

CE 4512: Open Channel Hydraulics (4 credits)

Fall 2015

University of Minnesota
Department of Civil Engineering

Instructor:

Michele Guala CEGE, office 161 &
St. Anthony Falls Laboratory
2 Third Ave. SE
Tel CE: (612) 626-7843
Tel SAFL: (612) 625-9108
E: mguala@umn.edu

Office Hours:

Michele Guala
Mon and Wed 11:00 am - 12:00 pm CE 161
Wednesday 12:00 am - 1:00 at SAFL (last floor)
In general: 9:30am – 5pm available at SAFL www.safl.umn.edu office 382

Communication via email is preferred. Please do not leave messages on the phone.

Class Meetings:

Mon and Wed 9:45 am – 11:00 am Civ E 202

Text Book:

(suggested) Open Channel Hydraulics, T. W. Sturm

Class Objectives:

The Department of Civil Engineering offers two ABET accredited undergraduate degrees: Civil Engineering (CE) and Geological Engineering (GeoE). The Department of Civil Engineering must demonstrate that all of their graduates have certain general skills and abilities. In this course, the following ABET Outcomes will be assessed:

- (a) an ability to apply knowledge of mathematics, science, and engineering.
- (c) an ability to design a system, component, or process to meet desired needs.
- (e) an ability to identify, formulate, and solve engineering problems.
- (k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

The course objectives are:

- Apply conservation of mass, momentum and energy principles to open channel flow problems,
- Design canals using the concepts of uniform flow and gradually varied flow conditions,
- Introduce the principles of unsteady state one-dimensional flows in open channels problems.
- Introduce the principles of sediment transport and erodible beds in channels problems.

Grading Policy:

The final grade will result from the following:

Homework (graded)	20%
Projects (graded)	25%
Midterm Exam	25%
Final	<u>30%</u>
	100%

Exams:

The first exam will be on the first half of the program. The final exam will be comprehensive (full program).

Midterm exam: 28 October (to be confirmed)

Final exam: 10:30 a.m.–12:30 p.m., Saturday, December 19 (this date will not change)

Homework:

You will be required to work individually on the assigned homework problems. I will collect them at the beginning of the class on the due date. All homework problems should be submitted as a stapled paper document, following standard engineering format for each of the problems (i.e. state known and unknowns, show all of your work, include relevant sketches and attach computer output (when needed), highlight final answers, name on each page). Illegible work will receive 0 points. Late assignments will not be accepted unless a permission is given by the instructor in advance.

Projects:

You will be required to work individually on two computational projects.

Class Participation:

Students are expected to participate in class discussions and small group activities. I will be asking questions throughout the lectures and expect students to try answering them to the best of their ability.

Any changes in this syllabus will be communicated to you during class hours.

		CE 4512	Open channel Hydraulics		
Week			Special dates	Topics	Homework due dates (To be confirmed)
1	Mon	7-Sep		Introduction	
	Wed	9-Sep		Specific energy equation	
2	Mon	14-Sep			
	Wed	16-Sep		Critical depth	
3	Mon	21-Sep			Homework 1
	Wed	23-Sep		Momentum equation	
4	Mon	28-Sep			
	Wed	30-Sep		Surges and transitions	Homework 2
5	Mon	5-Oct			
	Wed	7-Oct		Uniform flow	
6	Mon	12-Oct			Homework 3
	Wed	14-Oct		Canal design	
7	Mon	19-Oct	Chile		
	Wed	21-Oct	Chile		Homework 4
8	Mon	26-Oct		Review	
	Wed	28-Oct	Midterm Exam		
9	Mon	2- Nov		Gradually varying flow	
	Wed	4- Nov			
10	Mon	9-Nov		Water surface profile	
	Wed	11-Nov	Project due	Spatially varied flow	
11	Mon	16-Nov			Homework 5
	Wed	18-Nov		Culvert & bridges	
12	Mon	23-Nov	22-24APS	HEC-RAS computation	
	Wed	25-Nov			Homework 6
13	Mon	30-Nov		Sediment transport	
	Wed	2-Dec			
14	Mon	7-Dec		River morphodynamics	
	Wed	9-Dec	Project due		
15	Mon	14-Dec		Review	
16	Sat	19-Dec	Final Exam	10:30 a.m.–12:30.	