COURSE SYLLABUS

COURSE: CWR 6534, Coastal and Estuary Modeling
Web Site: http://scholar.acomp.usf.edu:90/courses/CWR6534.901F00/

COORDINATORS: Dr. Mark A. Ross — http://www.eng.usf.edu/~mross/
Course Hours: Wednesday, 6:00-8:50 p.m.
Office Hours: TR 11:30-12:30PM; W 4-5PM (or appt)
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OBJECTIVE: To familiarize the student, both in theory and application, with fundamental concepts of mathematical modeling of receiving water (estuarine and coastal) systems including hydraulics, water quality and transport processes.

COURSE CATALOG INFORMATION: CWR 6534 - Coastal and Estuary Modeling
PR: EGM 6814, Advanced Fluid Mechanics (desirable)
Computer modeling of coastal and estuary systems, currents, tide heights, sediment transport, erosion, data collection, temperature distributions, sources and sinks. Special emphasis on coastal waterways in Florida.

REFERENCES:

Fischer, H. B., et al., Mixing in Inland and Coastal Waters, Academic Press, New York, 1979.

Kowalik's Numerical Modeling of Ocean Dynamics, World Science Publishing, 1993.

Schlichting, H., Boundary Layer Theory, McGraw-Hill, New York, 1979.

Thoman, Robert V. and Mueller, John A., Principles of Surface Water Quality Modeling and Control, Harper & Row Publishing, Inc., New York, 1987.

GRADING:

1 or 2 Tests	50%
1 Project Report	50%
	100%

TENTATIVE OUTLINE

	Approx. Number of Hours
1. Introduction, Significance, Objectives, Project Setup	1
2. Continuity of Flow, Review of Fluid Mechanics	2
3. Derivation of Translational Equations of Motion	2
4. Introduction of the Viscous and Turbulent Equations	3
5. Introduction to Turbulence & Turbulent Flow Equations	3
6. Derivation of Conservation of Mass Transport	3
7. Reduction of Flow & Transport Equations to two, one, and zero dimensions	2
8. Solution Techniques, Finite Differences vs. Finite Elements	4
9. Setting up the Boundary Value Problem - Bay Modeling	2
10. Discussion of Computer Modeling - Hydraulics	2
11. Discussion of Assignments	1
12. Tides	2
13. Friction, Depth and Barriers, Inflows	3
14. Transport Requirements from Hydraulic Model	2
15. Water Quality Modeling - Introduction	2
16. Calculating Transport of Conservation Substances	2
17. Discussion of Assignments	1
18. Discussion of Boundary Conditions, Linkage with Hydraulic Model, Data Entry	4
19. Presentation of Results	1
20. Discussion of Midterm Exam and Results	1
21. Discussion of Project Results	1
Total	44