Department of Civil and Environmental Engineering
University of Connecticut
CE/ENVE 4820 Hydraulic Engineering
Spring 2010

Instructor:	Dr. Clement Alo
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Time/place:	MWF 9-9:50AM | CAST 201
Office Hours:	MWF, 10:45am-11:45am, or at other times by appointment (send email), BRON 303
Teaching Assistant:	Dimitrios Stampoulis (Das09011@engr.uconn.edu)
Text:	"Hydraulic Engineering," by Roberson, Cassidy, and Chaudhry, published by Wiley & Sons Inc., 2nd Ed.
Recommended Reference:	**"**Hydrology & Hydraulic Systems" by Ram S. Gupta, published by Waveland Press Inc., 3rd Ed.

ABOUT THIS COURSE:

This course is suitable for senior-level undergraduates. It will be assumed that most students in this class have had only one previous course in fluids. Thus, the only prerequisite for this course is Engineering Fluid Mechanics. The course consists of traditional lectures, reading assignments, homework, and a lab project that involves carrying out a series of experiments with a Hydraulic Flume in the Environmental Monitoring laboratory (CAST 114). Course materials (syllabus, homework, etc.) will be posted on the HuskyCT site for the class. Completion of assignments on time and independently is strongly recommended. You are expected to attend class and participate in discussions. Do not hesitate to seek assistance from the instructor! Email is a very efficient and convenient way to ask questions about course materials. One field trip to a water resource project will be scheduled.

OBJECTIVES:

After successful completion of this course you will be able to (1) apply the fundamental principles of Fluid Mechanics for the solution of practical Civil Engineering problems of water conveyance in pipes, pipe networks, open channels, and groundwater flow in porous media; (2) understand the implications of fluid statics and dynamics on the design of hydraulic structures; and (3) describe the factors affecting the operation and specifications of hydromachinery (pumps and turbines).

EXAMINATIONS & GRADING:

There will be two examinations during the semester and a final at the end of the semester. The course grade will be based on the performance in the examinations and homework-lab project as following:

Homework/Labs:	35%
1st Exam:	20%
2nd Exam:	20%
Final Exam:	25%

COLLABORATION POLICY:

Students are encouraged to work together (in groups of 2 or 3) on homework assignments in the interest of gaining better understanding of the material. However, any evidence of direct copying will result in a zero homework grade for all involved parties. Copying from solutions manuals will also result in a zero homework grade. Collaborating on exams will result in an F for the course for all parties involved.

INSTRUCTIONAL OBJECTIVES AND APPROXIMATE SCHEDULE:

The instructional objectives are given below in the order that the topics will be introduced in this course. Use these objectives to judge your understanding, see what is expected of you, and to study for exams. If your understanding does not meet the objectives before an exam, you should both study and see me for additional insight.

Week Period	Topics	Reading
1/19-1/22	Introduction, Basic concepts and principles	RCC, Chapter 1
1/25-2/26	Topic 1: Closed Conduit Flow Review of hydrostatics; Conservation of mass, energy equation, laminar/turbulent flow; Perform head loss analysis; Study flow in small indeterminate pipe networks; Analyze flow in large pipe networks; Instruments and procedures for discharge measurements; Calculate forces on closed conduits;	RCC, 5.1-5.7
2/26	Summary and review for Midterm exam	
3/1	Midterm Exam I	
3/3-3/5	Topic 2: Hydraulic Machinery Understand pump/turbine operations;	RCC, Chapter 8

	Distinguish among various types of pumps/turbines; Draw performance characteristics of pumps; Interpret and apply pump characteristic curves; Select appropriate pumps for different situations;	
3/7-3/13	SPRING BREAK	
3/15-3/19	Topic 2: Hydraulic Machinery Continue after Spring recess ends	RCC, Chapter 8
3/22-4/23	Topic 3: Open Channel Flow Categorize flow using terms “steady, unsteady, uniform, non-uniform”; Understand best hydraulic section; Apply the specific energy diagram to classify flows and to design transitions; Lab session in CAST 114	RCC, 4.1-4.4, 10-7, Chapter 7
4/16	Review for Midterm II	
4/19	Midterm Exam II Characterize critical flow and critical depth; Calculate change in depth across a hydraulic jump; Explain the function of common components of hydraulic structures, their function and design; Lab session in CAST 114	
4/26-4/30	Topic 4: Unsteady Closed Conduit Flow Define unsteady flow, hydraulic transient, and fluid transient; Calculate time for flow establishment in pipes; Determine pressure change due to velocity change; Final Exam	RCC, Chapter 11