

**CE 422/522 – Open Chanel Flow**  
**Department of Civil Engineering and Engineering Mechanics**  
**School of Engineering, University of Arizona**

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**Instructor:** Dr. Jennifer G. Duan, P.E. ([gduan@email.arizona.edu](mailto:gduan@email.arizona.edu))  
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**Grader:** Shiyan Zhang, Ph.D. student, CEEM.

**Textbook:** [Open-Channel Flow](#) by Terry W. Sturm, 2001. ISBN 0-07-062445-3.

**Office Hour:** Open door

**Prerequisite:** CE 323 Hydraulic Engineering

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***COURSE OBJECTIVES***

The course is taught to Civil, Agricultural, Hydrologic, Geologic engineering students. It aims to provide an introduction of fundamental principles governing unsteady flow and sediment transport in open channels and apply these theories to solve practical problems such as analyzing dam break flow, understanding flood routine in reservoirs, quantifying sediment load. A public domain computational model will be employed to demonstrate how to apply these theories to engineering practice. Graduate students will need to complete a technical report or paper in addition to all other requirements. Specific topics are as follows

- 1) Differential equations governing unsteady flow in open channels
- 2) Simple surface waves in subcritical and supercritical flows
- 3) Introduction of kinematic, diffusion, and dynamic wave methods
- 4) Applications to reservoir routing and dam break flow
- 5) Concepts of bed material, bed load, and suspended load
- 6) Bed load transport mechanism and prediction
- 7) Suspended load transport mechanism and prediction
- 8) Fluvial resistances and bed forms (e.g. ripples, dunes, antidunes)
- 9) Basics of depth-averaged two-dimensional model

The course consists of lectures covering basic concepts and theoretical derivations, recitations for reviewing and tutoring, two tests, and one final exam.

***GRADING***

Finals grades are based on homework assignments at 15%, 3 projects (35% at 12.5, 12.5, 10%), 2 exams (35% at 15, 20%), presentation (5%), graduate project (10%). Letter grades will be assigned as follows: A (>90%), B (80-89.9%), C (70-79.9%), D (60-69.9%), and E (< 60%).

Homework typically will be assigned on Friday and will be turned in the following Friday at 5:00 pm. 1-5 points will be deducted from late homework. Exams will be given at the scheduled dates stated in class calendar. Exams will be closed book but note card will be allowed with equations and short notes. Makeup exams will not be provided without an extreme situation for missing the scheduled exam. Drop policy is stated in the Fall schedule of classes.

ACADEMIC DISHONESTY will not be tolerated. Students committing academic dishonesty will receive an “E” for the course and the proper university officials will be notified.