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)

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.