

**SOS 4245/5245 Water Resource Sustainability**  
**3 credits/Spring Semester**

Course Motivation and Description

There is demand for expanding freshwater resources to provide drinking water for the growing population, while at the same time preventing pollution and leaving enough water for natural ecosystem functions. These combined pressures define the need for sustainable water resource management.

This course describes the effects of human impacts on hydrologic ecosystems (aquifers, watersheds, coastal zones, lakes, and wetlands) with quantitative measures of impacts and mitigation/attenuation efforts. Case studies from around the world will be used to illustrate both the detrimental effects of unsustainable resource utilization and the benefits of implementing sustainable resource management strategies.

This course is intended for graduate and undergraduate students interested in the interactions between human civilization and hydrologic systems and should be of interest to agricultural and environmental scientists and engineers, and natural resource managers.

Instructor

James W. Jawitz, Assistant Professor  
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392-1951 x 203, [jawitz@ufl.edu](mailto:jawitz@ufl.edu)  
Office hours will be following class lecture or  
by appointment.

Teaching Assistant

To be determined...

Course Format

Three-credit course taught Spring semester with two lectures and one discussion period per week.

Textbook

To be determined...

A CD-ROM will be available with required course materials (including several items from the Supplemental Reading list below).

Grading System

Mid-term exam (35%), final exam (35%), class participation—including periodic oral presentations (30%)

Grade Scale >90=A, 86-90=B+, 80-85=B, 75-79=C+, 70-74=C, 65-69=D+, 60-64=D, <60=E

Class attendance is highly encouraged. Class participation (including periodic written and oral assignments) counts for 30% of your grade.

There are no late assignments or make-up exams. In the event of unavoidable conflicts, arrangements must be made with the instructor in advance.

### Oral and Written Assignments

Your success as a professional will be based, in large part, on your ability to effectively communicate your ideas in both written and verbal forms. We all need practice to develop and improve these technical communication skills.

Periodic reading assignments will require one-page written responses. Responses must be limited to one typed page that includes the following key components:

- Brief description of the article,
- Identify the fundamental concepts,
- How does this information relate to previous information?
- How may this information be applied?

## LECTURE TOPICS

### I. Sustainability of Natural Resources

Definition of terms and contextual framework.

### II. Historical and Geographical Background

*Fundamental concepts:* Discussion of the hydrologic cycle, how humans interact with the hydrologic cycle (i.e., this is what we mean by ‘water resources’), and introduction to the importance of sustainable water resource management, including a summary of worldwide water resource quantities, demands, and impact levels.

*History:* Discuss the link between the development of human civilizations and water resources, how natural climate and ecosystem changes have impacted humans (climate changes and other natural events have been impacting humans since prehistoric times), and how humans have impacted natural ecosystems: unsustainable resource management has contributed to the demise many great civilizations.

### III. Groundwater

*Why should we care about groundwater?* Importance of groundwater in terms of both water quantity and quality. Discussion of groundwater utilization trends in different regions.

*Human impacts:* Discuss effects of subsidence, contamination (petroleum, chlorinated compounds, MTBE; natural contaminants: arsenic, saltwater). What are appropriate management responses to mitigate these effects and minimize future impacts?

*Case studies:* San Joaquin Valley, High Plains Aquifer, Long Island, South Florida; What has been or is being done in these areas?

### IV. Watersheds

*Watershed basics:* watershed definitions; descriptions of watersheds and river systems of the world.

*Human impacts:* dams and flow diversions, desertification, contamination (nutrients, endocrine disruptors, sediment, heat).

*Case studies:* Colorado River, Mississippi River, Nile River, Yellow River, Murray/Darling Basin, and other local-scale watersheds. Implementation of TMDLs as a mitigation strategy.

### V. Coastal Zones and Wetlands

*Description:* Why these areas are relevant as water resources.

*Human impacts:* erosion, overfishing, land use change, coral reef damage, eutrophication, exotic species. Discuss historical trends in these impacts, and whether these trends are improving—or getting worse.

*Case studies:* Florida coastline, New York coastline, Global coral reefs, Everglades, Illinois wetlands

### IV. Cross-boundary Impacts

*Hydrologic compartments:* compartmentalization into groundwater, surface water, wetlands, etc. is an artificial construct. Impacts are felt on many scales.

*Human impacts:* Climate change, acid rain, hypoxia, deforestation; Scale issues: political constraints increase as the scale of the problem increases, local-scale processes in relation to larger-scale issues.

*Case studies:* Glaciers worldwide, Mediterranean Sea, Gulf of Mexico.

### Academic Honesty

*As a result of completing the registration form at the University of Florida, every student has signed the following statements: "I understand that the University of Florida expects its students to be honest in all their academic work. I agree to adhere to this commitment may result in disciplinary action up to and including expulsion from the University."*

### UF Counseling Services

*Resources are available on-campus for students having personal problems or lacking clear career and academic goals which interfere with their academic performance. There resources include:*

- 1. University Counseling Center, 301 Peabody Hall, 392-1575, personal and career counseling;*
- 2. Student Mental Health, Student Health Care Center, 392-1171, personal counseling;*
- 3. Sexual Assault Recovery Services (SARS), Student Health Care Center, 392-1161, sexual assault counseling*
- 4. Career Resources Center, Reitz Union, 392-1601, career development assistance and counseling.*

### Accommodation for Students with Disabilities

*Students requesting classroom accommodation must first register with the Dean of Students Office. The Dean of Students Office will provide documentation to the student who must then provide this documentation to the Instructor when requesting accommodation.*

### Software Use

*All faculty, staff and students of the University are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against University policies and rules, disciplinary action will be taken as appropriate. We, the members of the University of Florida, pledge to hold ourselves and our peers to the highest standards of honesty and integrity.*