CIVE 612 OPEN-CHANNEL FLOW

COLORADO STATE UNIVERSITY
Spring 2018

Instructor: Prof. Timothy K. Gates, B209 Engineering, 491-5043
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Office Hours: 10 - 11 Monday, 2:30 – 4 Wednesday, or by appointment.

Objectives: To develop (1) insight into the basic physical principles that govern the way water flows in open channels, (2) analytical and mathematical skills that are needed to describe and predict the behavior of open-channel flow using modern computational tools, and (3) an ability to effectively apply these principles and skills in the engineering solution of open-channel systems problems.

Tentative Schedule:

Date	Topic
16 – 23 January	Introduction to the Course Analyzing Open-Channel Hydraulic Systems Modeling Physical Systems Field Trip to the Cache la Poudre River
23 January – 6 February	Governing Equations for Cross-Section-Averaged, 1-D Flow Modeling Irregular Hydraulic Geometry in Open Channels
6 – 8 February	Classification of Open-Channel Flow Froude Number: Subcritical and Supercritical Flow Velocity and Momentum Correction Factors
13 – 20 February	Energy Principle and Application to Steady Flow through Transitions Uniform Flow Concepts and Hydraulic Resistance Estimating Hydraulic Resistance Using Field Data Hydraulic Control in Open Channels
20 February – 6 March	Gradually- and Spatially-Varied Flow Developing Computational Algorithms for Gradually-Varied Flow
6 - 8 March	Hydraulic Jumps Rapidly-Varied, Steady Flow through Hydraulic Structures in Channels
10 - 18 March	Spring Break
20 – 29 March	Rapidly-Varied, Steady Flow through Hydraulic Structures (Cont)
3 April	*Mid Semester Exam*
5 - 12 April	Design of Canal Systems
12 – 19 April	Introduction to Computational Modeling of Unsteady Open-Channel Flow
19 – 26 April	Computer Models for Gradually- and Spatially-Varied Flow Analysis Computer Models for 1D and 2D Unsteady Flow Analysis
1 - 3 May	Dealing with Uncertainty in the Modeling of Open-Channel Flow Revisit to the Cache la Poudre River Course Review
8 May	*Final Exam* (6:20 – 8:20PM)

Text: Chaudhry, M. H. 2008. *Open Channel Flow.* 2nd Edition, Springer.

Selected journal articles.

Homework: **This course will adhere to the Academic Integrity Policy of the Colorado State University General Catalog and the Student Conduct Code** (https://resolutioncenter.colostate.edu/conduct-code/). The Honor Pledge (attached) with a place for the student's signature must be attached to, or written out by hand on, every exam and assignment turned in for this course. Please make sure that you read, understand, and comply with the **Policy on Academic Integrity in CIVE 612** statement posted on the **Canvas** course website.

Reading assignments from the textbook, handouts, and papers will be made for which students will be held accountable. Analytical and design problems will be assigned throughout the semester. Many problems will require solution using *Excel* spreadsheets. A major computational modeling project will be due at the end of the semester. **No late homework will be accepted.**

Grading: Regular Homework Problems – 20% of grade; Special Computational Modeling Project – 25%; Mid Semester Exam – 25%; Final Exam – 30%.

A:	90-100%
B:	75-89%
C:	60-74%
D:	50-60%
F:	<50%

Term grades for this course will use the +/- grading system as described in the CSU catalog.