# Computational problem solving in environmental and water resources engineering

CIVE 498/898, Section 3 Monday, Wednesday 1-2:15pm

# **Instructor:**

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### **Prerequisites:**

- Differential Equations and CSCE 150
- CIVE 326 and CIVE 310
- or instructor's permission

### **Textbook:**

 Chapra, S.C. and Canale, R.P, Numerical Methods for Engineers, 6th ed., McGraw-Hill, New York, N.Y

### **Reference Book:**

 Anne Greenbaum & Timothy P. Chartier, , Numerical Methods: Design, Analysis, and Computer Implementation of Algorithms, Princeton University Press

## **Course Objectives:**

- Introduce students to modeling by motivating every problem via problems in environmental and water resources engineering
- Solidify students' mathematics
- Solidify students' computing ability (including programming)
- Introduce students to a wide range of Numerical Methods
- Include key computing and numerical concepts (number representation, error analysis, order, condition, convergence, stability, efficiency, FLOPS, trade-offs, etc.)

• Grading:

<u>Undergraduates (498)</u>: <u>Graduates (898)</u>:

Homework: 50 % Homework: 30%

Midterm: 20 % Midterm: 20%

Final Exam: 30 % Final Exam: 30%

Project: 20%

- Class Attendance
- Homework and Project
- Exams and Quizzes
- Academic Ethics

# Do I have to know a lot about computing and programming to take this course?

Nope. You just have to have a positive attitude about learning to use them to solve problems.

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### Who might want to take this course?

- Junior, seniors or grad students who want a good general introduction to numerical methods and how they are used to solve engineering-oriented mathematical problems.
- Individuals who want to enhance their computing and mathematical skills.

### Who might not want to take this course?

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- Those who dislike math, cannot balance their checkbook and are satisfied using computer packages without understanding how they work.
- Individuals looking for an "easy" elective.
- Someone who already know numerical methods or wants to focus on advanced topics.