

CE 351 Water Resources Engineering, Spring 2009

Instructor:

Dr. David Brandes, Associate Professor of Civil & Environmental Engineering
Office: AEC 320, MW2:00-4:30 and by appt.
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When & Where:

Lecture: MWF 10:00 - 10:50, AEC 306
Lab: Th 8:00-11:00, 1:00-4:00, 4:00-7:00 AEC 101 (Hydraulics Lab)

Course Overview:

CE 351 is one of the required lab courses representing each of the six sub-fields of Civil Engineering. Water resources engineers analyze and design systems that control the quantity and quality of water to meet the needs of humans and the environment. Water resources engineering is based on the fundamentals of Fluid Mechanics in addition to hydrologic principles. These principles will be applied to a variety of problems in water resources. The course is divided into three main sections: Pipe Flow, Open Channel Flow, and Hydrology & Stormwater Management. The last section includes statistical methods related to the concept of return periods and probability that are central to water resources engineering. Weekly laboratories will include lab experiments in hydraulics, computer analysis, and field studies. Students will work in teams on a semester project and will write up the results in ASCE conference paper format. As time allows we will view several acclaimed documentary films related to water resources.

Learning Objectives:

- 1) apply principles of fluid mechanics and hydrology and modern engineering tools to analyze and design water resource systems (e.g., pipelines, hydraulic structures, storm sewers, culverts, and stormwater management) (3a, 3e, 3k)
- 2) learn statistical analysis methods relevant to water resources, such flood frequency analysis and regression analysis (3b)
- 3) develop your ability to design and conduct laboratory and field experiments, and to analyze and interpret data (3b)
- 4) develop writing and research skills through a conference paper on a project related to water resources engineering (3g, 3j)

(note, the codes 3a, 3e, etc correspond to ABET Program Outcomes)

Text:

Mays, L.W. 2005. *Water Resources Engineering*. John Wiley & Sons.
This is a comprehensive book covering far more than one semester's worth of topics. You are expected to read the assigned sections of the text to gain additional insight into the topics covered in class.

Course Webpage:

<http://www.lafayette.edu/~brandesd/class/ce351/index.html>

This page has links for course schedule, handouts, and the semester project

Grading:

Three exams: 100 pts each

Homework: 50 pts

Labs: 100 pts

Semester Project: 100 pts

Attendance, participation, and effort will also play a role in your final grade (e.g., it may be the difference between a B+ and an A-). More than two unexcused absences from class will reduce your final grade. Attendance is required at all laboratories. Late work will be accepted with full credit only if you have made prior arrangements with me. A penalty of 10% will be applied for each day an assignment is late.

Exams

Two 2-hour exams will be given in the evening during the semester (see [Schedule](#) link on webpage, time and place to be determined). All exams are closed book and notes; however, you may bring one sheet of equations. I will provide all material properties, constants, and unit conversions needed. Each exam covers the material discussed in class and lab since the last exam.

Homework

Homework assignments will be given on an approximately weekly basis (see [Schedule](#) link on webpage) and will be due on Thursday. Students are encouraged to work together on the problems (this does not mean copying another person's solution!), *which must be done in a neat, professional manner, on engineering paper or computer output, with answers clearly designated (see Division of Engineering Guidelines for Engineering Homework)*. Points may be taken off for *unprofessional work*. Make sure that units are included with all numerical answers and are consistent. Homework will be graded based on completeness and your answers to several problems selected at random. Complete solutions will be provided after the homework is returned.

Laboratory

I am a firm believer in learning by doing. The laboratory portion of the course is critical because you will test and apply theoretical relationships in the real world, where things are never quite as straightforward as in textbook problems. Because of the full-scale nature of the laboratory and field experiments, students must work cooperatively, and lab reports will be submitted by groups of three. Group lab reports will normally be due one week from the date of the lab; however, several weeks' experiments may be combined into one report, meaning that you won't necessarily have a report due every week. Late reports will be accepted only if you have made prior arrangements with me. Additional information on laboratory procedures and safety, as well as format for reports will be provided on separate handouts on the first day of lab.

Semester Project

More learning by doing - you and one or two co-authors will write a paper in ASCE conference format on a water resources project that you complete this semester. Your paper must be focused on a real project, and it should include a quantitative component – data analysis, design, computer work, etc. However, I will also allow papers that summarize or review the literature on a water resources topic if there is a particular topic that interests you. For the best two papers submitted, I will help the first author obtain a Student Travel Grant to present your paper at next year's ASCE EWRI conference or the NCUR conference. See course webpage for more information about the project and suggested topics.

Note on academic dishonesty:

The college has clear written policies on academic dishonesty (see Student Handbook, pages 7, 20, and Appendix II). Note that neglecting to provide citations for documents used in your lab reports and semester paper is a form of plagiarism.

Quotations of Interest

“Engineers ... shall strive to comply with the principles of sustainable development”

-ASCE Code of Ethics, Canon 1

“When the well is dry, we know the worth of water”

- Ben Franklin, *Poor Richard's Almanac*, 1746

“Thousands have lived without love, not one without water”

- W.H. Auden (poet)

“A man from the west will fight over three things: water, women and gold, and usually in that order”

- Barry Goldwater (Conservative/libertarian Arizona Senator)