**ABE 591 – Ecological Engineering & Ecosystem Restoration**
Spring 2016

**Instructor:**
Dr. Sara K. McMillan, P.E.
ABE 208B
mcmill@purdue.edu
Office hours: T/Th 3:00-4:00PM and by appointment

**Class Hours**
Tuesday and Thursday, 12:00 – 1:15 PM

**Textbook:**     W. J. Mitsch and S. E. Jorgensen, Ecological Engineering and Ecosystem Restoration 2nd ed.; ISBN 978-0471332640.

**Course Learning Objectives**
In this course, students will learn and apply governing principles of ecological engineering, including biological, chemical, and physical conditions that guide restoration design. We will use a systems approach to characterize and quantify water and elemental cycling, energy flow through systems, ecological disturbance and ecosystem response. Applications will focus on stream restoration, wetland & floodplain restoration, and stormwater control measures. We will utilize an ecosystem services approach to critically review the benefits and potential trade-offs. Another key objective is to further develop your skills to critically read and extract key findings the scientific literature and be able to present those to your peers. Therefore, it is critical that you attend and come prepared to actively participate.

**Course Topics**
1. Introduction and overview of relevant ecological frameworks and principles
2. Ecosystems and ecosystem services
3. Water and material cycles
4. Energy flow through systems
5. River geomorphology
6. Stream restoration and dam removal
7. Riparian zones and floodplains
8. Wetland restoration
9. Prairie restoration

**Paper presentation:**
Reading assignments will be taken from the textbook as well as supplemented with peer-reviewed literature. You are expected to have access to your own copy of the textbook for this course. Supplemental reading will be posted on Blackboard.
Graduate students: You will present key findings and lead discussion of a paper (assigned by me) pertinent to the topic that week.

**Field trip:**
There will be one mandatory class field trip on a Saturday (date/time to be determined). The field trip will be to a stream or wetland restoration project.

**Final project:**
A key component of this course is to work in groups of 2-3 students on a semester-long research project. Final presentations will be typical of a poster session at a scientific meeting: (1) detailed abstract, (2) poster and (3) presentation of your work using the poster to the class.
Undergraduates: The restoration of Todd's Creek on campus will be a focus of the course and used as a living laboratory. You will split into groups to assess the current state of the system and prepare conceptual designs using examples from other projects in Indiana and around the country. Because the project is in the design phases, the project scope may change slightly to accommodate the construction schedule.
Graduate students: The goal is to move beyond a literature review and create something new (e.g., synthesis of publicly available monitoring data, applying a model to conduct virtual experiments of a system). The project can be related to your graduate research, but cannot be duplicative. All project ideas will be reviewed and approved by me.

**Grading**
Grades will be earned by a weighted average:

| Item | *Grade allocation* Undergrads | *Grade allocation* Grads |
|---|---|---|
| Homework | 30% | 20% |
| Class performance and participation | 10% | 10% |
| Paper presentation (grads only) | NA | 10% |
| Exams | 35% | 35% |
| Final project | 25% | 25% |

Course grades will be determined as follows:

| Score | ≥ 97 | 92-96.9 | 88-91.9 | 82-87.9 | 77-81.9 | 72-76.9 | 67-71.9 | 62-66.9 | 60-61.9 | < 60 |
|---|---|---|---|---|---|---|---|---|---|---|
| Grade | A+ | A | A- or B+ | B | B- or C+ | C | C- or D+ | D | D- | F |

If you fall into one of the "gray areas" (A- or B+, B- or C+, C- or D+) your grade will be based on whether your performance has improved or gotten worse and your participation in making the classroom a positive learning environment for everyone. *If you believe that an error was made in grading either homework or exam, you should write a short justification and attach it to the original assignment/exam. I will review your concern and respond to you directly. The "statute of limitations" for submitting such a request is one week after the work is returned.*

## Academic Integrity

I expect honesty and integrity from my students. Anything that appears with your name on it must reflect your own work. My definition of "working together" includes teaching each other how to solve a problem and checking each other's work for mistakes. However, all work you submit under your name should be the result of your own efforts. If you copy someone else's work or "split" the work and copy portions of it, you are being dishonest. The penalty for dishonesty is automatic failure and a report to the Dean of Students. The University's student guide for academic integrity can be found at www.purdue.edu/odos/aboutodos/academicintegrity.php. The policy is stated here:

> Purdue prohibits "dishonesty in connection with any University activity. Cheating, plagiarism, or knowingly furnishing false information to the University are examples of dishonesty." [Part 5, Section III-B-2-a, *University Regulations*] Furthermore, the University Senate has stipulated that "the commitment of acts of cheating, lying, and deceit in any of their diverse forms (such as the use of substitutes for taking examinations, the use of illegal cribs, plagiarism, and copying during examinations) is dishonest and must not be tolerated. Moreover, knowingly to aid and abet, directly or indirectly, other parties in committing dishonest acts is in itself dishonest." [University Senate Document 72-18, December 15, 1972].

## Use of Copyrighted Materials

Students are expected to take their notes for their own use during the class. Students are not allowed to make course notes or other materials developed as part of this course available for others to purchase (e.g., via commercial note-taking service). The University's policy is stated here for your reference:

> Among the materials that may be protected by copyright law are the lectures, notes, and other material presented in class or as part of the course. Always assume the materials presented by an instructor are protected by copyright unless the instructor has stated otherwise. Students enrolled in, and authorized visitors to, Purdue University courses are permitted to take notes, which they may use for individual/group study or for other non-commercial purposes reasonably arising from enrollment in the course or the University generally.

> Notes taken in class are, however, generally considered to be "derivative works" of the instructor's presentations and materials, and they are thus subject to the instructor's copyright in such presentations and materials. No individual is permitted to sell or otherwise barter notes, either to other students or to any commercial concern, for a course without the express written permission of the course instructor. To obtain permission to sell or barter notes, the individual wishing to sell or barter the notes must be registered in the course or must be an approved visitor to the class. Course instructors may choose to grant or not grant such permission at their own discretion, and may require a review of the notes prior to their being sold or bartered. If they do grant such permission, they may revoke it at any time, if they so choose.

## Safe Learning Environment

Purdue University is committed to providing a safe and secure campus environment for members of the university community. Purdue strives to create an educational environment for students and a work environment for employees that promote educational and career

goals. Violent Behavior impedes such goals. Therefore, Violent Behavior is prohibited in or on any University Facility or while participating in any university activity. See the following website for more information: www.purdue.edu/policies/pages/facilities_lands/i_2_3.shtml

**Students with Disabilities**
If you have a disability that requires special academic accommodation, please make an appointment to speak with me within the first week of the course in order to discuss any adjustments.  It is important that we talk about this as soon as possible.  It is the student's responsibility to notify the Disability Resource Center (http://www.purdue.edu/drc) of an impairment/condition that may require accommodations and/or classroom modifications.

**Emergencies**
In the event of a major campus emergency, course requirements, deadlines and grading percentages are subject to changes that may be necessitated by a revised semester calendar or other circumstances beyond the instructor's control. Please see the Blackboard course page or contact one of the instructors to receive more information if such an emergency occurs.

**Safety considerations**
If the fire alarm is activated, the building must be evacuated immediately. Proceed to the nearest stairway, then to the nearest building exit doors and finally to the Emergency Assembly Area which is located on the Agricultural Mall directly north of the Food Science Building. In the event of a tornado, all ABE occupants should proceed to room 106. This procedure may also be necessary if other emergencies make it unsafe to be outside, such as release of a harmful or irritating gas outside the building.

**Nondiscrimination**
Purdue University is committed to maintaining a community which recognizes and values the inherent worth and dignity of every person; fosters tolerance, sensitivity, understanding, and mutual respect among its members; and encourages each individual to strive to reach his or her own potential. In pursuit of its goal of academic excellence, the University seeks to develop and nurture diversity. The University believes that diversity among its many members strengthens the institution, stimulates creativity, promotes the exchange of ideas, and enriches campus life. Purdue University prohibits discrimination against any member of the University community on the basis of race, religion, color, sex, age, national origin or ancestry, genetic information, marital status, parental status, sexual orientation, gender identity and expression, disability, or status as a veteran. The University will conduct its programs, services and activities consistent with applicable federal, state and local laws, regulations and orders and in conformance with the procedures and limitations as set forth in Executive Memorandum No. D-1, which provides specific contractual rights and remedies. Any student who believes they have been discriminated against may visit *www.purdue.edu/report-hate* to submit a complaint to the Office of Institutional Equity. Information may be reported anonymously.

**Anti-Harassment Policy**
Purdue University is committed to maintaining an environment that recognizes the inherent worth and dignity of every person; fosters tolerance, sensitivity, understanding and mutual respect; and encourages its members to strive to reach their potential. The most effective way to work toward preventing Harassment is through education that emphasizes respect for every individual. Harassment in the workplace or the educational environment is unacceptable conduct and will not be tolerated. Purdue University is committed to maintaining an educational and work climate for faculty, staff and students that is positive and free from all forms of Harassment. This policy addresses Harassment in all forms, including Harassment toward individuals with legally protected status for reasons of race, gender, religion, color, age, national origin or ancestry, genetic information or disability and Harassment toward individuals for other reasons such as sexual orientation, gender identity, gender expression, marital status or parental status. The University will not tolerate Harassment of its faculty, staff or students by persons conducting business with or visiting the University, even though such persons are not directly affiliated with the University.
Purdue Anti-Harassment Policy (III.C.1):
http://www.purdue.edu/policies/ethics/iiic1.html