ENGR 335 FLUID MECHANICS, **E.O. SECTION**
Fall 2009

Instructor:	Ralph Budwig, 208 364 4996, rbudwig@uidaho.edu
Office hours:	Send email to me any time
Text:	*Engineering Fluid Mechanics* by Crowe, Elger, and Roberson, **8th edition**
Class Website	www.webs1.uidaho.edu/engr335-01

PROBLEM SOLVING SESSIONS

A part of class time will be used to practice problem-solving skills with peer and instructor interaction. During these sessions a problem will be assigned to the entire class. You will work on the problems (preferably in groups of 2 to 3 students) with the instructor available to answer questions and make suggestions. I will then ask for your input in order to put the problem on the board. (E.O. students will benefit from viewing these problem solving sessions.)

HOMEWORK

(1) The required format is discussed on the attached pages.

(2) Problem assignments should be sent within a week of the class where they are assigned

(3) Please send assignments by:

a. Email - scan them and send them as JPEG or PDF files. (rbudwig@uidaho.edu); or
b. Fax: 208-332-4425; or
c. Postal mail - 322 East Front Street, Suite 340, Boise, ID 83702

GRADING

	Engineering Outreach
Subjective (participation and communication)	5%
Homework (I will drop your five lowest homework scores)	25%
Exam 1	15%
Exam 2	15%
Exam 3	15%
Final	25%

It is important to view each class and to solve the homework problems. This is much more important than indicated by the percentage of the grade that is obtained from subjective and homework. Students who do not view classes and/or do not solve homework have a very low probability of mastering the material or doing well in the course.

ENGR335-01 HOMEWORK FORMAT

GIVEN: State briefly what is known about the problem. This requires that you read the problem carefully and extract all of the important information. Often times, you can include a **sketch** of the system you are dealing with and assign appropriate dimensions and/or characteristics.

FIND: State what is to be determined.

At this point, all of the information about the problem should be contained in the two sections outlined above and you can begin to think about the solution. You should never have to refer to the problem in the textbook again! This is handy, because you will undoubtedly want to turn to various sections in the text. Having all of the problem information in front of you keeps you from flipping pages back and forth to figure out what is known, what is not known, and what is required.

SOLUTION: Begin your analysis and solution to the problem. This section should include all of the appropriate information that will allow you to solve the problem. Included in this are things like:

- solution strategy
- assumptions
- free body diagrams
- appropriate equations
- property values from a table, chart, or computer
- additional diagrams required to make the solution clear
- units check
- answer check (is your answer reasonable)

ANSWER: This is really part of the solution, but it deserves special mention. The answer should be easily identified by boxing it in, drawing an arrow, or underlining. Also make sure that the proper units are identified here and throughout the solution!

Neat, clean documentation is a must! Neat homework problems serve several purposes. First, they are easy to grade, but most importantly, they are an invaluable source for you to use when you prepare for an examination. In your professional career, you will be presenting your findings to colleagues, supervisors, sponsors, and potential customers. It is imperative that you develop a neat, systematic approach to your problem solution and display. Take pride in what you have done!

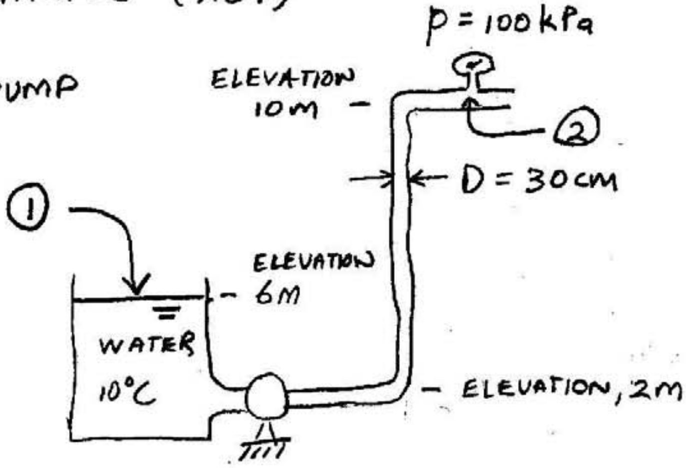
HOMEWORK FORMAT EXAMPLE (7.37)

GIVEN: RESERVOIR AND PUMP AS SHOWN

$Q = 0{,}25 \; m^3/s$

$h_L = 2 \frac{V^2}{2g}$ WHERE

V IS THE VELOCITY IN THE 30cm PIPE



FIND: POWER SUPPLIED BY PUMP

SOLUTION: CHOOSE (1) AND (2) AS SHOWN

WRITE EXTENDED BERNOULLI EQN. FROM (1) TO (2)

(p_1: 0 GAGE; $\alpha_1 \frac{V_1^2}{2g}$: RESERVOIR → 0; α_2: 1.0 TURBULENT FLOW)

$$\frac{p_1}{\gamma} + z_1 + \alpha_1 \frac{V_1^2}{2g} + h_p = \frac{p_2}{\gamma} + z_2 + \alpha_2 \frac{V_2^2}{2g} + h_L$$

$$h_p = z_2 - z_1 + \frac{p_2}{\gamma} + \frac{V^2}{2g} + 2\frac{V^2}{2g}$$

WATER @ 10°C → $\gamma = 9810 \frac{N}{m^3}$

$$h_p = 10m - 6m + \frac{100{,}000}{9810} + 3\frac{V^2}{2g}$$

$$V = \frac{Q}{A} = \frac{.25}{\frac{\pi}{4}(.3)^2} = 3.537 \frac{m}{s}$$

$$h_p = 4m + 10.19\,m + 1.91\,m = 16.1\,m$$

$$\dot{W}_p = \gamma Q h_p = (9810)(.25)(16.1)$$

$$\boxed{\dot{W}_p = 39.5 \text{ kW}}$$