

Ecological Engineering Syllabus
CIVE 330
Spring 2018

Instructor: Dr. Ryan Morrison **Office Hours:** TR 1:15-2:30 (Engineering B208)
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Course Hours: TR 11:00-12:15 **Course Location:** Engineering B2

Description Principles of ecological engineering and design of sustainable ecosystems that integrate human society with its natural environment for the benefit of both. Particular emphasis is placed on application of ecological engineering in the restoration of streams and rivers, lakes and reservoirs, wetlands, and coastal ecosystems, as well as treatment wetlands and mined land reclamation.

Prerequisites CIVE 300 or LIFE 320; BZ 110; BZ 111 or BZ 120 or LIFE 102 or SOCR 240; CHEM 113

Objectives Upon completion of the course students will be able to:

- 1) Understand and describe important physical, chemical, and biological processes that affect ecosystem integrity;
- 2) Explain, use, and illustrate mass balances, water balances, energy balances, and chemical balances as tools to help understand and describe ecosystem functions;
- 3) Familiarity with approaches to ecological restoration of streams and rivers, wetlands and riparian areas, lakes and reservoirs, and coastal ecosystems;
- 4) Understand and apply concepts involved in designing and achieving sustainable uses of ecosystems (e.g., treatment wetlands and land treatment systems), and application of ecological engineering techniques in stormwater management;
- 5) Analyze and illustrate the impact that designing ecosystems to solve engineering problems has in the context of societal and global issues; and
- 6) Identify and describe the contemporary issues and emerging fields in which ecological engineers will be called upon to use their expertise.

ABET Outcomes The Department of Civil and Environmental Engineering is accredited by the Accreditation Board for Engineering and Technology (ABET), which requires the department to track and meet a series of Outcomes. This class will focus on achieving outcome (1), which is an ability to *apply knowledge of mathematics, science, and engineering.*

Topics

1. Definitions and classification of ecological engineering
2. Ecosystems and ecology
3. Ecological design principles
4. Stream and river restoration
5. Lake and reservoir restoration
6. Wetland creation and restoration
7. Coastal restoration
8. Treatment wetlands
9. Mine and disturbed land reclamation

Text Book *Mitsch, W.J. and S.E. Jorgenson. 2004. Ecological Engineering and Ecosystem Restoration. John Wiley and Sons, Hoboken, New Jersey, 411pp. ISBN: 978-0471332640*

Grading

Homework	30%
Quizzes	15%
Mid-term exam	15%
Presentation	15%
Final exam	25%

Final Grades

Percent	Grade	Percent	Grade
100.0–96.67	A+	79.99–76.67	C+
96.66–93.33	A	76.66–70.00	C
93.32–90.0	A-		
89.99–86.67	B+	69.99–60.00	D
86.66–83.33	B	<60	F
83.32–80.0	B-		

Quizzes I will endeavor to make this a discussion-oriented course. For this approach to be meaningful and effective, it is essential that you read material as it is assigned prior to our class discussions. To encourage you to do this, I will give several short quizzes (~7) throughout the semester to assess whether the reading assignments are being comprehended.

Workload 3 hours outside of class for every hour of lecture. This is a 3-credit class and thus you should be prepared to spend 9 hours per week dedicated to this class.

Important Deadlines Please pay attention to the CSU Registrar’s Office for important information and deadlines regarding dropping, withdrawing, or auditing this course: <http://registrar.colostate.edu/registration/>

CSU Canvas In order to successfully complete this course, you must be able to navigate through Canvas (<http://info.canvas.colostate.edu>). For example, you must be able to complete online homework assignments and download study materials. Class notes and grades will be posted on Canvas. In order to use Canvas, every student must have a CSU eID. Also, I will email updates/changes to the class and reminders or help for assignments during the duration of the class. Let me know ASAP if you're having problems. You need Canvas access to succeed in this class.

Internet Access It is your responsibility to have easy and stable access to the internet in order to successfully complete this course. Inability to complete assignments due to lack of stable internet access is not a legitimate excuse for assignment extensions in this course. Internet access is available in the CEE computer labs.

Homework Policy Written problems sets are due at the beginning of class. I will accept late homework submissions up to five days after the due date or before solutions are distributed, whichever comes first. A **penalty of 20% per day** late will be assessed on these assignments. All grades are considered final one week after the due date.

Attendance You are expected to attend every class session prepared by completing assigned readings and/or video lectures before coming to class. You are also expected to come to class on time to participate in in-class activities. Attendance will be monitored via in-class activities. If you do not complete any four assignments or if you do not attend lecture for two consecutive weeks, you may be dropped from the course. However, it's ultimately your responsibility to drop yourself from this course by the last day to drop in order to avoid receiving an F grade.

Exam Policy Students are expected to take exams at the scheduled time. If you are ill or have a personal emergency, contact me before the exam. Make-up exams will be given only for university-approved excuses or when you have a note from a medical professional. Otherwise, not attending the exam will result in an exam score of zero. Further, failing to provide any documentation for a missed exam will result in receiving zero for the exam in question, and requests for a make-up exam will be disregarded.

There will be one midterm and one final exam (comprehensive) that will cover material from both the assigned readings and lectures, although the exams will emphasize the material covered in lecture. You should bring a calculator to exams for computations. Exam format will most likely be short answer and problem solving. Exams may be take-home (I'll give you plenty of warning if this is the case).

Honor Code

This course will adhere to the CSU Academic Integrity Policy as found on the Student' Responsibilities page of the CSU General Catalog (<http://catalog.colostate.edu/general-catalog/policies/students-responsibilities/#academic-integrity>) and in the Student Conduct Code (<https://resolutioncenter.colostate.edu/conduct-code/>) At a minimum, violations will result in a grading penalty in this course and a report to the Office of Student Resolution Center. CSU policies on academic integrity will be rigorously enforced in this course.

In accordance with CSU policies, I ask that you include and sign the following statement on all written work: "I pledge on my honor that I have not given, received, or used any unauthorized assistance. *Signature*"

Behavior

Be prepared for in-class activities by keeping up with your assigned readings and homework. Please be courteous to other students by not creating distractions during class. You will also be expected to silence your mobile phone during class. Headphones and hats are not allowed during exams. Refrain from texting, gaming, social networking, etc. during lecture. If you're behavior is causing a problem in class you will be asked to leave the classroom.

Students with Disabilities

I am committed to providing assistance to help you be successful in this course, and this course is in compliance with the Americans with Disabilities Act (ADA). ADA mandates accessibility in all facets of the learning environment. If you are a qualified student, I encourage you to notify me at the beginning of the course about any specific assistant that may be required to support your learning.

Title IX

CSU's Discrimination, Harassment, Sexual Harassment, Sexual Misconduct, Domestic Violence, Dating Violence, Stalking, and Retaliation policy designates faculty and employees of the University as "Responsible Employees." This designation is consistent with federal law and guidance, and requires faculty to report information regarding students who may have experienced any form of sexual harassment, sexual misconduct, relationship violence, stalking or retaliation. This includes information shared with faculty in person, electronic communications or in class assignments. As "Responsible Employees," faculty may refer students to campus resources (see below), together with informing the Office of Support and Safety Assessment to help ensure student safety and welfare. Information regarding sexual harassment, sexual misconduct, relationship violence, stalking and retaliation is treated with the greatest degree of confidentiality possible while also ensuring student and campus safety.

Any student who may be the victim of sexual harassment, sexual misconduct, relationship violence, stalking or retaliation is encouraged to report to CSU through one or more of the following resources:

- Emergency Response 911
- Deputy Title IX Coordinator/Office of Support and Safety Assessment (970) 491-1350
- Colorado State University Police Department (non-emergency) (970) 491-6425

Agreement

By enrolling in this class, you state that you understand and agree to the terms in the course syllabus. A verification assignment is due in Canvas on Thursday, January 18.

Tentative Schedule

Topic	Book Chapter(s)	Weeks(s)	Start Date
Why Ecological Engineering and Ecosystem Restoration?	Chapter 1	1	1/18
Definitions and Classifications of Ecological Engineering	Chapters 2-3	2	1/23
Ecosystems and Ecology	Chapter 4	3-4	1/30
Ecological Design Principles	Chapter 5	4	2/6
Stream and River Restoration	Chapter 7	5-6	2/13
Lake and Reservoir Restoration	Chapter 6	7	2/27
Midterm Exam		8	3/9
Spring Break		9	3/13
Wetland Creation and Restoration	Chapter 8	10	3/20
Coastal Restoration	Chapter 9	11	3/27
Treatment Wetlands	Chapter 10	12	4/3
Mine and Disturbed Land Restoration	Chapter 12	13	4/10
Case Study Presentations		14-16	4/18
Final Exam			May 9, 6:20-8:20pm