

Course Code & No. - Section: ENVS 355/356
Course Title (Credits): Environmental Engineering (4)
Term & Year: Spring / 2016
Course Ref. No. (CRN): 10166/10167

Instructor: Benjamin J. Hatchett
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Office: N/A
Office Hours: By appointment

Class Meeting Time: Tues and Thurs 5:30 - 8:15 p.m.
Location: TCES, room 205

Prerequisites: CORE 205, CORE 206, MATH 130
Corequisites: ENVS 356 (lab)

Course Description

This course introduces students to environmental engineering by combining engineering concepts with the importance of environmental ethics. The course hopes to provide comprehensive exposure to all types of environmental problems, including ecosystem dynamics, wastewater treatment, and air pollution control. We'll highlight sustainable development, emphasizing the need for engineers to become even more environmentally responsible during this time of increasing awareness of environmental concerns.

The computer labs that compliment ENVS 355 lectures will require students to develop critical thinking skills and problem solving strategies as they address a range of real-world environmental problems through computer modeling.

Student Outcomes

The primary objective of Environmental Engineering is to develop critical thinking and problem-solving skills to address a range of environmental issues. Students will:

1. Develop a better understanding the physical, chemical and biological processes that define a range of environmental issues
2. Develop an understanding of conceptual models and how to frame environmental issues into an environmental engineering framework
3. Develop critical thinking and problem solving skills to begin to address a range of environmental issues through computer modeling
4. Proficiently construct models of environmental systems using systems analysis software.
5. Propose solutions to real-world problems using environmental engineering approaches.

Methods of Assessing Student Outcomes

Student outcomes will be assessed using the following:

1. Assignments: 500-word summaries of book chapters, other readings and related problem sets of increasing levels of challenge, usually done in groups. Summaries will be due by the start of the Thursday class.
2. Exams: students will sit for 2 exams that test material practiced during assignments.
3. Lab reports: students will complete computer labs which will entail building and running a computer model. Each model assignment will be accompanied by a lab report.

4. Final Project: Students will prepare a presentation, a STELLA or other computer model, and 2000-word brief communication style report on a topic of their choice related to an Environmental Engineering challenge in the Lake Tahoe basin.
5. Class participation: may involve attendance requirements and will involve participation in team computer modeling projects and the project peer review stages.

Instructional Strategies

This class will utilize small group and individual work in class using laptop computers, inquiry learning, STELLA laboratories, group problem sets, and individual research. When possible, field trips will be utilized to illustrate real world applications.

Required Texts and Materials

1. Introduction to Environmental Engineering by Vesilind/Morgan/Heine (2011) Cengage
2. Laptop computer (one that meets the published SNC Laptop Requirements)
3. Scientific calculator

Moodle

All readings that are not in the book will be posted on Moodle and not handed out. A pdf of the lecture will also be posted on Moodle the day of class. All problem sets, labs, and other class handouts will be on Moodle in the event you miss class or need an extra copy. Please utilize this web resource.

Prim Library Resources

Using the library's resources effectively (not just internet resources) contributes to developing each of SNC's core themes by exposing students to high quality academic resources, diverse opinions, new ideas, and a future that includes building on a liberal arts education. In this course, you will be expected to utilize the library's resources (either on-site or remotely) as you complete your assignments. SNC students are also eligible (with verification of current registration) to check out books and use electronic resources from the Washoe County Library, Incline Branch, on Alder Avenue and at <http://www.washoecounty.us/library/>.

Attendance

Although lecture attendance does not count for a percentage of your grade, it is very difficult for most students to pass this course unless they attend class. Many of the assignments and labs will be completed in class as a team to mimic working engineers. Class discussions will cover topics not covered in the textbook, including local examples. If your circumstances require you to be absent, you can notify me ahead of time and I can provide problem sets or labs in advance. Make-ups on exams must be approved *prior to the absence*. If you are sick on the day of the exam, you must contact me by phone or email before the exam is scheduled.

Final Project Description: *Tahoe 2040*

Identify an environmental aspect of the Lake Tahoe basin that represents an ongoing or emerging challenge for sustainability and engineering (e.g., climate change impacts on recreation, water quality, waste management, air pollution). Visit the location(s) and use photography and existing references to document this issue. Next, utilize available resources and a modeling technique (e.g., STELLA) to estimate how this problem will continue or worsen during the next 25 years. Provide examples of adaptation or mitigation techniques that can be applied to the problem.

Each project will be written individually as a "brief communication"-style report (2000 words with a 100-word abstract, three highlights, introduction, data, methods, results, discussion, conclusions, and no more than 20 references). Your selected topic will be due on **18 February 2016**. The drafts will be due on **24 March 2016** and **21 April 2016**. We will undertake two rounds of peer-review (part of lab credits), returning the draft one week later to the author. Here you will learn how to provide constructive criticism and how to respond to it in a manner acceptable for publications in professional and peer-reviewed literature. The **final draft** will be due in class on **10 May 2016** and you will each give a **12-minute** presentation (timed for credit! Practice practice practice!) leaving 3 minutes for questions. SNC and TERC faculty will be invited.

Class Requirements

All students are required to bring a laptop computer and calculator to each class meeting. Be respectful; please turn off all cell phones and absolutely no texting in class.

Sanctions for Cheating and/or Plagiarism

The Honor Code

The faculty of SNC believes students must be held to high standards of integrity in all aspects of college life in order to promote the educational mission of the College and to encourage respect for the rights of others. Each student brings to the SNC community unique skills, talents, values and experiences which, when expressed within the community, contribute to the quality of the educational environment and the growth and development of the individual. Students share with members of the faculty, administration and staff the responsibility for creating and maintaining an environment conducive to learning and personal development, where actions are guided by mutual respect, integrity, responsibility and trust. The faculty and students alike must make diligent efforts to ensure high standards are upheld by their colleagues and peers as well as themselves. Therefore, faculty and students accept responsibility for maintaining these standards at Sierra Nevada College and are obligated to comply with its regulations and procedures, which they are expected to read and understand.

Consequences of Violating the Student Honor Code

SNC students and faculty share the responsibility for maintaining an environment of academic honesty. Thus, all are responsible for knowing and abiding by the SNC Faculty/Student Honor Code published in the current SNC Catalog. Faculty are responsible for presenting the Honor Code and the consequences of violating it to students at the start of their classes AND for reporting all incidences of academic dishonesty to the Provost. Students are responsible for knowing what constitutes CHEATING, PLAGIARISM and FABRICATION and for refraining from these and other forms of academic dishonesty. You can easily avoid the latter two simply by using PROPER CITATIONS! When in doubt, Violations of the Honor Code become part of a student's academic record.

1st Offense: Student receives a zero for assignment/exam and counseling with faculty on the honor code, consequences for violating the honor code, and the value of academic honesty in learning.

2nd Offense: Student fails course and receives counseling with faculty on the honor code, consequences for violating the honor code, and the value of academic honesty in learning.

3rd Offense: Student is expelled.

Grading Policy

Chapter Summaries, Assignments, Quizzes	12%
Labs	20%
Midterm	20%
Final Project (written)	15%
Final Project (presentation)	13% (10% for final, 3% for 5-minute practice)
Final Examination	20%

Grading Scale

A >90.0, **B** 89.9-80.0, **C** 79.9-70.0, **D** 69.9-60.0, **F** <60.0

Exams:

Exams will be administered during the week scheduled. You will be given 2 hours to complete each exam. Exams will be closed notes and closed text. Reference sheets will be given out for important equations, conversions, and constants.

Late assignments:

Homework and lab assignments are due at the beginning of the class period on the due date unless the instructor permits students to hold them while asking questions. Late work will be accepted, but students will lose 10% of the possible points for each calendar day that work is late. For example, students will earn 20% fewer points for work due on Wednesday if it is turned in on the following Friday. Work more than seven days late and late extra credit will NOT be accepted.

E-mailed work:

All work may be submitted by e-mail or in hard copy. Students may e-mail files generated on a computer or hardcopy work scanned to a pdf file. Please include your name or initials in the file name. The instructor will reply to verify that e-mailed work was received. It is the student's responsibility to follow up if the instructor does not reply about e-mailed work. It is advised to save work as a pdf file before submitting it electronically, as formatting and visuals may be lost otherwise.

Extra Credit:

The instructor will offer extra credit for additional work with instructional value regularly throughout the semester. A list of extra credit options available with due dates will be posted on Moodle. A student may earn up to 10% of the total number of points possible for the class. An example extra credit opportunity includes the various UNR Colloquium Series – attend and write a 300 word (one-page) summary with three highlights (100 character limit each).

ADA Accommodations

In accordance with the Americans with Disabilities Act and Section 504 of the Rehabilitation Act of 1973, students with a documented disability are eligible for support services and accommodations. If a student wishes to request an accommodation, please contact the Director of Academic Support Services, Henry Conover, at (775) 831-1314 x7534, hconover@sierranevada.edu, office in Prim Library: PL-304.

The SNC Email System

The SNC e-mail system is the official communication vehicle among students, faculty members and administrative staff and is designed to protect the confidentiality of student information as required by the Family Educational Rights and Privacy Act of 1974 Act (FERPA). Students should check their college e-mail accounts daily during the school year.

Students have a right to forward their SNC e-mail to another e-mail account (for example, @hotmail or @gmail). However, confidentiality of student information protected by FERPA cannot be guaranteed for SNC e-mail forwarded to an outside vendor. Having e-mail redirected does not absolve a student from the responsibilities associated with official communication sent to his or her SNC email account.

The Sierra Nevada College Mission Statement:

Sierra Nevada College graduates will be educated to be scholars of and contributors to a sustainable world. Sierra Nevada College combines the liberal arts and professional preparedness through an interdisciplinary curriculum that emphasizes entrepreneurial thinking and environmental, social, economic and educational sustainability.

The Core Themes:

Liberal Arts	Professional Preparedness
Entrepreneurial	Thinking Sustainability

Class Schedule* (**bold indicates project due date**, *italics indicates guest speaker or field trip*)

Approximate Dates	Approximate Number Lectures	Topic	Suggested Readings
Jan 19-21	2	What is Environmental Engineering?	Chapter 1
Jan 28-30	2	Engineering Decisions + <i>Risk Management</i>	Chapter 2
Feb 2-4	2	Engineering Calculations + <i>Pipekeepers Training</i>	Chapter 3
Feb 9-11**	2	Engineering Calculations + Reactions	Chapter 4, 5
Feb 16-18**	2	Reactors and Energy Flows (TOPIC DUE)	Chapter 6, 7
Feb 23-25**	2	Air Pollution: Sources (<i>UNR/DRI instruments</i>)	Chapter 12
March 1-3	2	Air Pollution: Meteorology and Modeling	Readings posted online
March 8	1	Review for Midterm + Project techniques	Class notes and review sheet to be provided
March 10	1	Midterm	Study!
March 15-17	2	SPRING BREAK	Progress on project
March 22-24	2	Climate Change (First draft DUE)	Readings posted online
March 29-31	2	Ecosystems (<i>Biogeochemistry</i>)	Chapter 8
April 5-7	2	Ecological Restoration (<i>Incline Projects</i>)	Readings posted online
April 12-14	2	Water Supply/Wastewater Treatment (<i>IVGID</i>)	Chapter 10, 11
April 19-21	2	Storm Water (<i>Incline Projects</i> ; Second draft DUE)	Readings posted online
April 26-28	2	Solid Waste Management (<i>IVGID</i>) + 5 min practice presentations	Chapter 14
May 3-5	2	Geoengineering (<i>Cloud seeding</i>) + Review	Readings posted online
May 7	1	Final Exam	Study!
May 10	1	Final Presentations	Self-directed

**Schedule is approximate and subject to change due to instructor and student needs as well as field trip and guest speaker opportunities. An up-to-date schedule will be kept online on Moodle.*

*** One of these weeks the instructor will be at an atmospheric river field project during the Thursday class.*