

EVR 5215 Water Resources Assessment  
Department of Earth and Environment

Fall 2009

Location: Paul Cejas Architecture 150  
Time: TR 11:00-12:15  
Instructor: Assefa M. Melesse, Office: ECS 339  
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Office Hours: TR : 1:00-3:00 PM

### Course Description

The course is designed to provide students with an insight of the different elements of water resources science. Students will familiarize themselves with hydrological cycle and factors involved in influencing the cycle, the hydrological processes responsible for the distribution and movement of water. Solving hydrological problems, water quality and quantity estimation, management and planning of water resources and projects will be stressed. Students will gain an understanding of the environmental impacts of water, water resources, and changes in water supply and availability, and they will be introduced to current and emerging trends in water resource issues, development, and technology. Students will learn through lectures, guest lectures, home work, and individual projects

### Objectives

The course is designed to help students to

1. understand the water resources at local, national and global levels and the challenges ahead
2. acquaint themselves with the elements hydrological cycle and processes
3. solve hydrological problems involving water quantity and quality
4. understand natural and human-induced factors in altering the hydrological cycle and processes
5. apply knowledge gained in class to solving local water resources problems:  
Everglades hydrology and urban flooding
6. apply some models to solve hydrological problems

**TEXTS:** Ward and Trimble, Environmental Hydrology, 2<sup>nd</sup> Edition

### **REFERENCES:**

Davis and SJ Masten, Principles of Environmental Engineering and Science, ML, McGraw Hill, 2004  
Dingman, Physical Hydrology, 2<sup>nd</sup> edition  
Viessman, Intro. to Hydrology, 5<sup>th</sup> edition  
Cech, Principles of Water Resources: History, Development, Management and Policy, 2<sup>nd</sup> edition  
Hornberger, Elements of Physical Hydrology

## Useful Links

Glossary of Hydrological terms: [http://or.water.usgs.gov/projs\\_dir/willgw/glossary.html](http://or.water.usgs.gov/projs_dir/willgw/glossary.html)

South Florida Water Management District: [www.sfwmd.gov](http://www.sfwmd.gov)

Florida water (USGS): <http://fl.water.usgs.gov/>

USGS Drinking Water programs: <http://water.usgs.gov/owq/dwi/index.html>

Water Use: <http://water.usgs.gov/watuse/>

USGS Groundwater Information: <http://water.usgs.gov/ogw/>

USGS surface water Information <http://water.usgs.gov/osw/>

Wetland Functions and Values: <http://www.epa.gov/watertrain/wetlands/index.htm>

Rainfall atlas maps: [http://www.srh.noaa.gov/lub/wx/precip\\_freq/precip\\_index.htm](http://www.srh.noaa.gov/lub/wx/precip_freq/precip_index.htm)

ET concepts: <http://www.fao.org/docrep/X0490E/X0490E00.htm>

## GRADING:

Attendance	5%
Home works	30%
3 Exams	45%
Paper	20%
Total	100

A	90-100
B+	88-89
B	80-87
C+	78-79
C	70-77
D+	68-69
D	55-67
F	<55

## Academic Misconduct

Florida International University is a community dedicated to generating and imparting knowledge through excellent teaching and research, the rigorous and respectful exchange of ideas, and community service. All students should respect the right of others to have an equitable opportunity to learn and honestly demonstrate the quality of their learning.

Therefore, all students are expected to adhere to a standard of academic conduct, which demonstrates respect for themselves, their fellow students, and the educational mission of the University. All students are deemed by the University to understand that if they are found responsible for academic misconduct, they will be subject to the Academic Misconduct procedures and sanctions, as outlined in the Student Handbook.

## COURSE OUTLINE

Lec	Date	Topic	Reading Assignment/ Home work
1	08/25	Course Overview Introduction, concepts in hydrology and properties of water	Davis (190-197)
2	08/27	Overview of hydrological cycles, physical processes and water budget	Ward (1-26) Davis (190-197)
3	09/01	Precipitation Process and formation Measurement (Point and areal) Remote sensing application	Ward (29-51)
4	09/03	Evaporation and Transpiration Concept and measurement	Ward (83-117) <b>Home work 1</b>
5	09/08	<b>Exercise 1</b>	
6	09/10	Surface energy budget, soil water budget, remote sensing approach SEBAL model	Ward (83-117)
7	09/15	Infiltration & interception Storm runoff and stream flow analysis	Ward (55-80) <b>Homework 1 due</b>
8	09/17	Homework 1 solution	
9	09/22	<b>Exam 1 (Lecture 1-7)</b>	
10	09/24	Runoff computation Curve Number: Theory, application and limitation Rational Method	Ward (119-159)
11	09/29	Hydrograph analysis and base flow separation Time of concentration, Overland flow, Unit hydrograph	Ward (119-159)
12	10/01	Wetland Definition, Functions of Wetlands Wetland restoration	Ward (315-317)
13	10/06	Groundwater hydrology Aquifers, Hydrostatics, Darcy's law (diffusion), Permeability	Ward (321-337) Davis (208-217)
14	10/08	Groundwater Flow, flow nets	Ward (321-337) Davis (208-217)
15	10/13	<i>Invited talk on hydrology of South Florida</i>	Dr. Wossenu Abteu, SFWMD <b>Homework 2</b>
16	10/15	Anthropogenic impacts on the hydrology Effects of Urbanization on Runoff: hydrograph analysis of urban watersheds	Ward (339-372)

17	10/20	<b>Exercise 2</b>	
18	10/22	Water use and sustainability	<b>Homework 2 due</b>
19	10/27	Homework 2 solution	
20	10/29	<b>Exam 2 (Lecture 10-19)</b>	
21	11/03	Drinking water quality, health and scaling up of water productivity	Davis (323-328)
22	11/05	Water Pollution and its Prevention	Davis (265-280)
		<b>November 11: No class: Veteran's Holiday</b>	
23	11/12	Point source pollution and non-point source pollution TMDL	Davis (271-280)
24	11/17	Water quality Management	Davis (271-297)
25	11/19	Wastewater treatment	Davis (371-384)
26	11/24	Hydrologic and sediment monitoring of watersheds Insitu Soil and water conservation measures	
	11/26	Thanksgiving	
27	12/01	Low cost Technologies of rainwater harvesting	
28	12/03	Artificial ground water recharging techniques.	
29	12/08	<b>Exam 3 (Lecture 21-28)</b>	