FISH/ESRM 447: Watershed Ecology & Management

Note: FISH/ESRM 447 is the "lecture only" part of the course. FISH/ESRM 448A is the optional but highly recommended lab component of the course that requires previous or concurrent enrollment in 447.

Course Description

This course is an investigation of stream and river ecosystems from a watershed perspective. Our emphasis will be on learning the fundamental processes affecting the structure and function of flowing aquatic ecosystems. Multiple theoretical concepts of riverine ecosystems will be evaluated and used to underpin our examination. Specific topics will include river/stream hydrology, geomorphology, biogeochemical cycles, food webs, and global change. While the course will initially focus on "natural" ecosystems, we will also use case studies to explore human interactions with rivers and approaches to river management.

Meeting Times

Lecture will be held Tuesday and Thursday 10:00a-11:20a in Smith Hall (SMI) 305.

Instructor

Gordon Holtgrieve, Assoc. Professor, Aquatic and Fishery Sciences
Email: gholt@uw.edu
Office: FSH 316B
Office hours: Wednesdays 10:30a - 12:30p (except 1st and 8th weeks)

Teaching Assistant

Elizabeth Elmstrom, graduate student, Aquatic and Fishery Sciences
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Office hours: XXX

Learning Objectives

Students will develop a broad understanding of the ecology of streams/rivers and their catchments at local to global scales, with a particular emphasis on the Pacific Northwest. Specifically, at the end of this course students will be able to:

1. Demonstrate through short answer and multiple choice testing a comprehensive understanding of the basic physical, chemical and biological processes that control the structure and function of healthy riverine ecosystems. Primary source of information will be in-class lecture and discussions, supplemented with additional readings.
2. Identify, contrast, and synthesize competing scientific views of watershed ecosystem theory in writing based on reading of assigned primary literature supplemented with small group discussions.
3. Produce a written, in-depth analysis that synthesizes, differentiates, and critiques the current state of science for a specific scientific topic within watershed ecology based on well researched and cited primary literature.
4. Apply concepts from this course to case studies to evaluate current watershed management practices in achieving stated goals for conservation and human uses. Evaluation will be through short essay exercises.

Required Reading

Course handouts, lectures, and the primary literature will be the dominant source of information. There is no required textbook but students may find it useful to look at a copy of "River Ecology and Management: Lessons from the Pacific Coastal Ecoregion" 1998 edited by Naiman and Bilby. You can find a set of suggested readings here. These are not required but for you to use as additional reference as needed.

Evaluation & Grading

Three (3) graded credits based on the following scheme:

Assignment	**Percent of final grade**	**Due Date**
Problem Set	10	Sunday 19 Apr at at 11:59 pm
Midterm Exam	30	30 Apr in class
Current "controversies" in the field literature review with short summaries.	15	#1: Designed vs. Natural Flow Regimes; Due Sunday 10 May at 11:59 pm #2: Marine Derived Nutrients; Due 24 May at 11:59 pm
Field Trip 16-17 May (participation & write up)	10	Sunday 24 May at 11:59 pm
Take Home Exam / Essay	35	Sunday 7 Jun at 11:59 pm

*Tentative and subject to change. Updated Feb 8, 2020

Academic Integrity

Plagiarism, cheating, and other misconduct are serious violations of the University of Washington Student Conduct Code (WAC 478-120) and your personal contract as a student. I expect that you will know and follow the university's policies on cheating and plagiarism. Please review the College of the Environment website on academic integrity so that you are clear on what constitutes academic misconduct. Any suspected cases of academic misconduct will be handled according to University of Washington regulations. For more information, see the College of the Environment Academic Misconduct Policy and the University of Washington Community Standards and Student Conduct website. Be advised that as an instructor at the UW, I have the *responsibility* to notify University Conduct committees about *any* suspected student misconduct.

Late Assignment & Re-grade Policy

As a matter of policy, late assignments will not be accepted unless you have received approval from the instructor (me) well in advance of the due date or the circumstances are truly beyond your control. At a minimum, this is at least 24 hours before the due date. I have full discretion over whether to accept a late assignment and you should assume the default to be they will not be accepted.

If you feel an assignment has been graded inappropriately, submit to me over email within one week of the receiving the graded assignment a brief description of why you feel the grade does not accurately reflect the quality of the work along with the original graded assignment. Note that we will likely re-grade the entire assignment, not just the part in question. You can expect to have the re-grade results within one week of submission (or a notification that it may take longer). If you are unsatisfied with the result of the re-grade you have the option to submit a written appeal to the School of Aquatic and Fishery Sciences Director. Please review the College of Environment Grade Appeal Process website for more information.

Email & Computer Use

All students are expected to have a working email address and you will receive email relevant to this course on a regular basis. Students are also expected to regularly check the course Announcements for updates relevant to the course. You are encouraged to reach out to your instructor and TA for help. In general, you can expect emails sent to instructors between 12a and 3p will be responded to the same day. Do not expect instructors to read or respond to emails sent after 6p until the following day nor should you expect responses over the weekend.

Writing assignments must be turned in via Canvas as either a Microsoft Word document (.doc or .docx) or as a .pdf. Problem sets and data analysis exercises will be turned in online as either Excel spreadsheets, Word documents, or as readable photos (if done by hand).

Disability Accommodations

It is crucial that all students in this class have access to the full range of learning experiences. At the University of Washington, it is the policy and practice to create inclusive and accessible learning environments consistent with federal and state law. Full participation in this course requires: 1) the ability to attend two 90 minute lectures per week with 40-60 other students; 2) participation in small group discussions on topics relevant to the course, and 3) making short presentations that synthesize small group discussions and/or results of specific analyses to the class orally.

If you anticipate or experience barriers to your learning or full participation in this course based on a physical, learning, or mental health disability, please immediately contact the instructor to discuss possible accommodation(s). A more complete description of the disability policy of the College of the Environment can be found here. If you have, or think you have, a temporary or permanent disability that impacts your participation in any course, please also contact Disability Resources for Students (DRS) at: 206-543-8924 (V), 206-543-8925 (TDD), uwdss@uw.edu, http://www.uw.edu/students/drs.

Course Schedule

Week	Tuesday	Thursday
1	31 Mar: Introduction, Course Logistics, Watershed Classification	2 Apr: Discharge & Channel Hydrology
2	7 Apr: Geomorphology & Sediment Dynamics	9 Apr: Hyporheic Zones & Riparian Areas
3	14 Apr: Damn Dams (Julian Olden)	16 Apr: Biogeochemical Cycles Overview
4	21 Apr: Nitrogen & Phosphorus Cycling	23 Apr: Ecological Stoichometry
5	28 Apr: Nutrient Spiraling	30 Apr: Midterm Exam
6	7 May: Ecological Theories -- RCC	9 May: Ecological Theories -- SDC, FPC
7	12 May: Autotrophic & Heterotrophic Productivity	14 May: Lower Trophic Levels / Bugs
8	19 May: Upper Trophic Levels / Fish	21 May: Communities & Ecosystems
9	26 May: Complexity within river basins for sustaining fisheries and wildlife (Daniel Schindler)	28 May: Integrated Water Resource Management
10	2 Jun: Controversies Discussion	4 Jun: TBD

Methow Field Trip (16-17 May)

There is an overnight field trip to the Methow River watershed 16-17 May (Sat & Sun). Departure will be 8:00a sharp Saturday from the Fishery Science Building (FSH) loading dock on the west side of the building. We will return around 8p on Sunday. We will be staying at a private residence with students camping on the lawn outside. If you do not own camping gear, I encourage you to team up with a classmate and ask your friends. You can also rent gear from the WAC Gear Garage. Bring a lunch for Day 1. The rest of your food will be provided. All students will be required to sign two liability waivers. Please see your instructor with questions or concerns. Plan to get wet and have fun!