

ESM 426/526 Ecology of Streams & Rivers

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e-office hours: anytime, please put “ESM 426 or 526” in your email subject line
or request for a Zoom meeting

Overall objectives

This course takes an integrative approach to study the processes influencing the distribution and abundance of organisms and the ecosystem functions (e.g., transformation and flux of energy and matter) in flowing water. Emphasis will be on biotic and abiotic connectivity of streams along longitudinal, lateral, vertical and temporal dimensions.

Software/App

- D2L, an on-line learning system (<https://d2l.pdx.edu/>). You need to use your ODIN user name and password to log in. Class materials such as syllabus, lectures, reading assignments, and grades will be posted in “D2L”. Please check it on a regular basis for class materials, news, and last-minute announcements. Students are encouraged to use “D2L” to post questions, comments, and suggestions.
- Zoom, a video conferencing tool which we will use for remote teaching, learning, and interactions (freely available from <https://www.pdx.edu/oit/zoom-meetings>)
- MS Office, PSU has an agreement with Microsoft for MS Office and as a PSU student, you can get free software including Powerpoint, Excel, and Word for your personal computer <<https://www.pdx.edu/oit/microsoft-office>>.

Approach

This class emphasizes tremendously on student-based learning. This approach places more responsibility on students to guide one’s own learning and intellectual development. Therefore, the learning you achieve in this class is largely a product of your participation in all aspects of the course. The class will be divided into project groups of 3-4 members (for undergraduate students only), which will work together on a common research question and write a scientific paper while graduate students will work on research projects individually.

1. Synchronized sections (ESM 426 section 001, ESM 526 section 001)

Class is scheduled to meet twice a week between **2:00 and 3:50 pm on Tuesday and Thursday**. Most of the course contents will be delivered via Powerpoint slides coupled with audiotaped explanation by the instructor. The slides with audio will be loaded to D2L weekly. We will reserve the first part of the class time (2:00 to 2:50 pm) for students to review the Powerpoint slides (no Zoom meetings) and then start the class facetime via Zoom at 3:00 pm. During the Zoom meetings, we will briefly review the key concepts and then open up for questions and discussion. Your instructor will schedule Zoom video conference meetings for each class period (T and Th at 3:00 pm) in D2L and record each session. The recorded session will be posted in D2L in case you miss it due to health or other issues.

2. Asynchronized section (ESM 426 section 002, ESM 526 section 002)

Students will access to the course contents via Powerpoint slides coupled with audiotaped explanation by the instructor. The slides with audio will be loaded to D2L weekly. No weekly Zoom meetings are required to attend but the recorded Zoom meeting sessions will be posted in D2L. Since it is an asynchronized format with no live interactions with the instructor and peers in the class during weekly Zoom meetings, students are highly encouraged to schedule a meeting session with the instructor to discuss the course requirement and particularly on the research project within the first week and latest in the early second week. Though it is not required to attend the Zoom meetings, students are welcome to join the live Zoom meetings anytime. We have five undergraduate students in this section and you are encouraged to form research groups within this asynchronized section or join the research groups in the synchronized section. Please reach out to the instructor if you run into any issues. Students in the asynchronized sections are required to take exams at the same times as those in the synchronized sections. If there is any time conflicts between the exam schedules and the courses that students are taking, please discuss with the instructor at your earliest convenience.

3. Virtual classroom facetime via Zoom video conference

We will use Zoom for virtual meetings and recordings in this course. Your use of Zoom is governed by [the Acceptable Use Policy](#) and [PSU's Student Code of Conduct](#). A record of all meetings and recordings is kept and stored by PSU, in accordance with the Acceptable Use Policy and FERPA. Individual use and distribution of recording is limited to academic purposes.

a. How to join a Zoom meeting in D2L

Note: Zoom meetings run best via the Zoom App or Google Chrome. If you have not already downloaded the app, you will be prompted to do so upon joining the meeting. It will take a few minutes and thus it is highly recommended that you join the first zoom meeting several minutes before class starts.

1. Login to D2L at d2l.pdx.edu
2. Navigate to the course in which the Zoom meeting is scheduled.
3. Click **People**, then **Zoom Meetings**.
4. Find your meeting from the list of upcoming meetings and click Start or Join.
5. Confirm the browser dialogue to launch Zoom.
6. Select your audio conference options. In most cases, you should choose "Join With Computer Audio," which may be your only option.

For more details, please check this webpage < <https://oaipplus.pdx.edu/blog/2019/09/20/getting-started-with-zoom-via-d2l/> >

b. How to ask questions during the class facetime with the instructor

We have 25 students enrolled in the synchronized sections of the class and thus it will be a challenge for students to ask questions and generate in-class discussion. Students are encouraged to ask questions, which is particularly important under the circumstances of

remote teaching. In order to provide everyone an equal chance to ask questions without interruption, students can use the function in “Reactions” to catch the instructor’s attention or use the “**chat**” function in Zoom to submit a question and if the instructor feels that many other students may have the same question, the student who submits the question will be asked to speak with the rest of the class.

4. Student-led and group-based learning

Interaction with your group members frequently becomes much more important under today’s environment with social distancing. You can find more information on the research projects at the end of the syllabus.

Student guide to learning remotely and remote learning kit

PSU has a variety of tools to help you connect, share information, and complete coursework without meeting physically. For more information, please check these webpages

< <https://portlandstate.atlassian.net/servicedesk/customer/portal/2/article/877265100> >
< <https://pdx.pressbooks.pub/remoteteachingkit/front-matter/introduction/> >

Textbook (required)

Allan, J. D. and M. M. Castillo 2007. *Stream Ecology: Structure and Function of Running Waters*. 2nd edition. Springer.

Grading

PSU has allowed the expansion of the Pass/No Pass grading policy for courses in an effort to support students during this time period of remote instruction. This policy was effective in spring and summer and has been extended to fall. As a result, students have the ability to select P/NP or A-F grading. The grading option deadline is extended to the Monday of Week 10, and All Pass grades earned Fall 2020 will apply to major/program requirements without restriction. More information is available on [PSU's Pass/No Pass policy changes](#).

1. Grading structure

	Graduate students (ESM 526)	Undergraduate (ESM 426)
Exams:	50%	60%
Research paper:	40%	25%
Oral presentation:	5%	10%
Class participation:	5%	5%

Exams:

Both exams will be open book and notes but with a time limit (one hour and 50 minutes). The exams will test students’ overall understanding of key concepts and theories in stream ecology, the abilities to synthesize the materials covered in the class and apply them to tackle

real life changes in the field. The format will be essay only. The first exam will include the materials covered in the first part of the term while the 2nd exam will cover all the materials.

*If you have a legitimate reason for missing an exam, please notify the professor **prior to the exam date.***

Research projects:

The research project includes both oral presentation and final written paper. For undergraduate students, the research project will be group-based. Students can form the research groups with 3-4 members based on common interests. Graduate students will conduct the research individually. More detailed information on the research projects and examples from previous class will be provided during the term.

Class participation

Attendance is critical to your success in this class and as such is strongly encouraged. We will have a number of group-based discussion and class discussion during the class period. Students are responsible for catching up with all missed course materials.

2. Grading Scale (percent scores and grade break points for letter grades):

- A: "excellent", comprehensive knowledge and understanding of subject matter;
 - B: "good", moderately broad knowledge and understanding of subject matter;
 - C: "satisfactory", reasonable knowledge and understanding of subject matter;
 - D: "inferior", minimum knowledge and understanding of subject matter
- A: 94–100; A⁻: 90–93; B⁺: 87–89; B: 84–86; B⁻: 80–83; C⁺: 77–79; C: 74–76; C⁻: 70–73

Incompletes

Departmental and university policies dictate that incompletes can be given only for verified medical reasons (through the Office of the Dean of Student Life).

3. Statement on Academic Honesty

Plagiarism of any form will not be tolerated in this class and will result in failing grades for the assignment and course participation, and a referral to the Office of the Dean of Student Life. For more information, please see the Portland State University's Bulletin and how to [avoid plagiarism](#).

PSU Student Resources

- [Title IX reporting](#)
- [Disability accommodations](#) and the [Disability Resource Center](#)
- [Dean of student life](#)
- [Religious accommodations policy](#)
- [Library](#)
- [Writing Center](#)
- [Food assistance](#)
- [General PSU Policies](#) (e.g., Student Conduct and Responsibility Policy)
- [Student Resources and Centers](#) (e.g., campus public safety, veterans resource center, etc.)
- [Sanctuary campus information and resources](#)

- [DACA](#) resources

Tentative Course Outline

Date	Topics	Reading
Sept.29	Introduction: Waters of the United States; River as a 4-dimensional fluvial system;	Ch.1
Oct. 1	Channel initiation; Drainage networks; Source streams; Stream flow;	Ch. 2,3
Oct. 6	Fluvial process; Channel morphology; Biota adaption	Ch. 2,3
Oct. 8	Stream water chemistry; Acid neutralizing capacity; Cations, anions, and conductivity	Ch.4
Oct. 13	Headwaters: Heterotrophes; Detrital energy sources; Leaf decomposition; Detrital-based food web	Ch. 7
Oct. 15	Transfer zone: Bryophytes; Periphyton; Primary productivity; Resource competition	Ch. 6 (pages 105-125)
Oct. 20	Nutrient dynamics; Eutrophication; Nutrient Spiraling concept; Red alders and stream nutrient input	Ch.11
Oct. 22	Exam I (2:00-3:50 pm)	
Oct. 27	Transfer zone: Community assembly; Metacommunity; Autotrophic food web	Ch. 10
Oct. 29	Transfer zone: Macroinvertebrates	Poff (1997); Poff et al. (2006)
Nov. 3	Transfer zone: Grazer-periphyton interaction; Species traits	Ch. 9
Nov. 5	Transfer zone: Lotic food web	Ch.10
Nov. 10	Depositional zone: Phytoplankton; Food web in large river;	Ch.6 (pages 129-135)
Nov. 12	Depositional zone: Riparian zones, Flood plains; Flood pulse concept	Junk et al. (1981)
Nov. 17	Vertical dimension: Hyporheic zone	Stanford and Ward (1988)

Nov. 19	River Continuum Concept; Serial Discontinuity Concept; Stream restoration and assessment	Vannote et al. (1980); Ch. 13
Nov. 24	Exam II (2:00-3:50 pm)	
Nov. 26	Thanksgiving Day, No class	
Dec. 1	Class presentation (2:00-3:50 pm)	
Dec. 3	Class presentation (2:00-3:50 pm)	
Dec. 7	Class presentation (10:15 am-12:05)	
Dec. 9	Paper due (Before mid-night)	

ESM 426/526 Research Project: Systematic Reviews on a Topic Related to Stream Ecology

What is a systematic review? A systematic review answers a defined research question by collecting and summarizing all empirical evidence that fits pre-specified eligibility criteria. It should include the following essential components:

- clearly stated objectives with pre-defined eligibility criteria for studies
- explicit, reproducible methodology
- a systematic search that attempts to identify all studies
- critical appraisal of studies (quality assessment)
- systematic presentation, and synthesis, of the characteristics and findings of the included studies

Select a topic related to stream ecology: The topics can range from basic ecological concepts to applied environmental issues as long as they are related to stream ecology. For instance, the topics can include “mechanism(s) for macroinvertebrate drift in streams”, “hyporheic zone”, “ephemeral streams and biodiversity”, “mountaintop removal mining and stream water quality”, “timber harvest and stream ecosystems”, etc.

The scope of the search: It is one of the key components for a rigorous systematic review that a systematic search will include all studies relevant to the review topic. As a term project, we will set up a manageable search limit. For ESM 426 students, the review is required to include at least 10 peer-reviewed publications and for ESM 526, the minimal number is 15.

It is likely that for a topic, there are hundreds peer-reviewed publications. If so, we can filter these potential papers by the following criteria:

- (1) Study location: the preference will be Oregon>Pacific Northwest>West coast>United States>Outside the United States
- (2) Publishing date: most recent>2015-2000>1990-1980
- (3) The number of citations

Type of peer-reviewed publications: A peer-reviewed journal publishes several types of papers including primary research papers, review papers, concept papers, communication, and others. In our research projects, we only include primary research papers (original research) for the systematic reviews. A primary research paper can be easily recognized by its conventional scientific writing format which includes *abstract, keywords, introduction, methods, results, discussion/conclusion, and cited references*. If you have any questions regarding the papers selected, please discuss it with your instructor.

Class presentation: You will have 15 minutes to present your work in class using Powerpoint slides and then 5-10 minutes for questions. You can either present your work synchronously or as pre-recorded the presentation. We will have three class periods devoted to class presentations. If you are taking the course asynchronously, please contact the instructor to schedule your presentations. If there is irreconcilable time conflict, you can submit pre-recorded presentation and your instructor will play it for you. In doing, you may miss the opportunity for answer any questions from the audience. But audience questions will be recorded for your review.

The format of the review paper: The written should require the following sections: Title, Abstract, Introduction, Methods, Assessment, and Conclusion
There is no minimal page requirement. Please save your work as a word document with every author's last names separated by underscore as the file name (e.g., *smith_johnson_oliver.docx*) and submit the document to me via email pany@pdx.edu. Please type "ESM 426 or 526 paper" in the email subject line.

Group peer review for ESM 426: To make sure that everyone contributes equally to the group research project, each team member will have a chance to evaluate his/her teammates' contribution. An evaluation form will be provided and I will collect all evaluation forms after the paper is submitted.

Suggested time table:

Oct. 15.	Form a research team for ESM 426 students
Oct. 22.	Submit a review topic
Nov. 21	Submit an abstract for the review
Dec. 3-Dec. 11	Class presentation
Dec. 13.	Submit the paper and Peer evaluation form

A few research topics from the past:

Does the presence of run-of-the-river dams on streams or rivers produce negative effects on the existing ecosystem?

Effects of stream sedimentation on EPT Macroinvertebrate Species

Stream burial in reference to fish passages and temperature effects

How mountaintop removal mining activity affects fish population/health downstream?