

GSC 556 - Complexity in Coastal Systems

Instructors:

Drs. Gene Rankey & Hal Wanless

Description: Coastal regions are very dynamic environments impacted by a number of variables from the biosphere, atmosphere, hydrosphere, and lithosphere. These ‘spheres’ interact to influence and shape coastal systems. In this upper-level undergraduate/beginning-level graduate course, we seek to integrate course and field work to make explicit several concepts central to Earth system science: different spheres; spatio-temporal scales; systems, order, and organization; and feedback and complexity. Our focus will be on understanding different aspects of the coastal system and their interactions using inquiry-based learning and instruction by experts from a diverse suite of disciplines, and will include remote sensing data as a tool for data analysis and visualization.

In this upper-level undergraduate course, we seek to integrate course and field work to make explicit several concepts central to Earth system science:

- *Spheres:* Interactions of the hydrosphere, lithosphere, biosphere, and atmosphere
- *Scale:* Temporal and spatial scales, including concepts of geologic time and history, spatial context,
- *Systems, order, and organization:* Systems theory, organizational patterns, equilibrium and evolution, and
- *Feedback and Complexity:* Causes and effects of non-linearity, influences on systems; chaos and complex systems theory

We start with a survey of the different components of the coastal system, from geologic history to chemistry. Our focus for the second part of the course will be exploration and integration of these concepts, using South Florida as a case study. We will have several field trips to experience the system first-hand.

Textbook:

This course will not require purchase of a textbook. Instead, it will rely on primary literature that will be provided as the class proceeds.

Grading:

35% Mid-term Exam

20% Participation: discussions, field trips

35% Projects

There will be no final exam. **Plagiarism will earn you an automatic F in the course, and referral to the Honor Council.**

Lectures:

(Time TTh 10:50)

	Topic
<i>Week 1</i>	Conceptual Overview: "Spheres," Scales, Systems, Order and Organization
<i>Week 2</i>	Components of the Coastal System: Geologic History
<i>Week 3</i>	Components of the Coastal System: Oceanography
<i>Week 4</i>	Components of the Coastal System: Biophysical Processes
<i>Week 5</i>	Components of the Coastal System: Chemistry
<i>Week 6</i>	Components of the Coastal System: Sedimentology
<i>Week 7</i>	Review and Exam
<i>Spring Break 13-21 March</i>	
<i>Week 8</i>	Exploring Connections: Coastal Wetlands
<i>Week 9</i>	Exploring Connections: Shorelines
<i>Week 10</i>	Exploring Connections: Reefs
<i>Week 11</i>	Exploring Connections: Human Dimensions to Coastal Change
<i>Week 12</i>	Experiencing the Coastal System
<i>Week 13</i>	Experiencing the Coastal System
<i>Week 14</i>	Presentations & Reviews

Policies:

Attendance at Class Lectures

You are here to learn, but we cannot force you. Your attendance and participation is critical for learning some of these concepts – you cannot make them up. Attendance will be taken sporadically. PLEASE - turn off beepers, pagers, and cell phones.

Attendance at Field Trips

Attendance and participation in the field trips is required part of the course. These trips provide opportunities for unique experiences of the South Florida coastal system and to collect, analyze, and interpret data.