

SYLLABUS

- Course:** CWR 4103, Water Resources Engineering (Hydrologic Analysis); 3 credits
TR 3:30-4:45 p.m. (A web instruction assisted course)
See also: <http://scholar.acomp.usf.edu:90/courses/CWR4103.001F00/>
(enter as User Id: guest, Password: guest)
- Coordinator:** Dr. Mark Ross, Associate Professor
Office: ENG 307 or CEE office (ENG 139)
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 engineering principles involved in analyzing and managing the quantity and quality of water in natural and developed systems. An introduction to surface water and groundwater hydrology for engineers.
- Objectives:** To provide students with knowledge of engineering practices for water facilities design and management.
- Pre-requisites:**
- 1.. EGN 3353C Basic Fluid Mechanics (or equivalent)
 2. CWR 4202 Hydraulics (C grade or better)
 3. Working familiarity with PC's and Windows
 4. Fortran 77, Spreadsheet, or BASIC Programming skills
- Required Text:** Bedient, Philip B., and Huber, Wayne C., Hydrology and Floodplain Analysis, 2nd Edition, Addison-Wesley Publishing, 1992.
- Additional References:**
- 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.
- Team Project:** Storm water collection and detention system design.
(USF Park or Tenoroc Wetland Area)

Tentative Grading Policy:

Tests (2)	25%
Homework (weekly)	25%
Project (Teams)	25%
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; Water Budgets	1-10	1.1, 1.2	2 (1)
Precipitation	Mechanisms of Precipitation; Measurement of Rainfall; Rainfall Hyetographs; Intensity Duration Frequency (IDF) Curves; Estimate of Point and Areal Precipitation; Design Storms	10-29	1.3, 1.4, 1.5, 1.9, ICA	4 (2,3)
Evaporation (E) & Transpiration	Evapotranspiration (ET); Pan, Potential and Open Water Evaporation; Energy and Water Budget Methods	30-41	1.10, 1.11 1.24	2 (4)
Infiltration, Soil Moisture Percolation	Measurement; Phi Index; Horton's, Holtan's and Green-Ampt Models; Soil Moisture Redistribution; Field Capacity and Other Indices	42-59	1.12, 1.13, 1.14, 1.16, 1.20, ICA	2 (5)
Runoff & Streamflow	Hydrographs; Flow Measurement; Baseflow Separation; Rational Method	59-67	field trip 2.8, 2.22, ICA	3 (6,7)
Test 1				1 (7)
Hydrograph Analysis	Unit Hydrograph Theory; Estimation of Hydrograph Ordinates; Triangular Hydrographs; Convolution	87-119	2.1-2.7, ICA	3 (8,9)
Synthetic Hydrographs	Snyder Method; Soil Conservation (Curve Number) Method;	120-145	2.11, 2.18 ICA	3 (9,10)

Flood Routing	Hydrologic Vs. Hydraulic Methods; Storage Indication; Muskingum Methods	239-269	4.1, 4.3-9	2 (11)
Test 2				1 (12)
Stormwater Management	Introduction Urban Hydrology; Quantity and Quality Management Issues; Detention and Retention Systems	369-407 Hand-outs	6.1, 6.2 ICA	3 (12,13)
Frequency Analysis	Histograms; Risk and Reliability; Frequency Distributions; Estimation of Extreme Events	167-209	3.1-7	2 (14)
Project	Presentations and Discussion			2 (15)
Total				30 (15)
Final Exam				1 (16)

Course Notes Availability: ProCopy on Fowler Ave. (option)
<http://www.eng.usf.edu/~mross/>

Outline of Notes: (subject to change)

<u>Section</u>		<u>Pages</u>
SECTION I	Introduction and Fundamentals	1-1 to 1-9
SECTION II	Precipitation and Design Storms	2-1 to 2-18
SECTION III	Infiltration and Abstractions	3-1 to 3-8
SECTION IV	Evaporation and Transpiration	4-1 to 4-10
SECTION V	Runoff Calculations and Hydrograph Analysis	5-1 to 5-26
SECTION VI	Streamflow Routing	6-1 to 6-36
SECTION VII	Sizing and Planning Water Quality Controls	6-1 to 6-36
SECTION VIII	Introduction to Groundwater Hydrology	7-1 to 7-50
SECTION IX	Introduction to GIS	8-1 to 8-15
SECTION X	Florida Land Use, Cover & Forms Classification System	9-1 to 9-81
SECTION XI	Introduction to Computer Models	10-1 to 10-3
SECTION XII	References	11-1 to 11-6
APPENDIX	Special Figures	A-1 to A-64

Please note: the instructor reserves the right to modify, add or delete the available course notes, assignment schedule and student performance assessments as necessary and with minimal notice.