

Virginia Tech
Department of Civil and Environmental Engineering
CEE 4324/5984 – Open Channel Flow
Fall 2011

Catalog Entry:

This course encompasses a rigorous examination of the concepts of energy, momentum, and friction as they relate to flow in open channels. Concepts of alternate depths, conjugate depths, normal depth, are developed and used to ultimately develop a close examination of the full range of gradually varied flow surface water profiles. The course stresses both analytical calculations and computer approaches culminating in a careful exploration of the HEC-RAS computer program. Numerical “labs” may be used to complement classroom discussions.

Instructor:

Dr. Glenn E. Moglen
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Phone: (703) 538-3786
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Office Hours: Tu, 3:30 pm – 4:30 pm
 Th, 12:45 pm – 1:45 pm
 (or by appointment)

Class times:

Lecture: Tuesday/Thursday, 2:00 pm – 3:15pm, (NVC – 103 in Falls Church,
Torg 1000 in Blacksburg)

Web Page:

CEE 4324/5984 – Open Channel Flow (at Scholar)
also
<http://filebox.vt.edu/users/moglen/ocf/>

Video Streaming:

http://www.vbs.vt.edu/content/classes/display_class.php?course_ID=976492011

Texts:

Required:

- Chaudhry, M.H. (2008). *Open Channel Flow (2nd Edition)*, Springer. ISBN:9780387301747.

Recommended:

- Henderson, F.M., 1966. *Open Channel Flow*, Prentice-Hall.
- Chow, V.T., 1959. *Open Channel Hydraulics*, McGraw-Hill.

- Daugherty, R.L. and Franzini, J.B., 19?? (various editions) *Fluid Mechanics with Engineering Applications*, McGraw-Hill.
- Hanselman, D. and Littlefield, B., 1997. *The Student Edition of MATLAB: Version 5, User's Guide*, Prentice-Hall.

Tentative Class Schedule:

<u>Date</u>	<u>Topic</u>
Aug.	23 Course Introduction
	25 Specific Energy
	30 Specific Energy - The E - y Diagram
Sept.	1 Specific Energy: Sluice Gate Problems
	6 Specific Energy: Step Problems
	8 Specific Energy: Constriction Problems
	13 Occurrence of Critical Flow
	15 Energy in Non-Rectangular Cross-Sections
	20 Review Session / Problem Solving
	22 Exam 1 (basics and energy)
	27 The Momentum Function
	29 The M - y Diagram
Oct.	4 The Hydraulic Jump
	6 Physical Lab: The Hydraulic Jump
	11 Duality of the E - y and M - y Diagrams
	13 Momentum in Non-Rectangular Cross-Section
	18 Resistance to Flow
	20 The Chézy and Manning's Equations
	25 Numerical Lab: Manning's " n "
	27 Uniform Flow
Nov.	1 Exam 2 (momentum and early resistance)
	3 Gradually Varied Flow
	8 Numerical Lab: Gradually Varied Flow
	10 Surface Water Profiles – Interactive Teamwork
	15 Computation of Surface Water Profiles
	17 Introduction to HEC-RAS
	22 No Class – Thanksgiving break
	24 No Class – Thanksgiving break
	29 Numerical Lab: HEC-RAS
Dec.	1 Numerical Lab: HEC-RAS (continued)
	6 Review/Summary, Course Evaluation

Scheduled topics may vary due to time or weather constraints. Semester exam dates are tentative.

Homework: May be in the form of labs, problem sets, or computer programs. Late homework will be penalized and may not be accepted.

Final Exam: December 12, 2011 – 1:05 – 3:05 pm.

Grading Method:

Homework:	40%
2 Semester Exams	20% (each)
Final Exam:	20%

Academic Integrity: Please review the University's Honor System (web site: <http://www.honorsystem.vt.edu>) This code applies to CEE 4324/5984. I encourage group work in this class. However, I do not condone copying the work of others. If working as part of a group, I expect you to contribute your proportionate share to the group and to understand all elements of the work completed, not just your part. There will be times during the semester when assigned work is to be completed solely by the individual. During these times you are not to share any work with other students in the class.

Special Needs: If you have a disability that may affect your performance in this class, or if a problem arises during the semester, you should make me aware of this as soon as possible. I will make every effort to accommodate you.

Religious Observances: If your observance of a religious holiday will affect your ability to attend class or complete an assignment on time, please inform me of this with at least a week's advance notice.

My role as a teacher: I will try to lead clear, informative, and interesting discussions on the course topic. I will assign homework/labs/exams that exercise concepts discussed in class and grade/return all materials promptly. I will make every effort to be available to you outside of class during my office hours and by e-mail, however please try to avoid unscheduled visits during non-office hours times. I will treat everyone fairly and with respect.

Your Role as a Student: You are expected to complete and turn in **all** assignments on the date due. Read the relevant class notes **prior** to the class in which they are discussed. Come to class ready to **think**, not just take notes. If something is unclear, please ask questions (in class, by e-mail, during my office hours). **Above all, ask questions.**

If you are experiencing difficulties in keeping up with the academic demands of this course, contact the University Academic Advising Center (web site: <http://www.uaac.vt.edu/success/index.html>). Their educational counselors can help with time management, reading, note-taking, and exam preparation skills.