

#### **Academic Misconduct**

At SPSU, academic misconduct is defined as “any act that could have resulted in unearned advantage or that interferes with the appropriate academic progress of others”. For more information see [www.spsu.edu/honorcode](http://www.spsu.edu/honorcode). The application of the definition of academic misconduct in this course is described as follows. For informal reports: while multiple groups may use the same data, all analysis and calculations must represent the work of only the individual group members; copying of any kind from any source will constitute a violation. For formal reports: any information other than basic well-known fluid mechanics equations not originating from the report authors must be properly cited. All instances of academic misconduct will be reported to the SPSU Honor Council.

#### **Disability Statement**

If you have a documented disability as described by the Rehabilitation Act of 1973 and the Americans with Disabilities Act (ADA) that may require you to need assistance attaining accessibility to instructional content to meet course requirements, please contact the ATTIC at 678-915-7361 as soon as possible. It is then your responsibility to contact and meet with the instructor. The ATTIC can assist you and the instructor in formulating a reasonable accommodation plan and provide support for your disability. Course requirements will not be waived but accommodations will be made, when appropriate, to assist you to meet the requirements.

#### **Communication**

Course material will be disseminated in D2L. All official course announcements, including instructions when class may be cancelled or postponed, will be posted in the D2L course news. Be sure to check D2L regularly.

## **Course Schedule**

<b>Day</b>	<b>Date</b>	<b>Description</b>
Wed	01/16	Introduction
Wed	01/23	Draft report
Wed	01/30	Viscosity
Wed	02/06	Draft report
Wed	02/13	Fluids statics
Wed	02/20	Losses in piping systems
Wed	02/27	Draft report
Wed	03/13	Free jets
Wed	03/20	Wind tunnel
Wed	03/27	Flow measurement in open channels
Wed	04/03	Pump performance
Wed	04/10	Draft report
Wed	04/17	Pelton turbine
Wed	04/24	No class