

BE 881 - Ecohydrology

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3 credits

Course Descriptions

This course reviews and synthesizes recent literature in ecohydrologic systems analysis. The course also identifies and quantifies the critical linkages between ecological processes and the hydrological cycle. In this course students will be introduced to software and hydrologic modeling applications in local and regional ecohydrological assessment.

Course Objectives

Upon completion of this course, students will be able to: (1) understand the value of ecosystem services; (2) quantify linkages between ecological processes and the hydrological cycle, (3) incorporate ecohydrological concepts in water resources management planning

Course Outline

I. Introduction to Ecohydrology

II. Process and Response

- Physical–Ecological Interactions: Patterns and Processes in the Catchment
- River Function
- Environmental Flow
- Hydrological Cycle in Forest Ecosystems
- Ecohydrology of Invertebrates
- Fluvial Sedimentology
- Aquatic–Terrestrial Subsidies along River Corridors
- Flow-generated Disturbances and Ecological Responses
- Surface Water–Groundwater Exchange Processes and Fluvial Ecosystem Function
- The Ecological Significance of Hydraulic Retention Zones
- Ecohydrology and Climate Change

III. Methods and Critiques

- Value of Long-term (Palaeo) Records
- Field Methods for Monitoring Surface/Groundwater Hydroecological Interactions
- Examining the Influence of Flow Regime Variability on Instream Ecology
- Environmental Flow Assessment Methodologies
- A Mathematical and Conceptual Framework for Ecohydraulics
- Ecohydrologic Modeling

IV. Case Studies

- Ecohydrological Analysis to Manage Watersheds of Contrasting Climates
- The Role of Floodplains in Mitigating Diffuse Nitrate Pollution
- Flow–Vegetation Interactions in Restored Floodplain Environments
- Hydroecological Patterns of Change in Riverine Plant Communities

Course Materials

Recommended text:

- *Hydroecology and Ecohydrology: Past, Present and Future*. 2007. P.J. Wood, D.M. Hannah and J.P. Sadler (eds.)
- *Stream hydrology: An Introduction for Ecologists*. 2007. N.D. Gordon, T.A. McMahon, B.L. Finlayson, C.J. Gippel, and R.J. Nathan (2nd edition), John Wiley & Sons Ltd.
- *Ecohydrology*. 2008. D. Harper, M Zalewski, and N. Pacini (eds.) CAB International.

Grading

Your grade will be based on the following assignments as well as class participation.

Class participation	10 points
Synthesis paper and presentation	30 points (15+15)
Literature review paper and presentation	60 points (50+10)

TOTAL	100

Grading scale will be assigned as follows: **4.0:** 90-100, **3.5:** 85-89.9, **3.0:** 80-84.9, **2.5:** 75-79.9, **2.0:** 70-74.9, **1.5:** 65-69.9, **1.0:** 60-64.9.

Synthesis papers and presentations

- Identify two papers (primarily from journals of Ecohydrology, Ecological Indicators, Stream Ecology, Ecological Informatics) of interest to you and thematically linked
- Identify papers
- You are presenting twice during the semester
- Email papers to the class one week ahead of time – everyone reads them
- Provide a 20-slide PowerPoint presentation and lead a discussion on the papers (objectives, methods, findings, limitations, implications)
- You are presenting for 30 minutes and 15 minutes for questions
- Everyone participates every week and asks at least one question to the presenter (prepare three questions before class) and email them to me and the presenter on the morning of class (**9:00 am**)

Literature review paper and presentation

- **Start early!**
- Identify a topic
- Identify the paper structure and the journal that you would like to submit your work
- Review twenty plus journal papers in the related area
- The final paper should include introduction & background, body, conclusion, and citations
- The final paper should be at least 15-page long, single-spaced, 1-inch margins, and 12-point Times New Roman font
- The 15-page does not include citation and figures
- Provide a 25-slide PowerPoint presentation (introduction & background, body, conclusion)
- You are presenting for 12 minutes and 5 minutes question and discussion

Assignments

All assignments are due at the beginning of class on the date due. *Late assignments will not be accepted.* Assignments that are poorly prepared (neatness, completeness, spelling, grammar, punctuation, etc.) will be returned to the student without a grade.

Reading Assignments. Students will be expected to complete all assigned readings prior to each class session. The assigned readings will be the daily topic of lecture and in-class discussions.

Classroom Management

Ground Rules. To facilitate having a cooperative learning environment, we will utilize the following ground rules to govern the "way we do business" in our classroom. These rules should be followed by everyone, including the instructor, as we conduct class on a daily basis. We will modify these rules as we need to.

- Classes will start and end on time.
- Everyone will come to class prepared (e.g., reading completed, abstracts done).
- Everyone will participate.
- No one will speak while others are speaking.
- Cell phones will be turned off or switched to a silent mode during class.

People must treat each other with dignity and respect in order for scholarship to thrive. Behaviors that are disruptive to teaching and learning in the classroom will not be tolerated. Behaviors that create a hostile, offensive or intimidating environment based on gender, race, religion, national origin or other categories protected by university policy will be referred to the Department of Student Life or other appropriate campus office (see www.inclusion.msu.edu).

Attendance. This class is organized so that attendance and participation are essential to the success of each student. Students are expected to fully participate in all class sessions.

Special Needs. Michigan State University is committed to providing equal opportunity for participation in all programs, services and activities. Accommodations for persons with disabilities, with documentation from the MSU Resource Center for Persons with Disabilities, may be requested by contacting me at the start of the term and/or two weeks prior to the accommodation date (test, project, etc). Requests received after this date will be honored whenever possible.

Student Honor Code

On all assignments, examinations, or other course work undertaken by MSU students, the following pledge is implied, whether or not it is stated: "*On my honor I pledge that this work is my own and I did not receive any unauthorized help nor am I aware of any infraction of the honor code.*" The honor code states, "As a Spartan, I will strive to uphold values of the highest ethical standard. I will practice honesty in my work, foster honesty in my peers, and take pride in knowing that honor is worth more than grades. I will carry these values beyond my time as a student at Michigan State University, continuing the endeavor to build personal integrity in all that I do," Although we have specifically authorized and encouraged teamwork with certain projects and homework, you still are on your honor that any teamwork represents a *meaningful collaboration* in which your contribution is evident (please ask if you need me to clarify what this means), and you must give appropriate credit to all collaborators and sources.