

SYLLABUS - Fall Semester, 1999

- Course:** CWR 6535 - Hydrologic Models (Surface Hydrology); 3 credits
W 6:00-8:30 p.m. CPR 339 (A web instruction assisted course)
Web Address: <http://www.eng.usf.edu/~mross/coursework/cwr6535>
- Coordinator:** Dr. Mark Ross, Associate Professor
Office: ENG 307 or CEE office (ENG 139)
Office Hours: 11:30-12:30 p.m. TR; 4:00-5:00 p.m. W (or by appointment)
Email: mross@eng.usf.edu
Web: www.eng.usf.edu/~mross
- Summary:** A study of the principles of surface water simulation (computer modeling) including precipitation, precipitation losses, rainfall excess, runoff, streamflow, infiltration and percolation. An introduction to surface water hydrologic analysis for engineers and scientists.
- Objectives:** To present the theoretical and applied principles of hydrologic modeling of surface hydrology and to examine various numerical hydrologic models used in engineering practice. Emphasis will be on developing a broad perspective of available runoff model types, limitations and applicability of each to meet specific objectives. This course is not a "how to" short course on the use of a particular model but instead an intensive orientation to the theoretical concepts and basis of the more common hydrologic models.
- Pre-requisites:**
1. CWR 4103 Water Resources Engineering (or equivalent)
 2. Working familiarity with PC's and Windows
 3. Fortran 77, Spreadsheet, or BASIC Programming skills
- Required Text:** None at present.
- Additional References:**
- Bedient, Philip B., and Huber, Wayne C., [Hydrology and Floodplain Analysis](#), 2nd Edition, [Addison-Wesley Publishing](#), 1992.
- McCuen, Richard H., [Hydrologic Analysis and Design](#), Prentice-Hall, 1989.
- Viessman, Knapp, Lewis and Harbaugh, [Introduction to Hydrology](#), 3rd Edition, Harper and Row Publishers, 1989.
- Ponce, Victor Miguel, [Engineering Hydrology: Principles and Practices](#), Prentice-Hall, Inc., 1989.

Project: Model test applications on selected basin.

Tentative Grading Policy:

Midterm	25%
Homework and Project	50%
Final Exam	<u>25%</u>
TOTAL	100%

Tentative Class Schedule:

Topic	Items	Reading	Homework Assignments	# of Lectures (Week #)
Introduction	Course Format; Expectations; Terminology; Hydrologic Cycle; Review	-	-	1 (1)
Precipitation	Measurement and Data Sources for Rainfall; Rainfall Hyetographs; Intensity Duration Frequency (IDF) Curves; Point and Areal Precipitation; Design Storms	-	-	1 (2)
Catchments	Natural and Urban Catchments; Initial Abstraction losses; Rainfall Excess, Runoff and Accumulated Flows, Basin Concentration			1(3)
Infiltration, Soil Moisture, Percolation	Infiltration Measurement; Soil Moisture Physics; Phi Index; Horton's, Holtan's and Green-Ampt Models; Field Capacity, Hydraulic Conductivity and Sorptivity			2(3,4)
Overland Flow	Mechanics of Overland Flow; Kinematic Flow; Time-of-Concentration; Numerical Considerations;			1(5)
Simulation Types	Event vs. Continuous Simulation; Groundwater Interaction; Sensitivity			1(6)

Evaporation (E) & Transpiration	Evapotranspiration (ET); Pan, Potential and Open Water Evaporation; Energy and Water Budget Methods; Data Sources			1(7)
Test 1				1 (8)
Streamflow	Hydrographs; Flow Measurement; Baseflow Separation; Storage Attenuation			1 (9)
Hydrograph Analysis, Simple Predictive Methods	Unit Hydrograph Theory; Estimation of Hydrograph Ordinates; Triangular Hydrographs; Convolution; Synthetic Hydrographs; Snyder Method; Soil Conservation (Curve Number) Method			2 (10,11)
Computer Models	Overview; Characteristics, and Applicability;			1 (12)
Flood Routing	Hydrologic Vs. Hydraulic Methods; Storage Indication, Muskingum, Diffusion Methods			1 (13)
Statistical Methods and Frequency Analysis	Stochastic vs. "Deterministic" Methods; Regression, Correlation and Other Analyses; Modeling Risk and Extreme Events			1 (14)
Project	Presentations and Discussion			1 (15)
Total				30 (15)
Final Exam				1 (16)

Course Notes Availability: ProCopy on Fowler Ave. (optional)
[M. Ross Web page](#)

Policy on Homework: Students are required to complete all homework assignments. The homework is graded pass/fail. Homework that is incomplete or that receives a failing grade must be redone and resubmitted.

Additional Notes: Students would have not taken Water Resources Engineering should consider downloading the undergraduate notes from the CWR 4103

web site (<http://www.eng.usf.edu/~mross/coursework/cwr4103/>).