

CIVE 401 HYDRAULIC ENGINEERING
Spring 2023 – Prof. P.Y. Julien, Ph.D., P.Eng., Dist. M.ASCE

Class: CIVE 401 03(3-0-0) Hydraulic Engineering
Prerequisites: CIVE-300 Fluid Mechanics - required

Lectures: Mon, Wed. and Fri., 9:00-9:50 pm, Clark A203
Stay home if you have any Covid19 symptom, fever, cough...follow CSU guidance

Office Hours: MW 10:10-10:50 A207H Engineering
W 12:15-1:45 A207H Engineering

Objectives: Identify, analyze, formulate and solve engineering problems.
Apply knowledge of mathematics, science and engineering.
Develop an ability to use techniques, skills and modern engineering tools for engineering practice and the design of hydraulic systems.
Gain knowledge of contemporary issues and professional ethics.

Topics: Closed conduits: flow in pipes and energy grade lines
Energy losses and pipe networks
Pumps, turbines and hydromachinery
Open channels: Resistance to flow, specific energy and momentum
Culverts, gates, weirs and spillways, stilling basins

Text: Julien, P.Y., Essentials of Hydraulics, Cambridge Univ. Press at the bookstore
<https://www.cambridge.org/highereducation/books/essentials-of-hydraulics/DC26D0EE2E1F00E4A02A3EAC8AE30192#overview>

Web Page: http://www.engr.colostate.edu/~pierre/ce_old/classes/CIVE%20401/index.html

Problem sets will be available for download from this web page.

Problems need to be solved on separate 8^{1/2} x 11 sheets kept in a 3-ring binder.
Students must bring binder to class for quizzes, midterms and final exam.

Evaluation:	Midterm I (1 hour)	- Mon. Feb. 13	25%	
	+ Midterm II (1 hour)	- Mon. Mar. 20	25%	
	+ Midterm III (1 hour)	- Mon. Apr. 17	25%	75%
		+		+

Plan A: in person - Quizzes (~1 per week any lecture time) (25%)

Or Plan B: online - Final Exam (2 hours) – Wed. May 10 4:10-6:10pm (25%) 25%

Grade expectation: A>90%, B>75%, C>60%, D>50%, F<50%; and +- are used.

Failure to attend midterms and/or final exam must be approved by both the instructor and the Department Head.

Cases of misconduct, cheating, etc. will be reported to the Conflict Resolution and Student Conduct Services, leading to dismissal from the University!

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Problem sets will be posted online on the course web page.

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Tentative course schedule for 2023

CLOSED CONDUITS

Week 1 – Hydrostatics and dam stability

Week 2 – Flow and forces in pipes, EGL and HGL, Bernoulli

Week 3 – Distribution systems and pipe networks

Week 4 – Head losses and minor losses in pipes

Midterm I - (25%) in class on February 13.

All exams are open book and strictly individual.

HYDROMACHINERY

Week 5 – Pumps

Week 6 – Turbines

Week 7 – Water hammer

Week 8 – Surge tanks

Midterm II – (25%) in class on March 20.

Partial exam, i.e. material since the last midterm.

OPEN CHANNELS

Week 9 – Resistance to flow and normal depth

Week 10 – Continuity and momentum

Week 11 – Specific energy, critical depth

Week 12 – Backwater curves

Midterm III – (25%) Partial exam in class on April 17.

HYDRAULIC STRUCTURES

Week 13 – Culverts

Week 14 – Weirs and spillways

Week 15 – Gates and energy dissipation

Semester Grade:

Plan A: in class attendance

Midterms I + II + III in class (3x25%) + Quizzes (~1 per week) (25%) = 100%.

Plan B: online option -> Final exam

Comprehensive exam, i.e. the material from the entire semester

Midterms I + II + III (3x25%) + Final Exam (25%) = 100%.