## CE 462 – Open Channel Hydraulics

Instructor:	Dr. David F. Hill
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Telephone:	863-7305
Office Hours:	W 9:00a - 10:30a, F 10:30a - 12:00p
Text:	Open Channel Hydraulics, T. Sturm
Grading:	Homework - $30\%$ Midterm Exams (2) - $20\%$ each Final - $30\%$

### 1. Introduction

Open Channel Hydraulics is a class dedicated to the study of free surface flows. From municipal water conveyances to storm water runoff systems to flood prediction, a solid physical understanding of these flows is crucial to the practicing civil engineer.

### 2. Prerequisite Requirements

The prerequisite for this class is CE 360. You will be dropped from this course prior to the drop date (September 14th) if your PSU record does not reflect that you have passed this requirement. Students should discuss any concerns regarding this requirement with the instructor prior to this date.

For another perspective, the material in Open Channel Flow draws heavily from Fluid Mechanics and Dynamics; we will use the conservation laws of classical mechanics to formulate and analyze a wide variety of interesting flow phenomena. Your familiarity with the material in CE 360 is assumed and will be essential to a satisfactory performance in CE 462.

### 3. Class Management

All communications and distributions of class materials will take place via ANGEL, the PSU course management system. If you have not already done so, you are encouraged to visit www.angel.psu.edu and enroll. There, you will find homework assignments and solutions, announcements, and other materials relating to CE 462.

Week	Topic(s)	Reading Assignment
1	Introduction, governing equations	Chapter 1
2	Specific energy, frictionless flow in channels	Chapter 2
3	Uniform flow	Chapter 4
4	Rapidly varied flow	Chapter 3
5	Introduction to gradually varied flow	$\S{5.1}{-}5.3$
6	Gradually varied flow, numerical solution	$\S5.4-5.6$

### 4. Tentative (!!) List of Topics

7	Unsteady flow and routing	Chapters 7, 9
8	Hydraulic structures I	Chapter 6
9	Hydraulic structure II	Chapter 6
10	Flow measurement techniques	
11	Sediment motion and applications to stable channels	Chapter 10
12	Sediment transport calculations	Chapter 10
13	HEC-RAS	
14	HEC-RAS	
15	HEC-RAS	

### 5. Homework

Homework assignments will be given on a weekly basis. They will be available on Friday and they are due the following Friday. Some important points:

- (a) The primary roles of homework are to help reinforce the concepts learned in class and to help students prepare for the exams.
- (b) Homeworks are due, at the front of the classroom, at the start of class. Please drop them off at the front as you arrive. As a rule, late homeworks are not accepted, as solutions are posted immediately.
- (c) At the end of the semester, your lowest homework score will be dropped. This accommodates a missing score due to illness, family emergencies, etc.
- (d) Your homework assignments should be in the following overall format:
  - List your name, assignment number, and section number on the first page of your assignment.
  - Initial all subsequent pages, in case pages get separated.
  - Use 8.5 x 11 paper and use only one side (please feel free to 'recycle' paper).
  - Staple pages together.
  - Use pencil.
- (e) Each problem solution should include and clearly indicate the following:
  - Given: briefly summarize the problem, including given information and relevant sketches.
  - Objective: briefly state what is unknown, i.e. what the problem is seeking.
  - Solution: present a detailed solution of the problem, listing assumptions, including units, and boxing / circling the final answer.
- (f) The structure / grading of each homework problem will be as follows:
  - 3 points Work of the highest quality. The assumptions and problem are well defined, the problem solving method is clear and logical, the correct conceptual approach is used, the solution fully addresses all parts of the problem posed, and a correct or nearly-correct final answer is obtained. Minor algebraic or computational mistakes will typically still result in full credit.

- 2 points Work of satisfactory quality. The problem statement is fully posed. The problem solving method incorporates a generally correct conceptual approach but incorporates inappropriate assumptions, skips a step or two, or is otherwise only slightly incomplete or incorrect. A 2 is also the maximum score you can earn if you either do not box your answer or do not include units as part of your answer.
- 1 point Work of marginal quality. The problem statement is incomplete and / or the problem solving method is not conceptually correct. The work may also be illegible, unorganized, or marginally complete.
- 0 point Work of unacceptable quality. No substantive effort to solve the problem was made.
- (g) While you are encouraged to discuss the problems with other students in your class, the work you turn in MUST be your own. There is a fine line between collaboration and academic misconduct; please don't cross it. Assignments that do not appear to be independent work will not be graded.
- 6. **Exams** There will be two in-class mid-term exams and one final. All exams will be closedbook, with necessary equations and numerical constants provided. While calculators may be used, cell phones, blackberries, and other electronic devices are strictly prohibited. Makeup exams will only be given in the event of a documented illness or a family emergency. Arrangements for an alternate exam need to be made, when possible, prior to the scheduled exam date.

The final exam date and time are scheduled by the registrar and will be available on elion in approximately the fifth week of the semester. If you require a conflict final exam, you must file for the conflict between October 9 and October 22, as per university policy. See http://www.registrar.psu.edu/exams/final.html for information on the final exam schedule and the procedure for handling final exam overload.

# 7. Grading Scale

- A  $\geq 92\%$
- $92\% > A \ge 90\%$
- $90\% > B + \ge 88\%$
- $88\% > B \ge 82\%$
- $82\% > B \ge 80\%$
- $80\% > C + \ge 78\%$
- $78\% > C \ge 70\%$
- $70\% > D \ge 60\%$
- 60% > F
- 8. Miscellaneous
  - (a) If you expect me to learn your name during the course of the semester, take the time to introduce yourself to me (during office hours, after class, etc.).

- (b) If you find yourself having difficulty early on in the semester, it is imperative that you come see me early so that we can get you back on track. Please do not wait until the last few weeks of the semester, when it may be too late.
- (c) I will gladly treat you with respect if you will do the same. So, at the start of class, put the newspapers away, turn the cell-phones off and please give me your attention. Failure to do so is distracting not only to me, but to your classmates as well.
- (d) Contrary to popular belief, professors actually LIKE office hours! It gives us a chance to get to know students on a more individual level and to offer more personalized instruction. To maximize the effectiveness of office hours, please arrive with *specific* questions. I do not simply 'give out' the solutions to homework problems during office hours. I will help you identify what is being asked and the appropriate tools, but it remains up to you to solve the problem.
- (e) While you are free to email me at any time, do understand that I can not be expected to reply immediately. Moreover, understand that certain topics of inquiry are inappropriate for email. For example, an email asking 'how do I do homework problem # 3?' is likely to go unanswered for two reasons. First, as per the previous point, this is not a specific question. Second, even specific questions are hard to answer via email as it is difficult to incorporate equations and figures into email. You will have much greater success getting homework assistance if you come to my office hours.

### 9. Academic Integrity

Students are expected to review the College of Engineering's Academic Integrity Website, found at http://www.engr.psu.edu/CurrentStudents/acadinteg.asp. This site provides details about what constitutes a violation of academic integrity, the process for dealing with violations, and the penalties for violations.

### 10. Food Policy

As per AD62, water is the only food / beverage item allowed in instructional classrooms.