**Biology 342**

**Restoration Ecology**

***“When ecosystems come together, so do we.” – Eric Higgs, Professor of Environmental Studies, University of Victoria***

**Instructor: *Dr. Megan B. Rothenberger***

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Office Hours: Tuesdays 11 am – noon, Wednesdays 2:30 – 4:30 pm, or by appointment if necessary (but typically not on Friday, which I reserve for research and my “lab family”).

**Meeting Time and Location:**

Wednesday 1:10-4 pm; RISC 230

A note on course format: My approach to this course will involve a variety of methods, including *some* lecture, group exercises, field investigations, consideration of restoration case studies locally and in the academic literature, interacting with students in other courses (i.e., EVST 353), and guided discussion to review concepts and theories foundational to the practice of ecological restoration. However, BIOL 342 will evolve into a practicum format, especially in the final third of the semester, involving activities and a project that emphasize the practical application of ecological theory to restoration practice.

**Course Description:**

Restoration Ecology is a relatively new – but rapidly growing – multidisciplinary field of applied study. It is an exciting time to be learning about the science of **Restoration Ecology** and engaging in the human practice of **Ecological Restoration**, which can be defined as the process of assisting the recovery of a degraded ecosystem. Because of the urgent need to combat climate change, reverse a mass extinction, alleviate poverty, and develop sustainably, the United Nations has declared 2021 – 2030 as the Decade for Ecosystem Restoration. This course is designed to give students an overview of the natural and human dimensions of ecological restoration. You will discover that, while ecological restoration has mostly been taught and practiced from a strictly scientific perspective, ecology alone fails to capture the problems we are trying to solve. Restoration activities take place in historical, cultural, political, and economic contexts, and they are not objective and value-free – if you are a scientist or engineer, does this make you feel uncomfortable? We will begin the semester with consideration of the recently revised international principles and standards for the practice of ecological restoration (see above; Gann et al. 2019). These Standards not only guide restoration practitioners but also highlight the role of ecological restoration in connecting social, community, economic, and sustainability goals. The remainder of the course will be structured around the human dimensions of ecological restoration: 1) **participation**, 2) **power**, and 3) **perspective**.

**Prerequisites:**

This course is advertised as a natural science course and will at times be quite science-y. As such, you must have successfully completed Ecology (BIOL 231) **or** Conservation Biology (BIOL 272) **or** Earth Surface Processes (GEOL 300) **or** Environmental Geomorphology (GEOL 310) **or** Introduction to Environmental Engineering (CE 321) to enroll in this course. However, students who have had at least 2 of the prerequisite courses (i.e., one in biology + one in geology or engineering) as well as courses in the environmental social sciences and humanities (e.g., EVST 100, EVST 215, EVST 253) will be most prepared for this advanced, multidisciplinary course.

**Student Learning Outcomes:**

SLOs are simply statements that specify what you will know or be able to do after successfully completing a course. The SLOs in this course can be sorted into 3 groups – those that relate to application of **KNOWLEDGE** to solving problems in the field of restoration ecology, those that relate to **WRITING SKILLS**, and those that relate to **COMMUNICATION** ofrestoration science to diverse audiences. After successfully completing this course, you will:

1. Gain an understanding of ***fundamental principles*** of restoration ecology, including:
* the importance of engaging a wide range of stakeholders and including different types of knowledge,
* how ecological theory underlies restoration planning and practice,
* how restoration can be used to test ecological theory,
* the necessity of defining a vision and setting clear goals, and
* the steps in the restoration process, including how we might address challenges in the face of global change.
1. ***Analyze*** and ***critically evaluate*** ideas, arguments, and points of view presented in published restoration research from the natural and social sciences and humanities.
2. Learn and apply ***fundamental skills*** in any field-based environmental science, including:
* application of the process of science – observation, experimentation, quantitative analysis – to measuring outcomes of ecological restoration,
* communication and collaboration with individuals from a variety of disciplines, and
* identification skills of organisms for the purposes of environmental monitoring and assessment.
1. Appreciate the challenges – and your own strengths and weaknesses – related to ***practicing ecological restoration***.

**Course Resources and Materials**:

* rothenbm@lafayette.edu is a way to contact me if you want to ask a question or make an appointment, although I would much prefer to interact with you in person.
* Lecture slides, course readings, and other information relevant to the course will be posted on Moodle, which you can access using your Lafayette Network ID (username) and password at [http://moodle.lafayette.edu](http://moodle.lafayette.edu/).
* **Text:** *Human Dimensions of Ecological Restoration: Integrating Science, Nature, and Culture* edited by D. Egan, E.E. Hjerpe, and J. Abrams
* **Field Handouts:** There is no required field manual. However, you will be given handouts on Moodle before field investigations, and any handouts that I provide on Moodle are required material.
* **Additional Readings:** Each of you will be assigned to a case study topic – and scholarly article – related to one of the metathemes of your textbook: 1) participation, 2) power, 3) perspective. You will need to read all articles presented in class. However, you will only need to be an **expert on one** of these articles. All required readings will be listed in a separate document and available on Moodle.

**Assessment and Assignment Policies:**

* The Curriculum and Educational Policy Committee (CEP) at Lafayette requires all writing courses to assign ***at least*** 20 pages of process writing. ***Be prepared to do quite a bit of writing in this course!***
* You can earn 600 points in this course. The final breakdown is as follows:

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| --- | --- | --- |
| **EVALUATION** | **POINTS** | **PERCENTAGE** |
| Journals (2 collections) | 100 | 17% |
| Article Discussion (as leader, with partner) | 100 | 17% |
| Written Summary & Critique (draft 1 – for peer review) | 25 | 4% |
| Written Summary & Critique (final draft) | 100 | 17% |
| Scientific Peer Review | 50 | 8% |
| Campus Restoration/Decolonizing Methods Initiative | 175 | 30% |
| Class Participation | 50 | 8% |
| **TOTAL** | **600** | **100%** |

* I will consider extensions for out of class assignments in difficult circumstances. However, **communication is key**. If you are having trouble completing assignments, come see me during office hours or make an appointment to meet with me outside of class before the assignment is due. Please don’t abuse this offer and know that it is up to you to come to me if you need help. If you are not showing up for class or turning in assignments, I will not chase you down. My general policy for late assignments (i.e., if you are not communicating with me) is to deduct 5% for each additional day late.

**Assignments:**

**JOURNALS:** You will need to purchase a bound notebook specifically for the purpose of journaling in this class, and you should bring your journal to every class meeting. The type of notebook you purchase is up to you – if you like to draw, doodle, and paste inspirational images in your journal like I do, you might consider one with thick, unlined pages. By the end of the semester, your BIOL 342 journal should provide evidence of your evolving thought processes and understanding in the course. I will collect your journals twice for grading – once at midterm and again at the end of the semester. You will use your journal in several ways:

* 1. **Mindful journaling practice.** At the beginning of every class, I will provide at least 10 minutes for free-writing. At the end of every class, I will provide at least 5 minutes to consolidate your mental gains. I may or may not provide you with prompts for these entries. The idea is to relax, not think too much, keep your hand moving, and let it rip! I am not going to grade these entries. They are intended to be a sandbox to sketch out ideas and/or collect your thoughts on readings that we discuss in class. Writing mindfully can loosen the grip of confusion and bring creative ideas to light. This means that if you commit to this practice – even though it won’t be graded – I can almost guarantee that it will help you with your other assignments.

***“Start writing, no matter what. The water does not flow until the faucet is turned on.” – Louis L’Amour***

* 1. **In-class assignments and reflections.** For these entries, I might ask you to develop your own definition of a concept, draw a concept map to connect ideas conceptually, summarize important points from class, or log your progress on your restoration project. Each time you are asked to make one of these entries, the date and assignment will be recorded on Moodle. These entries will be graded on a three-point scale.

***“We write to heighten our own awareness…to teach ourselves to speak with others, to record the journey into the labyrinth.” – Anaïs Nin***



* 1. **Field journaling.** Your journal is also a field workbook meant to develop and reinforce the most important science process skills – observation and documentation. All other parts of the scientific method depend on these skills. You may think you are naturally good at observing but learning to really see is a skill that must be learned and developed. In fact, it is a skill that my art teachers often conveyed more effectively than my science teachers! Each of these entries will be longer, accompanied by a handout with specific instructions, and worth more points. In addition to recording your activities and observations in the field, you will be asked to collect, analyze, and interpret data associated with our field activities and to write about how the data patterns relate to what you learned about ecological theory and the practice of ecosystem restoration.

***“We measure and record and analyze in ways that might seem lifeless but to us are the conduits to understanding the inscrutable lives of species not our own. Doing science with awe and humility is a powerful act of reciprocity with the more-than-human world.” – Robin Wall Kimmerer***

Do you see the field journal in Jane’s lap where she recorded her groundbreaking observations of chimpanzee behavior?!

**ARTICLES:** As I mentioned in the course description, BIOL 342 will be structured around the human dimensions of ecological restoration and the three metathemes of your textbook: 1) participation, 2) power, and 3) perspective. To explore each of these themes, I have chosen case studies from the academic literature that describe projects, programs, and experiences that emphasize that aspect of restoration. I will provide a brief explanation of theme and case study in the first week. After considering the themes and articles, you will provide me with a list of three articles that interest you for this assignment. I will make every attempt to give each of you one of your choices. You will be assigned to a principle and ***one*** article by the second week of class. You will work with a partner to lead the class in discussion of your article, but you will turn in individual writing assignments. The links to all chosen articles will be posted to the Moodle website. With the article that you are assigned, you will need to write a summary and critique paper and lead the class in the discussion of your article. You will also be required to read and participate in discussions of the articles being presented by other students in the class.

1. ***Summary and Critique Rough Draft:*** After carefully and critically reading your article, you will write a paper, summarizing and critiquing what you have read. In the first part of your paper, your job is to explain the **substance** of the study so that one of your peers in the class would gain a better understanding of the research than they would have been able to get from reading only the article’s abstract. In particular, you should highlight how the principles and steps we discussed in week 2 relate to your case study.In the second part of the paper, you need to **constructively critique** the article, highlighting the strengths and weaknesses of the restoration project’s design and conclusions. Finally, you must make suggestions for potential future directions for the restoration project (i.e., adaptive restoration plan). *You will need to use at least 2 additional valid references to support your arguments.* The due date for this assignment will depend on the timing of your presentation (i.e., your paper draft is due on the day you present). Your draft will be reviewed by me and a peer using the scientific peer review process (see below).
2. ***Presentation (with partner):*** As leaders, you will need to spend a few minutes in lecture-mode clarifying the topic (i.e., presenting any background information that I have not already covered). You also need to explain the **substance** of the restoration project (i.e., highlighting the principles and steps), **constructively critique** the article, and make suggestions future adaptive restoration.For the discussion, I recommend that you come with “talking points.” These are points/questions that probably should be considered during the discussion. If they don’t come up in the conversation, as the ‘leader’ you should guide the discussion towards them. You should plan on having approximately 45 minutes for your lecture/discussion. I will present the article for the first case study to give you a better idea of what my expectations are for this assignment. Refer to the schedule to determine the date that you will be leading the class in discussion of your article.
3. ***Paper Final Draft:*** After considering the feedback you’ve received on your first draft and presentation, you will revise the paper and resubmit a final version approximately two weeks after you receive feedback on your rough draft and presentation.
4. ***Peer Review:*** This assignment is meant to introduce you to the peer review process used by academic journals. Scientific progress depends on the communication of information that can be trusted, and the peer review process is a vital part of that system. As a peer reviewer, you are a valued member of your academic community. You will receive feedback about your draft version of this assignment from another student in the class, and you will provide feedback to another student chosen at random (by me). The format of the review will be similar to the formal reviews submitted by anonymous peer reviewers of submitted academic manuscripts. In the end, your recommendation will be to “accept, pending minor revision,” “accept, pending substantial revision,” or “may be resubmitted following major revisions.” Your review must be typed, and follow a certain structure, which I will review during class.

***You can find additional details on the format and specific requirements of this assignment on Moodle.***

**INTEGRATING DECOLONIZING METHODS AND CAMPUS RESTORATION INITIATIVES:**

As you will learn this semester, reciprocal restoration is the mutually reinforcing restoration of land and culture such that repair of ecosystem services contributes to cultural revitalization, and renewal of culture promotes restoration of ecological integrity (Kimmerer 2011). With that in mind, we aim to expand the vision and goals for ecological restoration of the Lafayette College campus. One of the highlights of the class will be the opportunity to collaborate with an interdisciplinary team that includes our class and students in Professor Guernsey’s EVTS 353 (Decolonizing Methods in Environmental Studies) class to work on a land acknowledgement statement for Lafayette College and to begin outlining a plan to take action to support indigenous communities into the future. Research for this project will span much of the semester and will culminate in written land acknowledgement and action plan drafts and communication of the results to members of the campus community. Please refer to the documents on Moodle for further instructions for this assignment.

**PARTICIPATION:** Participation ***means regular attendance and active engagement in class writing activities and discussions.*** Please refer to the sections below for a description of my expectations for attendance and respectful class discussions. The quality of our sessions depends a great deal on the level of preparation students bring to the class. It is important that students complete the readings on time, reflect on them and be ready to engage in a discussion. Expression of students’ questions and opinions plays an important role in making class a stimulating experience for everyone. There is a strong distinction between attendance and participation. ***Attending every class, without ever speaking up, does not constitute participation.***To receive full credit for participation, students are required to adhere to the discussion guidelines established by the group (see below), ask questions, raise issues, express opinions, and respond to questions. Here are some guidelines for evaluating students’ class participation:

1. ***Basics:***Does the student demonstrate a sensitive understanding of the assigned material?
2. ***Creativity:***Did the student come up with some interesting ideas or questions for all of us to consider? Did the comments take opposing arguments into consideration?
3. ***Comparative aspect:***To what extent were the readings previously discussed during this course considered for the materials presently under review?
4. ***Argumentation:***How well was evidence used to support the claims?
5. ***Flow of discussion:***Did the student offer comments that encouraged others to participate? Were the comments useful in keeping the discussion on track?

Class attendance is expected. If you miss a class, you must get notes from a classmate. I do not supply copies of my notes. You may miss 2 classes without being penalized. However*,* ***each additional unexcused absence will result in a loss of 5 points from the class participation component of the grade****.* Even though you may miss 2 classes without being penalized, you are still responsible for turning in assignments when they are due (see schedule below) *unless* you provide me with persuasive evidence demonstrating your inability to complete assignments on time.

**Commitment to an Inclusive Learning Environment:** It is my intent that students from diverse backgrounds and perspectives be well served by this course, that students’ learning needs be addressed both in and out of class, and that the diversity that students bring to this class be viewed as a resource, strength and benefit. It is my intent to present materials and activities that are respectful of diversity: gender, sexuality, disability, age, socioeconomic status, ethnicity, race, and culture. Your suggestions are encouraged and appreciated. Please let me know ways to improve the effectiveness of the course for you personally or for other students or student groups. In addition, if any of our class meetings conflict with your religious events, please let me know so that we can make arrangements for you.

**Guidelines for respectful class discussions:** Given that class discussions/group problem-solving are core components of this course and that we are committed to an inclusive learning environment, we will develop a set of guidelines for class discussion together in the beginning of the semester. These guidelines will be posted to Moodle as a record of our agreement.

**Special needs:** Students with special classroom or testing needs should contact me as soon as possible so that appropriate accommodations may be arranged. Students must register during the first two weeks of the semester with the Office of the Dean of the College for disability verification and for determination of reasonable academic accommodations. If you are unsure about what constitutes special needs, contact the Office of Disability Services in 302 Hogg Hall at 330-5098.

**Academic Integrity Policy:** To maintain the scholarly standards of the College and, equally important, the personal ethical standards of our students, it is essential that written assignments be a student’s own work, just as is expected in examinations and class participation. A student who commits academic dishonesty is subject to a range of penalties, including suspension or expulsion. Finally, the underlying principle is one of intellectual honesty. If a person is to have self-respect and the respect of others, all work must be his/her own.

**Federal credit hour regulations:** The student work in this course is in full compliance with the federal definition of a four-credit hour course.  Please see the Lafayette College Compliance webpage (<http://registrar.lafayette.edu/files/2012/07/Federal-Credit-Hour-Policy-Web-Statement.doc>) for the full policy and practice statement.

**Hints for success:**

* Practice excellent self-care – sleep, exercise, eat whole foods and regular meals, connect with friends, mentors and positive people, do something you enjoy every day, see healthcare professionals (i.e., physical & mental) when necessary. See Moodle for additional resources.
* Attend every class whenever possible.
* When you are confused, always assume the best and ask for more information. Don’t make assumptions.
* Read the assigned articles and take notes BEFORE coming to class (e.g., write down the key concepts, learn vocabulary, and think of any questions you have before coming to class).
* Participate in class discussions by making an effort to say at least one thing during every class period. Asking questions for clarification counts!
* Begin your writing assignments *at least* one week ahead of time by brainstorming or making an outline. Get help from a peer or from me when you’re struggling.
* Consider drafting a written outline for your presentations, and practice before doing them in class.
* Keep up with your journal entries – try not to get behind.
* For group assignments, work together and consider the strengths of each person in your group. Meet in person to discuss your approach. Do not try to do all your communicating about these assignments over email. Do not simply assign each person a task and dump all the separate responses into word document because I will be able to tell. Each group member may become an expert on one aspect project, but make sure you come together at the end to synthesize all of the information.
* Come to see me if you’re having problems. SOONER IS BETTER THAN LATER.

**PLEASE NOTE:** The course syllabus serves as a contract between the instructor and the students. Your continued presence in the class beyond the first lecture signifies that you understand and accept the course policies on attendance, demeanor, exams (including excused absences and the make-up exam) and grading.