BEE 446-546, River Engineering, Spring 2013

Syllabus

Instructor: Dr. Desiree Tullos
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Office Hours: Wednesdays, 3-5pm

Class meeting times and places: Tuesdays & Thursdays, 8:30am-9:50am

Course Description from catalog: Multipurpose river use; natural physical processes in alluvial rivers; channel modification practices; river structures; design practices; impact of river modification; problem analysis; and impact minimization. Offered alternate years.

Instructional objectives and student learning outcomes of the course:

In accordance with ABET's a-k learning outcomes, students completing this course will possess:

1. An ability to identify, formulate, and solve engineering problems.
2. An ability to function on multi-disciplinary teams
3. An ability to model and design ecological systems

Upon completion of this course, all students will be able to:

- Make observations of and investigate hypotheses about river processes and the impacts of river engineering alternatives [ABET OUTCOME 1]. Field labs will focus largely on observations leading to questions about rivers. Students will be expected to generate hypotheses about observed conditions at field sites, and select and implement appropriate methods of data collection for addressing engineering problem at the project site. We will discuss methods in class and get hands-on experience by surveying the project site. Students will apply field data in engineering analysis and design. Students will be expected to analyze data collected at the field site using simple descriptive statistics, visualization, time series analysis, and simple hydraulic modeling. Students will be required to develop and simulate design alternatives using a variety of tools for the homework assignments and for the class project.
- Identify and justify appropriate engineering solutions [ABET OUTCOME 1]. Students will be required to interpret the findings of their analyses, compare alternatives, link data to river processes, raise additional questions and identify sources of uncertainty. These analyses will be used to 1) make design recommendations, 2) justify why proposed designs are feasible and appropriate, and 3) describe the physical, biological, and chemical response that should be expected.
- Analyze tradeoffs in designs with multiple objectives [ABET OUTCOME 1]. Demonstrate knowledge of and ability to analyze costs and benefits of designing systems for multiple objectives (e.g. economics, ecological integrity, water supply, etc.)
- Formally document analyses and design recommendations [ABET OUTCOME 2]. Students will submit a written report and give an oral presentation describing the data collection, analysis,
modeling and design considerations for the class project in lieu of a final exam. Students will be graded according to the appropriateness of and their ability to articulate and justify their choices in the design process as well as group evaluations of peer performance.

- **Communicate professionally in design teams [ABET OUTCOME 2].** Students will demonstrate ability to respond to emails in a timely manner, to communicate needs and respond to needs of others, give team presentations on analysis and design, and write coherent design reports.
- **Effectively use figures and graphs to communicate analysis results [ABET OUTCOME 2].** Students will be required to interpret and develop figures, graphs, and feasibility matrices to communicate concepts around fluvial processes, and design decisions.

**Prerequisites:** CE313 or with instructor permission

**Required Text:** None.

**Field trip information:** We will have at least one Saturday field lab. Please be prepared to be cold and wet; We will go out regardless of weather conditions. Thus, you should come to field labs prepared with good clothing and foot wear. Depending on the weather, warm clothes, rain coat and pants, and boots/waders that will keep your feet warm and dry may be necessary. Waders will be provided.

**Slash course information:** Students enrolled in BEE 546 will be considered project managers for the design teams. Project manager duties include: 1) submitting the “rules of engagement” to the Discussion board after discussion with group (graded), 2) fostering open and equal sharing of ideas and responsibilities throughout the term, 3) providing a mechanism for evaluating the group process, and 4) ensuring that team members understand their individual roles and responsibilities, and execute their tasks in a timely and quality manner.

**Evaluation of student performance.**

**Final group design project:** 50%
- Alternatives analysis (10%), final report (30%) and presentation (10%)
- Appropriateness of motivation, data collection, methods, project analysis of alternatives, design details, justification and defense of assumptions, recommendations
- Clarity and completeness of design report
- Clarify and completeness of oral presentation
- Peer evaluation of group process and performance

**Midterm Exam (20%).** The midterm will be based on lectures and in class examples, homeworks, and reading discussions.

**Homework assignments (20%):** 5 assignments

**Participation (10%):** Participation grades will be based on four low-stakes assignments: submission of key concepts cross-word, discussion board posting of team “rules of engagement,” attendance at field lab, and one unannounced quiz on course reading. Please make arrangements with me if you cannot attend the lab.

**Due dates and times:** Don’t turn assignments in late.
University and Departmental Policies.

Students with Disabilities: "Students with documented disabilities who may need accommodations, who have any emergency medical information the instructor should know, or who need special arrangements in the event of evacuation, should make an appointment with the instructor as early as possible, no later that the first week of the term. In order to arrange alternative testing, the student should make the request at least one week in advance of the test. Students seeking accommodations should be registered with the Office of Services for Students with Disabilities."

Rules on Civility and Honesty: The Biological and Ecological Engineering Department follows the university rules on civility and honesty. These can be found at: www.osu.orst.edu/instruct/cssa556/CIVHON556.

Cheating or plagiarism by students is subject to the disciplinary process outlined in the Student Conduct Regulations. Students are expected to be honest and ethical in their academic work. Academic dishonesty is defined as an intentional act of deception in one of the following areas:

* cheating- use or attempted use of unauthorized materials, information or study aids
* fabrication- falsification or invention of any information
* assisting- helping another commit an act of academic dishonesty
* tampering- altering or interfering with evaluation instruments and documents
* plagiarism- representing the words or ideas of another person as one's own

Behaviors disruptive to the learning environment will not be tolerated and will be referred to the Office of Student Conduct for disciplinary action.

“The goal of Oregon State University is to provide students with the knowledge, skill and wisdom they need to contribute to society. Our rules are formulated to guarantee each student's freedom to learn and to protect the fundamental rights of others. People must treat each other with dignity and respect in order for scholarship to thrive. Behaviors that are disruptive to teaching and learning will not be tolerated, and will be referred to the Student Conduct Program for disciplinary action. Behaviors that create a hostile, offensive or intimidating environment based on gender, race, ethnicity, color, religion, age, disability, marital status or sexual orientation will be referred to the Affirmative Action Office.”