Course Description:
This is a three credit-hour course that serves as a quantitative introduction to the principles of hydrology, hydraulics, and water resource engineering. The course covers the fundamentals of hydraulics, including properties of water, hydrostatic forces / pressures, fluid statics / dynamics, head losses, and related phenomena in closed conduit flow. Additional topics to be covered include: hydraulic machinery (pumps), open channel flow, statistical methods, and the design of hydraulic structures.

Instructor: Dr. Jason T. Kirby, Associate Professor of Environmental Engineering
Department of Civil, Construction and Environmental Engineering
University of Alabama at Birmingham (UAB)
Office:
238 HOEN
1530 3rd Ave S
Birmingham, AL 35294-4440
Fall 2011: T/H 2-4pm
Phone: (205) 934-8479
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Prerequisites: MA 126 (Calculus II)


Course Goals:
Provide students a basic understanding of hydrology, hydraulics, and water resource engineering. Emphasis will be given to computer assisted design, engineering problem solving, and contemporary issues.

Assignment Schedule:
Homework / projects will be due on the dates announced in class (1 week notice). All assignments should be typed or neatly written on engineering paper. “Illegible” work products will be returned ungraded. Assignments turned in up to 2 days late will be assessed an automatic penalty of 20 percent. Homework which exceed this grace period will not be accepted for credit. Missed assignments or quizzes can be rescheduling only if prior arrangements have been made with the instructor, or in the case of a documented emergency.

Grading Policy:
<table>
<thead>
<tr>
<th>Component</th>
<th>Weight</th>
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</thead>
<tbody>
<tr>
<td>Homework / Quizzes</td>
<td>20%</td>
</tr>
<tr>
<td>Midterm Exam</td>
<td>25%</td>
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<tr>
<td>Final Exam</td>
<td>25%</td>
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<tr>
<td>Design Projects (2)</td>
<td>30%</td>
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Midterm and Final Exam:
There will be no make-up midterm or final given without prior instructor consent. Failure to appear for either of these examinations will result in an automatic penalty of 25 percent from the final course grade.
**Class Expectations:**
Attendance / participation in class discussions and activities is expected. Students should arrive to lectures / labs prepared and behave in an appropriate / professional manner. Please see the “UAB Student Handbook” concerning the university’s policy on attendance and student conduct.

As a consideration to your fellow students cellular phones and/or additional electronic devices should be turned off during class so as not to disturb / distract from the lecture.

**Instructor Communication:**
The use of e-mail to communicate with the course instructor is acceptable and encouraged. However, email will primarily be responded to during office hours and students should not expect a response afterhours or on the weekend. Email is a formal communication with the course instructor; please treat is as such.

Emails must include a subject, greeting (Dear Dr. Kirby….) and your name / UAB email address. Emails without these pre-requisites will not be responded to.

Please make use of office hours for any lengthy questions, problems, or discussions related to the class.

**Academic Misconduct:**
It is expected that the solutions presented on homework, quizzes, exams, and projects will be solely the answers / input provided by individual students; cheating will not be tolerated. UAB policy states that it “expects all members of its academic community to function according to the highest ethical and professional standards…” Academic misconduct undermines the purpose of education. Such behavior is a serious violation of the trust that must exist among faculty and students for a university to nurture intellectual growth and development. Academic dishonesty includes, but is not limited to, the following categories of behavior: abetting, cheating, plagiarism, fabrication, and/or misrepresentation of data. First offence will merit written warning. Additional instances will be referred to UAB academic review panel.

**Disabilities Act Requirements:**
Students with disabilities are encouraged to contact Disability Support Services at 934-4205. Thereafter, they are invited to schedule an appointment with the instructor to discuss accommodations or additional needs.

**Tentative Course Outline:**
1. Introduction / Fundamental Properties of Water 1 lecture  
2. Pressure Forces / Fluid Mechanics 3 lectures  
3. Flow in closed conduits  
   a. Single pipes 1 lecture  
   b. Pipe networks 3 lectures  
4. Pump performance and selection 3 lectures  
5. Flow in open channels  
   a. Fundamental principals 1 lecture  
   b. Cannell design methods 3 lectures  
6. Groundwater 2 lectures  
7. Hydraulic Structures 2 lectures  
8. Probability and statistical methods 3 lectures  
9. Surface water hydrology  
   a. Design storms and IDF curves 1 lectures  
   b. Rainfall abstractions 1 lectures  
   c. Peak Flow estimation 1 lectures  
   d. Hydrographs and flow routing 2 lectures  
   e. Culvert design 2 lectures  

Total: 29 lectures
ABET Course Criteria / Program Outcomes:

3a. The ability to apply knowledge of mathematics, science, and engineering will be demonstrated by students during the completion of class assignments, exams, and design projects.

3c. The ability to design a system, component, or process to meet desired needs will be demonstrated via the final student design project.

3e. The ability to identify, formulate, and solve engineering problems will be demonstrated via student assignments and the final design project.

3l. “The ability to use computers for civil engineering applications.” Computer software, and particularly spreadsheets such as Microsoft’s Excel product, is very well suited to developing tabular and graphical solutions to problems commonly encountered within this course. Students will be required to employ software in the completion of their class assignments. Failure to do so on any particular assignment will result in an automatic 20 percent grade reduction for that assignment. Failure to utilize computers on a recurring basis will result in a non-passing grade for the course.

ABET Course Orientation:

~ 50% engineering science; and
~ 50% engineering design.