CE 5361 Surface Water Modeling
Course Syllabus

Course Location, Textbook, Instructor Contact Information

Class meetings:	T-TH Distance
Instructor:	Theodore G. Cleveland, TBD
Teaching Assistant:	None
Office Hours:	TBD
Telephone:	(806)834-5101
E-mail:	`theodore.cleveland@ttu.edu`
Web Content:	`http://theodore-odroid.ttu.edu/documents/university-courses/ce-5362-swmodeling/`
Web LMS:	`http://atomickitty.ddns.net/moodle/`
Textbook :	Course notes and library resources. Any hydraulics text with open channel flow component should suffice.
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Course Objectives

The purpose of this class is to study the theory and application of one-dimensional hydraulic models, apply these models in watershed modeling of both water flow and constituent transport.

The student will be able to

1. Present relevant theory for 1D dynamic wave routing.
2. Develop and code a Lax-Diffusion method for time-varying flow in an open channel and compare results with HEC-RAS unsteady or SWMM.
3. Simulate the confluence of two streams in steady and unsteady conditions using HEC-RAS or SWMM (1D-spatial)
4. Present relevant theory for 2D estuary/floodplain modeling
5. Develop a quasi-2D models to approximate 2D floodplain
6. Simulate selected 2-D examples using EFDC

ABET Program Outcomes Addressed in CE 5362[1].

- `3[a].` Ability to apply knowledge of mathematics, science, and engineering.
- `3[e].` Ability to identify, formulate, and solve engineering problems.
- `3[i].` Recognition of need for life-long learning.
- `3[k].` Ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.
- `8[d].` Proficiency in water resources engineering.

Course Schedule

Week	Topics
1	Modeling philosophy, concept of an algorithm, 1D dynamic wave routing.
2	Open conduit dynamic flow (St. Venant Equations) – Simple Finite-Difference Schemes
3	Develop and code a Lax-Diffusion method for time-varying flow in an open channel
3	Develop and code a Lax-Diffusion method for time-varying flow in an open channel
5	Compare Lax-Diffusion model to HEC-RAS (or SWMM)
6	Simulate the confluence of two streams in steady conditions using HEC-RAS (or SWMM)
7	Simulate the confluence of two streams in unsteady conditions using HEC-RAS (or SWMM)
8	Relevant theory for 2D estuary/floodplain modeling
9	Quasi-2D model using SWMM to approximate 2D floodplain
10	Review of available 2D models;Install EFDC (a grid-based model) without GUI
11	Simulate 2D steady in East Lab Flume (EFDC) or White River
12	Simulate 2D unsteady "simple estuary" with river inflow
13	Simulate 2D unsteady San Antonio Bay with salinity tracking
14	Simulate 2D unsteady San Antonio Bay with salinity tracking
15	**Final Exam** (on-line via `http://atomickitty.ddns.net/moodle/`)

Disability: *"Any student who, because of a disability, may require special arrangements in order to meet the course requirements should contact the instructor as soon as possible to make any necessary arrangements. Students should present appropriate verification from Student Disability Services during the instructors office hours. Please note instructors are not allowed to provide classroom accommodations to a student until appropriate verification from Student Disability Services has been provided. For additional information, you may contact the Student Disability Services ofice at 335 West Hall or 806- 742-2405."*

[1]Included for compatability with other courses in Civil and Envrionmental Engineering.

Religious Holidays: *"A student who intends to observe a religious holy day (as defined by OP 34.19) should make that intention known to the instructor prior to the absence in order to receive accommodations prescribed by OP 34.19."*

Cellphones/Pagers: Cellphones and pagers are common with both students and faculty. Please set your personal communication devices to silent ring or off during class. Do not take calls in class.

Prerequisites: Mastery of material from CE 5360 and CE 5361 or equivalent is expected.

Attendance: If you come to class every day, you won't miss anything. Please let the instructor know if you must miss a class for a legitimate reason[2].

Exams: One examination will be given The exam will appear as a quiz on the learning management system (LMS) `http://atomickitty.ddns.net/moodle/`

Quizzes: Six (6) quizzes will be given. The quizzes will be on the learning management system (LMS) `http://atomickitty.ddns.net/moodle/`

Exercises: Five project assignments will be made during the semester they appear as assignments on the learning management system (LMS) `http://atomickitty.ddns.net/moodle/`. Due dates are announced on the LMS.

Cheating: Cheating will not be tolerated. The instructor will indicate when students can work as a team and when solely individual work is to be submitted.

Grading: Final grades are determined based on performance during the semester. Letter grades will be assigned using University standards. The approximate weighting of graded material in determining the final grade is as follows[3]:

Item	Percent of Grade
Homework	50%
Quizzes	20%
Examination	30%

[2]Legitimate reasons include: Academically-related extracurricular activities (ASCE, AGU, etc.); Illness with documentation; Federal Family Leave Act Policies; Orders to activate (Military, Peace Officer, Public Health, etc.). Bring me some kind of documentation for such absences.

[3]Graded materials with fewer than 100 points will have raw scores reported and will be normalized to 100 points for calculating the final grade.