

Syllabus for
ENGR 370 -FLUID MECHANICS
Spring 2014

Meeting days, time, and place: MWF, 9:00 a.m. – 9:50 a.m., Rm.: Engr., A Wing 0219

Instructor: Dr. Gregory V. Wilkerson, Engr., D Wing 0013, 453-7810, gwilkers@siu.edu.

Office hours: T.B.D.

Monday	Tuesday	Wednesday	Thursday	Friday
10:00-11:00 p.m.		10:00-11:00 p.m.		10:00-11:00 p.m.

- I can meet with you at times other than my office hours by appointment. Talk with me after class, send me an email, or call so we can find a time that works for both of us.
- # Please refrain from coming to my office from before class as I will likely be preparing for this class and will not be able to meet with you.

Text: Engineering Fluid Mechanics (10th ed.) by D. F. Elger, B. C. Williams, C. T. Crowe, and J. A. Roberson. John Wiley & Sons, Inc. ISBN: 978-118-16429-7.

Final Exam: Wednesday, May 7, 2014; 7:50 a.m. - 9:50 a.m.

Objectives: This course provides an introduction to the properties of fluids and the principles that govern their behavior. Specific topics discussed include hydrostatics; flowing fluids; continuity, momentum, and energy equations; dimensional analysis; drag and lift, and closed conduit flow.

TENTATIVE OUTLINE

Chapter 1 - Introduction, Sections 1.1 - 1.6

Chapter 2 - Fluid Properties, Sections 2.1 - 2.9

Exam 1

Chapter 3 - Fluid Statics, Sections 3.1 - 3.7

Exam 2

Chapter 4 – Flowing Fluids and Pressure Variation, Sections 4.1 - 4.7

Exam 3

Chapter 4 – Flowing Fluids and Pressure Variation, Sections 4.8 - 4.11

Exam 4

Chapter 5 - Control Volume and Continuity Equation, Sections 5.1 - 5.5

Chapter 6 - Momentum Equation, Sections 6.1 - 6.4

Exam 5

Chapter 7 - The Energy Equation, Sections 7.1 - 7.8

Chapter 10 - Flow in Conduits, Sections 10.1 - 10.7

Exam 6

Chapter 8 - Dimensional Analysis and Similitude, Sections 8.1 - 8.7 & 8.9

Chapter 9 - Surface Resistance, Sections 9.2 - 9.5

Chapter 11 - Drag and Lift, Sections 11.1 - 11.9

Chapter 15 - Flow in Open Channels, Sections 15.1 - 15.3 & 15.6

Exam 7 (Final Exam)

COURSE GOALS/OBJECTIVES

At the end of the semester, students should:

- be familiar with basic properties of fluids
- understand fluid statics and solve hydrostatic problems
- understand and apply equations governing fluid flow (e.g., Euler's and Bernoulli's equations)
- be familiar with Reynold's transport theorem and how it is used to derive the continuity, momentum, and energy equations.
- be able solve problems that require using continuity, momentum, and/or energy equation
- be solve to solve closed conduit (pipe) flow problems
- be familiar with and able to solve problems for a broad range of topics in fluid mechanics, including dimensional analysis, similitude, boundary layers, lift and drag, flow measurement, open-channel flow, and the Navier Stokes equation
- be proficient at collecting and analyzing experimental data; and writing technical reports that communicate your methodology, results, and ideas.

GRADING

Task	Weight
Homework	11%
Exams (6 exams * 13%/exam)	78%
Lab	11%

Grade scale: A = $\geq 90\%$, B = $\geq 80\%$, C = $\geq 70\%$, D = $\geq 60\%$, and F < 60%.

CLASS REGULATIONS

Conversations and other distracting activities (e.g., reading a newspaper, using a cell phone, using a laptop computer, etc.) will not be tolerated during class. If you engage in conversations you will be asked to change seats and may be told to leave the class. If you are told to leave the class

you will not be readmitted without a request from your Department Head and the College of Engineering Dean or Associate Dean.

MISCELLANEOUS COMMENTS ABOUT HOMEWORK

1. **One or two homework problem sets will be assigned at the beginning of class.** Assigned homework will be due two periods after the period during which it was assigned.
2. **All homework problems will be collected** but only one problem in each problem set will be reviewed in detail. If you submit an incomplete problem set, your grade will be reduced accordingly.
3. **Homework solutions should be organized, neat, and concise.** The preferred format for preparing homework is illustrated in Figure 1. Show all work performed in solving a problem but do not include extraneous information (e.g., irrelevant hand calculations or results from a failed attempt to solve a problem). Points will be deducted for incomplete and/or poorly formatted solutions.
4. You are encouraged to **use Engineering paper.**
5. Prior to submitting your homework, staple the pages together, fold them lengthwise, and write your name on the outside of the folded pages (Figure 2).
6. **Late homework will not be accepted.** Homework is considered late if it is not submitted at the beginning of the class period on the date it is due. In lieu of accepting late homework, four of your homework grades will be dropped.
7. **Attempt to solve homework problems on your own before asking for help.** You should show me the work you have performed towards solving the problem (as opposed to a blank sheet of paper). This is in no way meant to discourage you from asking questions but to emphasize the point that you are expected to attempt to solve a problem before asking for help.
8. You are encouraged to work on homework assignments with your classmates. However, every participant is expected to contribute to such efforts. **Copying someone else's work and submitting it as your own, and copying from published homework solutions constitutes plagiarism.** Any student that submits plagiarized homework will receive a failing grade for the assignment. Students involved in copying or plagiarizing homework more than once will receive a reduced grade for the course and a written notice of warning. In addition, the letter of warning will be copied to the student's file and the Department Head. Please refer to the SIUC Student Code regarding "Acts of Academic Dishonesty" (www.siu.edu/~policies/policies/conduct.html).

<i>Problem Number</i>	<i>Course Number</i>	<i>Name</i>
<p><i>Problem Definition:</i> Summarize the important facts and information from the complete statement given in the text. That is, list what is known and assumed about the problem.</p> <p><i>Plan:</i> Identify what is to be determined.</p> <p><i>Solution:</i></p> <ul style="list-style-type: none"> • Solutions should be presented in a logical step-by-step order. The method used to arrive at an answer must be shown. A correct answer by itself is not sufficient for credit and an incorrect answer may still be good for partial credit depending on the accuracy of the method. • Draw free-body diagrams indicating control volumes, etc. • Show the units (e.g., kg, m, lb, ft, etc.) for values presented in your work. • Present the equations being solved in symbolic form prior to using numerical values. That is, show equations symbolically and with actual values. • Use a leading zero on numbers less than one, i.e., “0.034” is correct and “.034” is not. • No work should be done on the back of pages--that is, use only one side of each sheet. • For problems solved using Excel: <ul style="list-style-type: none"> ○ If repetitive calculations are performed, submit handwritten or typed sample calculations. ○ If problems are solved by iteration, present handwritten or typed notes that explain how the problem was setup and solved on the computer. • Show answers clearly (e.g., label, underline, etc.) and, again, include units. 		

Figure 1 Schematic showing how homework should be formatted.

MISCELLANEOUS COMMENTS ABOUT EXAMS

1. There will be 7 exams. For computing your final grade, your lowest exam score will be dropped. No make-up of exams will be allowed unless arrangements are made prior to the exam (email is not an appropriate means for making arrangements). Make-up exams will be allowed only for excused absences (e.g., illness with a doctor's note, death in the immediate family, required court appearance). The instructor reserves the right to give any or all make-up exams during finals week.

- Individual work is required on all exams. **A grade of “F” will be assigned for the semester to any student caught cheating on an exam. If a student is caught cheating, a written notice will be sent to the student, and copied to the student’s file and Department Head.** Please refer to the SIUC Student Code regarding “Acts of Academic Dishonesty” (www.siu.edu/~policies/policies/conduct.html).

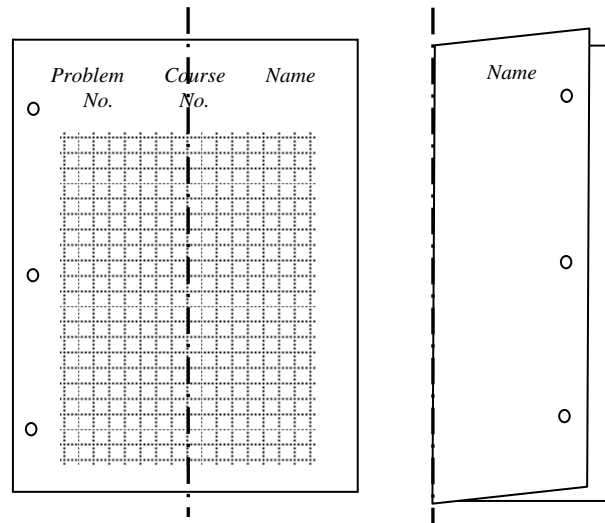


Figure 2 - Illustration showing how homework should be labeled.

EMERGENCY PROCEDURES

Southern Illinois University Carbondale is committed to providing a safe and healthy environment for study and work. Because some health and safety circumstances are beyond our control, we ask that you become familiar with the SIUC Emergency Response Plan and Building Emergency Response Team (BERT) program. Emergency response information is available on posters in buildings on campus, available on the BERT’s website at www.bert.siu.edu, Department of Public Safety’s website www.dps.siu.edu (disaster drop down) and in the Emergency Response Guidelines pamphlet. Know how to respond to each type of emergency.

Instructors will provide guidance and direction to students in the classroom in the event of an emergency affecting your location. **It is important that you follow these instructions and stay with your instructor during an evacuation or sheltering emergency.** The Building Emergency Response Team will provide assistance to your instructor in evacuating the building or sheltering within the facility.