**WETLANDS ECOLOGY**

(E440/E540, Fall 2024)

**Note: This course is open to BSES, MSES and Environmental Science PhD students. All others require permission/approval of the Instructor.**

**Lecture:** Tuesday & Thursday 4:45-6:00 PM

**Lab:** Most Fridays, 8-12, Back Entrance to SPEA

**Instructor:** Jacob Bannister **Office:** Virtual **Office hours:** Wednesdays, 4-6 PM

**Drivers:**

**Description:** *Wetlands Ecology* emphasizes the ecosystem structure and function of freshwater and estuarine wetlands, the ecological services they provide, and their value to society. The course focuses on seven basic areas:

- *Characteristics used to identify wetlands* (vegetation, soils, hydrology)
- *Classification of wetlands*
- *Plant and animal adaptations to anaerobic conditions*
- *Wetland community structure and ecosystem processes*
- *Biogeochemistry of wetlands*
- *Wetland functions and values*
- *Management of wetlands*, *including jurisdictional wetland delineation, and wetland creation & restoration*

The information will be used to discuss the role of wetlands as a component of ecosystems, landscapes, and the biosphere, their importance as a sustainable resource (water resources & water quality, shoreline protection & disturbance regulation, biodiversity & wildlife habitat, and preservation of natural areas) and their economic and aesthetic values to society.

**Readings:** *Lecture notes are available on Canvas. Notes will be supplemented by readings, also on Canvas*.

**Grading:**

You will be evaluated on your knowledge of the material based on 2 quizzes, term paper, (group) delineation project, and Wetland Restoration project. There will be half-day field labs most Fridays. In the lab, you will learn to identify wetlands from non-wetlands and to characterize the different types of wetlands based on vegetation and landscape position. The purpose of the group project is to learn how to delineate a jurisdictional wetland. The delineation exercise will culminate in a report, including a field presentation that describes the results, including a map of wetland versus non-wetland acreage, of your delineation. In Wetland Restoration we will assess current wetland restoration projects in the state of Indiana, i.e. restoration processes, legislation, efficacy, etc., which will culminate in each student locating a potential restoration site and producing plan narrative for how restoration will be completed.

**You will complete a short (10-12 pages double spaced plus references) term paper**. You should select a topic carefully, based on your own interests (research, policy, etc) as related to some aspect of Wetlands Ecology.

**The term paper should be an original piece of work and not something that was submitted for credit in another course.** The term paper must be a **literature review** that is formally organized with subheadings, including an Introduction (with a statement of purpose), Results/ Discussion, Conclusions and a Literature Cited. The Literature Cited section should follow the style of the journal *Wetlands*. **Note: This is not a position/opinion paper.**

Term paper format: Double-spaced, 10-12 pages in length **plus references**.

20+ references, at least 80% are from the peer-reviewed literature.

Use a scientific journal (e.g. *Wetlands*) as a template for citing and listing

references.

Term paper critique: 1. FOCUS on a specific topic.

2. Include some visual aides (e.g. tables and figures) that synthesize/summarize your
3. Cite mostly scientific (wetlands, ecological)
4. PROOFREAD your

Term paper deadlines: Nov. 1 (Topic, 10%)

Nov. 18 (Assignment due, 90%)

**Note: I do not accept email submission of term papers, lab write-ups, etc.**

**I do not accept late assignments.**

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| **Grading Criteria:** | **Quiz #1** | **(Sept. 22)** | **20%** |
| | **Quiz #2** | **(Oct. 27)** | **20%** |
| | **Delineation exercise** | **(Nov. 11)** | **20%** |
| | **Term paper** | **(Nov. 18)** | **25%** |
| | **Restoration exercise** | **(Dec. 8)** | **10%** |
| | **Class participation** | | **5%** |

**Note:** "The devil is in the details." In order to perform well on the tests, **you will need to master detailed information** from the lectures and lecture notes. If you are not able to develop a command of knowledge of details, this course is not for you.

**I do not re-grade tests. If you want a question re-graded, you will need to put the request in writing.**

**Learning Outcomes:**

- Develop critical thinking skills

- Develop technical writing skills
- Compile and analyze quantitative data

- Become proficient with field indicators of wetland hydrology, vegetation and soils

- Search and use relevant spatial databases to identify wetlands and wetland types on the landscape
- Become familiar with federal and state wetland laws, regulations, and rules

**Lecture Schedule**

| Date | Topic | Reading assignment |
|---|---|---|
| Aug. 27 | Overview | |
| Aug. 29 | Wetland Vegetation | |
| Sept. 3 | Wetland Soils | |
| Sept. 5 | Soils (cont.) | |
| Sept. 10 | Wetland Hydrology | |
| Sept. 12 | Hydrology (cont.) | |
| Sept. 17 | Classification of Wetlands | |
| Sept. 19 | Plant / Animal Adaptations | Reading: Oxygen deficiency in *Spartina* |
| Sept. 24 | Bottomland and Alluvial Forests | |
| Sept. 26 | **Quiz 1** | |
| Oct. 1 | Tidal salt marshes | Reading: Multiple Stable Isotopes Used…<br>Are coastal habitats an important nursery… |
| Oct 3 | Northern Peatlands | |
| Oct. 8 | **Open** | |
| Oct. 10 | Jurisdictional Wetland Delineation | |
| Oct. 15 | Wetland Biogeochemistry (Redox) | |

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| Oct. 17 | Wetland Nutrient Cycling | |
| Oct. 22 | Wetland Ecosystem Processes (Productivity / Decomposition / C cycling) | |
| Oct. 24 | **Open** | |
| Oct. 29 | Wetland Ecosystem Services | Reading: Changes in the global value of ecosystem |
| Oct. 31 | **Quiz 2** | |
| Nov. 5 | Wetland Mitigation | Readings: Assessing wetland mitigation sites…<br>Landscape characteristics of a stream & wetland mitigation… |
| Nov. 7 | Mitigation (cont.) | |
| Nov. 12 | **Open** | |
| Nov. 14 | Wetlands and Climate Change | |
| Nov. 19 | Wetland Creation and Restoration | Nov. 21 Creating and Restoring Wetlands in Natural, Agricultural and Urban landscapes |
| **Nov. 23, 25** | **Thanksgiving – no class** | |
| Nov. 29 | Constructed & Natural Wetlands for wastewater Nutrient Removal & Wastewater Treatment | Reading: Constructed wetlands for treatment |
| Dec. 1 | Lessons Learned in Restoring Wetlands in Indiana | |
| Dec. 6 | Wetland Restoration Practices refined | |

Dec. 8 Living on the Edge: Chronicles of a Wetland Professional

**Lab Schedule**

| **Date** | **Topic** |
|---|---|
| Aug. 30 | Field lab (Wetland Vegetation) |
| Sept. 6 | Field lab (Field indicators of Wetland Soils) |
| Sept. 13 | Field lab (Field indicators of Wetland Hydrology) |
| Sept. 20 | Field lab (Classification of Wetlands/Plant and Animal Adaptations) |
| Sept. 27 | **Lab Practical** |
| Oct. 4 | Intro to Wetland Delineation |
| Oct. 11 | **Fall Break** |
| Oct. 18 | Intro to Wetland Delineation |
| Oct. 25 | Open |
| Nov. 1 | Delineation Exercise |
| Nov. 8 | Delineation Exercise |
| Nov. 15 | Delineation Report and Field Presentation |

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| Nov. 22 | Open |
| Nov. 29 | **Thanksgiving** |
| Dec. 6 | Wetland Restoration in Practice |
| Dec. 8 **– Thurs.** | **Wetland Restoration Assignment Due** |

**Summary Suspension Policy**

**“A student may be summarily suspended from the university and summarily excluded from university property and programs by the Provost or designee of a university campus. The Provost or designee may act summarily without following the hearing procedures established by this section if the officer is satisfied that the student’s continued presence on the campus constitutes a serious threat of harm to the student or to any other person on the campus or to the property of the university or property of other persons on the university campus.”**