

SYLLABUS: NRSM 465 RESTORATION ECOLOGY SPRING 2020

Introduction

This course covers the primary ecological theories that inform the practice of ecological restoration, appropriate experimental design for making inference about the efficacy and effects of restoration treatments, and the nuts and bolts of writing a scientific research paper. Topics covered include community assembly, the dynamic nature of ecological systems, biodiversity and ecosystem functioning, ecological resilience, genetic considerations for restoration, and statistical issues and study design. The course has a substantial focus on critical analysis of the content and structure of research papers and best practices for scientific writing.

Prerequisites include at least one advanced undergraduate ecology course and one course in ecological restoration. All pre-requisites must be met prior to enrollment.

Meeting Times

Tuesdays and Thursdays, 2:00PM-3:20PM.

Meeting Location

Liberal Arts Bldg (LA), room 205

Instructor

Dr. Cara R Nelson, Department of Ecosystem and Conservation Sciences, College of Forestry and Conservation. Email: cara.nelson@umontana.edu. Office: 460-C Clapp.

Office hours: Tuesday 3:30-4:20 PM and Thursday 10:00-10:50 AM. Please make an appointment if you would like to meet during office hours to ensure that Cara will be available to meet with you. If you are unavailable during office hours, other times to meet can be arranged.

Course Format

This course combines lectures on restoration-relevant ecological theory with seminars and peer-learning activities that allow students to develop skill critiquing, synthesizing, and writing scientific information. The semester will end with three student debates on key topics within restoration ecology.

Course Objectives and Learning Outcomes

The objectives of this course are to provide students with foundational knowledge in restoration ecology and to improve their skill in critical thinking and scientific writing.

Specific Ecological Objectives

- To explore fundamental ecological theories and their relevance to the practice of ecological restoration;
- To explore best practices for designing experiments in restoration ecology; and

- To examine the principles of scientific inference and to critically apply these principles to both ecological theory and restoration practice.

Specific Objectives Related to Writing

- To identify and pursue sophisticated questions for academic inquiry;
- To find, evaluate, analyze, and synthesize information from the scientific literature;
- To explore the structure of scientific research articles and practice scientific writing;
- To recognize the purposes and needs of discipline-specific audiences and adopt the academic voice necessary for science writing;
- To use multiple drafts, revision, and editing in conducting inquiry and preparing written work;
- To follow the conventions of citation, documentation, and formal presentation appropriate to that discipline;
- To develop competence in information technology and digital literacy, including using cite-while-you-write software; and
- To manage information from diverse perspectives.

Learning Outcomes

By completing this course students will be able to:

- Integrate key ecological theories into restoration practice;
- Identify and discuss the relevance of scientific ideas for use in a practical framework;
- Analyze and succinctly summarize articles from the peer-reviewed literature;
- Use library resources and electronic databases to find scientific information;
- Use published literature to develop research ideas and answer research questions;
- Express complex scientific ideas in concise and clear writing;
- Write a research paper in a standard scientific format;
- Use electronic reference software for managing citations and preparing bibliographies; and
- Develop logical and persuasive arguments about concepts in restoration ecology and communicate ideas orally.

Pedagogy and Expectations for Assignments

The assignments and expectations for this course are deliberately challenging. As an advanced course, the curriculum requires that students integrate knowledge rather than just memorizing and repeating ideas presented in lecture. As such, course assignments and exams are designed to help students think both broadly about the material covered in class, knowledge gained from other coursework, and relevant work experiences. *A commitment to coming to class prepared and eager to discuss ideas, dilemmas and solutions is necessary for success.*

Consistent with three credits, this course requires an average of six hours of work per week outside of class time. Please allow enough time in your schedule for course work.

Writing

Roughly 20% of course lectures are devoted to exploring the structure of research articles and best practices for technical writing. Writing assignments include three seminar article critiques, a debate position statement, a research paper, and an essay-style mid-term exam. The research

paper requires submission of a draft and revision based on feedback from the course instructor and peers. To succeed in the course, students will need to allow time for writing, re-writing, and copy editing. There are services available on campus to assist students who would like additional instruction in developing and improving writing skills (e.g., [The Writing Center](#)).

Assignment due dates and submission

Assignments must be uploaded to *Moodle* at the beginning of class on the day the assignment is due. Late assignments will not be accepted without prior arrangement, except in emergency situations (which will be evaluated on a case-by-case basis). For most assignments, in addition to *Moodle* submission, you will need to bring a copy of your work to class to reference during class discussion.

Please do not include your name on submitted assignments. Instead, please include your 790 number. That will help avoid any potential bias in evaluation. The one exception to this is the research paper. Since I will be discussing your research papers with you, there is no way to have an anonymous grading system.

Reading Assignments

Textbooks

- *Foundations of Restoration Ecology*. **FIRST EDITION**. D.A. Falk, M.A. Palmer and J.B. Zedler eds., Island Press. 2006.

Note that we will be using the FIRST edition of this textbook, rather than the more recently published second edition, because the chapters in the first edition provide clearer explanations of course content. The complete book can be accessed at for free at research gate Foundations of Restorations Ecology 40777417. You may need to create an account to download it.

- *Writing Scientific Research Articles*. **SECOND EDITION**. M Cargill and P. O'Connor, Wiley-Blackwell.

This text is available for purchase at the bookstore.

- Additional readings will be assigned from the contemporary scientific literature, chapters from books, and popular sources. Reading assignments will be handed out in class or posted on Moodle (UM's Online Course Supplement). If you need technical assistance with Moodle, you can send the support team an email at courseware-support@umontana.edu, call 243-4999, or visit the [Tech Support Website](#).

Reference reading – Students interested in delving more deeply into aspects of restoration can find reference information within *The Science and Practice of Ecological Restoration* book series, published by Island Press. The course instructor has a copy of all the books in the series in her office.

Research Paper

Each student will write a ca. 12-to-20-page paper in which they answer one or more research questions using published literature (i.e. synthesis or meta-analysis). Several course sessions will

be devoted to the process of conducting this type of research, specific methods for writing a meta-analysis paper (i.e. a paper based on a literature review), and using reference software. In addition to writing a paper, each student in the course will be expected to review the first draft of one other students' papers. *A detailed hand-out describing the assignments and expectations will be provided.*

Seminars

This course includes three seminars during which students will apply concepts from course lectures and readings to the scientific literature. For each seminar, students will be expected to read a technical article and submit a written review that: 1) critically evaluates the scientific merits and contributions of the article paying particular attention to whether the data support the conclusions drawn by the author(s), and 2) evaluates the organization, structure and format of the article. Reviews are due at the beginning of each class session during which a seminar will be held. *A detailed hand-out describing the assignment and expectations will be provided.*

Mid-term Exam

There will be an essay-style, open-book mid-term exam. Students will need to bring a laptop computer to class to take the exam. Please notify the course instructor if you do not have access to a laptop and she will reserve one of FCFC's for you to use.

Debates

Students will participate in in-class debates at the end of the semester. Each student will be assigned to a debate team and will have the opportunity to go head-to-head debating another team. Prior to their assigned debate, students will work in teams to develop arguments and will each independently write and submit a 750-word debate position statement. During the remaining debates, students will participate as audience members and evaluators. Class sessions have been set aside for debate teams to prepare for the debates. *A detailed hand-out describing expectations will be provided after Spring Break.*

Class Attendance, Participation, and Contribution

Please inform the instructor in advance if you need to miss a class session. Class attendance and participation will be evaluated as follows (table is a guide only, scores in-between those listed will be assigned as appropriate):

Performance	% (of 3 points)
Attend all class sessions/regularly contribute to class discussions	100
Attend all class sessions/not an active participant	85
Miss up to 2 class sessions/regularly contribute to class discussions	87
Miss up to 2 class sessions/not an active participant	75
Miss 3 or more class sessions/regularly contribute to class discussions	Variable: depending on number of classes missed
Miss 3 or more class sessions/not an active participant	

Evaluation

Students will be evaluated based on their preparation for and performance in all course assignments as well as class attendance and the overall quality of their participation in the course, based on engagement in discussions and course activities.

Assignment	Points
Research paper	37
Mid-term exam	32
Seminar article critiques (3)	18
Debate	10
Class attendance, participation, &	3
TOTAL	100

This course is offered as traditional letter grade only. Students cannot change to credit/no credit at any time during the semester. Letter grades will be assigned based on students' numeric scores as follows:

A = $\geq 94\%$, A- = 90-93%

C+ = 77-79%, C = 74-76%, C- = 70-73%

F = $<60\%$

B+ = 87-89%, B = 84-86%, B- = 80-83%

D = 60-69%

Graduate Increment

Graduate students will conduct an additional assignment related to the course debate worth a total of 10 points (9% of course grade) (i.e. course will be graded on 110 points: 100 regular points + 10 points for the graduate increment). Specifically, each graduate student will write an annotated bibliography on the debate topic that includes at least 14 references to be submitted one week before the assigned debate. This annotated bibliography should include articles related to both the "pro" and "con" perspectives on their debate topic. For each article, the student must provide a 300-500 word assessment of the authors arguments related to the pros and cons of the debate topic. The submitted annotated bibliography will be shared with all students in the course.

Learning objectives include: 1) critical analysis of the scientific literature, and 2) application of concepts from the scientific literature to developing ecological arguments.

General Course Guidelines

Communication

All official course communications outside of class will be sent to students' University of Montana email accounts. It is your responsibility to regularly check your University account. *Beware: If your email account is full, you may not be able to send messages (but Griz mail will not tell you that the message has not been sent).* In general, the instructor tries to respond to email within 24 hours during the business week, but as a rule will not respond to email sent over the weekend. If your email is not returned after 36 hours (excepting weekend), please resend it, as it may have gotten lost in the email stack.

Class Attendance Policies

Students who are registered for a course but do not attend the first two class meetings may be required by the instructor to drop the course. This rule allows for early identification of class vacancies to permit other students to add classes. Students who are required to drop due to lack of attendance must complete a drop form or drop the course through [CyberBear](#) to avoid receiving a failing grade. Students who know they will be absent should contact the instructor in advance.

Students are expected to attend all class meetings. Occasional absences due to illness, injury, family emergency, religious observance, participation in a University sponsored activity (e.g., field trips, ASUM service, music or drama performances, and intercollegiate athletics), military service or mandatory public service will be excused without penalty. Please inform the instructor as soon as possible if you need to miss a class. Unexcused absences will result in lost participation points (see evaluation section above).

Classroom environment

Students at University of Montana are diverse in many ways, including race, gender, age, religion, preparedness, and mobility. Please help create a respectful learning environment by honoring all student contributions and expressing your views in ways that do not diminish other students' perspectives.

Plagiarism

All students must practice academic honesty, including taking care not to plagiarize the words or ideas of others (i.e. submitting a direct quotation from a source without using quotation marks and citing the original document; or submitting text based on someone else's ideas without proper citation). Academic misconduct is subject to an academic penalty by the course instructor and/or a disciplinary sanction by the University. All students need to be familiar with the Student Conduct Code. The Code is available for review on line at: [Student Conduct Code Web Page](#).

The penalty for plagiarism in this course is zero credit on the plagiarized assignment, in addition to any consequences per the Student Conduct Code.

Disability modification

If you are a student with a disability and wish to request reasonable accommodations for this course, contact Cara privately to discuss the specific modifications. You will need to provide a verification letter from Disability Services for Students. If you have not yet registered with Disability Services, located in Lommasson Center 154, please do so in order to coordinate your reasonable modifications. For more information, visit the Disability Services website at [Disability Services Link](#).