

ENVIRONMENTAL SCIENCE-BIO 158- WINTER 2017

Times: Monday & Wednesday, 3:30-5:48 PM

Location: LISD Biochemical Technology Lab

Instructor:

Carley Kratz, Ph.D.
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Office hours: Monday, Wednesday & Friday 3:00 to 3:30 PM Other times by appointment

Required materials:

- Text: Environment: The Science Behind the Stories, 4th or 5th Edition, Withgott & Brennan.
- Lab Manual: Handouts will be provided
- Calculator: Helpful in lab. Cell phones and other electronic devices may **NOT** be used during tests.
- Bound laboratory notebook
- Flash drive (1G or higher) is recommended

Course Description:

Students will develop a scientific skill-set to understand the four strands of scientific investigation; content, process, communication, and the nature of science. Students will use critical thinking to evaluate scientific information, data, and current environmental science issues. The foundation for environmental science will be constructed using the four strands. The fundamental concepts in environmental science, like ecological cycles, evolution, analytical chemistry, molecular biology, genetics, and biotechnology, are presented in context with current issues. The students will compare and contrast the content and process through communications with their peers and the instructor, ultimately understanding the nature of science. The four strands will improve the student's scientific literacy which will support the enduring understanding of the building blocks of environmental science and biology. This course is designed for people interested in environmental issues using their computational skills, and includes a strong laboratory and field component.

Upon completing this course students will retain a skill-set derived from critical thinking and environmental scientific methodology. This skill-set can be used in classes following environmental science, and in problem solving needs through-out their lives. *Although this course is an introductory class, introductory does not translate into easy.* This course does not require background knowledge in environmental science. It will require effort to build the scientific foundation and the philosophical underpinnings of critical thinking and scientific thought. Students will have to spend time studying the material to succeed. For this course, you should expect to study 8 hours a week, and depending on your study skill-set, this time commitment may increase or decrease. You are responsible for the resulting grade that you shall receive.

Course Objectives:

Upon completing this course I will be able to:

- Understand how the nature of science is a result of the content, process, and communication; and, how this process is self correcting.
- Identify the big ideas in scientific discourse including how levels of ecological hierarchy pertain to biotic and abiotic properties.
- Integrate information of natural processes that govern the natural world into laboratory and field practice.
- Critically evaluate data drawn from natural phenomena to establish a scientific baseline.
- Understand the connection between population growth patterns, socioeconomic development, and environmental degradation.

- Measure environmental variables and interpret results of scientific studies of environmental problems.
- Understand how the mechanisms of evolutionary change, natural selection, mutation, migration, genetic drift, and sexual selection affect populations.
- Understand sustainability as it relates to ecological health.
- Understand factors affecting global climate change and human impact on the environment.

Associate Degree Outcomes:

All JC graduates should develop or enhance certain essential skills while enrolled in college, as defined by the Board of Trustees. The Associate Degree Outcomes addressed in this class are:

ADO 4: Scientific Reasoning. Students will be able to design and carry out valid experiments to assess a given hypothesis, and to draw appropriate conclusions based on the results.

ADO 7: Critical Thinking. Students will learn to critically analyze and interpret scientific data from scientific experiments, as in the analysis carried out in numerous labs that involve interpreting and graphing data.

Incompletes - Consistent with JCC policy, incompletes are granted with instructor permission only in situations where a student is passing the course and encounters an unusual emergency that prevents them from completing coursework.

Instructor Absence/School Closing: If I am unable to attend class, the building secretary will be notified, and a notice will be posted outside our room. If the college is closed due to inclement weather, announcements are made on local radio stations, via email and on the JC website. With the exception of these two situations, **ASSUME WE WILL HAVE CLASS.**

Plagiarism and Cheating - Be sure that homework and any assignments are your own work. Copying anyone else's work is **plagiarism**, and plagiarized work will **not be accepted**. Evidence of plagiarism or cheating on any exam, lab, lab quiz or assignment will result in a "0" score for that assignment and notification of the Academic Dean - please see the JCC Academic Honesty Policy.

Extra Credit - is not given in the course. Focus your time and energy on completing course assignments and studying for lab quizzes and lecture exams.

Course Help and Special Needs - if you have special needs that I should be aware of in order to help you to best learn course material, please let me know as soon as possible. Students requiring special assistance (including those affected by the Americans With Disabilities Act) should contact the staff at JC@LISD. Tutoring services are free at JC - if at any point in the course you feel that you would benefit from a tutor, contact your instructor.

Computer Resources – reliable computer access is necessary for this course, as some course materials can be accessed only through the course webpage and some assignments must be written in an electronic format. I will post announcements and grades, as well as many other course materials like discussion papers through this system. Access these resources through <http://jetnet.jccmi.edu>.

Grading Scale - Grades will be rounded to the nearest percent. Grades may be curved at the instructor's discretion.

Percent	Grade	Percent	Grade	Percent	Grade
90 - 100%	4.0	75 – 79%	2.5	60 – 64%	1.0
85 – 89%	3.5	70 – 74%	2.0	55 – 59%	0.5
80 – 84%	3.0	65 – 69%	1.5		

Student Responsibilities:

Attendance - I expect that you will do your best to attend every class. Because testing is primarily from lectures, missing class makes it very hard to do well. In addition, absences will only be considered excused with proper documentation (police report, court notice, doctor's note, etc.). If you know you will be absent for class in advance, please let your instructor know as soon as possible.

Keep Up With Homework - If you miss class, it is your responsibility to find out if homework is due on the day you return. In class assignments cannot be made up.

Contribute to a courteous learning environment – Our class time is valuable. Please be punctual, especially on exam days, to avoid disruption to others and to be aware of class announcements. Anyone who interferes with the learning of others will be asked to leave class. This includes talking while an instructor is talking, using cell phones or other devices during class, or being disruptive or disrespectful to others.

Study - This is a difficult course that will take significant study time outside of class. You will need to use the text and electronic resources, review notes and do study questions to prep for exams and lab quizzes.

Grading:

Your overall grade in the course will be based on the following assessments:

- Lecture exams - 60% of the overall grade
- Homework assignments and quizzes- 10% of the overall grade
- Laboratory assignments and notebook checks-10% of the overall grade
- Final Lab Project Report and Presentation - 20% of the overall grade

Exams – There will be approximately five exams in the course, which may include multiple choice, fill-in, short answer, problem solving, and essay. A missed exam will be given only with appropriate documentation or at the instructor's discretion. The lowest score on the first four exams will be dropped. The final exam will be cumulative in nature and be cannot be made up or dropped.

Homework assignments - will be accepted up to one class day late, but with a 50% point reduction of possible points after the first five minutes of class time the day they are due. Unless otherwise directed, all assignments should be typed. In class assignments cannot be made up. Deadlines are not negotiable, and technology failure is not an excuse for late work. Protect your work carefully, including saving early and often, backing up work in more than one place, etc.

Laboratory Notebook- Your laboratory notebook will be your place to document your independent research project findings. Unexcused absences will negatively affect your points possible from your notebook grade. Details on the content of your notebook will be provided the first week of class.

Independent research project – Involved in the laboratory portion of the course is an opportunity to explore a research project on a topic of your choosing. You will need to develop an experimental design and gather data in your lab notebook. More details on the project will be presented during the first few weeks of class.

Student Appeal Process

In the event of a dispute, both students and faculty should follow the Conflict Resolution Policy. The policy is presented in the Student Rights and Responsibilities section of the student handbook. The first step of this process is to set up a scheduled conference with the **instructor** to discuss the issues of concern.

Tentative Schedule

While I will attempt to follow the syllabus and schedule as closely as possible, I reserve the right to make changes.

Date:	Topic	Lab	Chapter
1/16	Introduction	Intro to Lab Format, Safety, Basic Lab Equipment, Descriptive Statistics, Resumes	1
1/18	Sustainability and the Future	The Scientific Method and Independent Research Project Planning	1
1/23	Matter, Energy and Geology	Testing Water Hardness and pH Resumes Due	2
1/25	Evolution and Biodiversity	Testing Water Chemistry Using a Standard Curve	3
1/30	Exam Review	Experimental Design and Hypothesis for Independent Research Projects Due	
2/1	Exam 1	List of materials for Research Project Due	
2/6	Community Ecology & Species Interactions	Winter Tree Identification	4
2/8	Community Ecology & Species Interactions	Community Structure: Woody Plants Transect	4
2/13	Ecosystem Ecology	Using Excel to Analyze Data	5
2/15	Ethics and Economics of Sustainability	How to Write a Scientific Paper	6
2/20	Exam 2 Review	Finding Citations and Properly Citing Sources	
2/22	Exam 2	Independent Research Project Notebook Check Woody Plants Transect Paper Due	
2/27	No Class Spring Break	NO LAB	
3/6	Environmental Policy	Independent Research Project	7
3/8	Environmental Policy	Measuring Caffeine Content	7
3/13	Soil and Agriculture	Soil Testing (Part 1)	9
3/15	Soil and Agriculture	Soil Testing (Part 2)	9
3/20	Biotechnology	GMO Foods (Part 1)	10
3/22	Biotechnology and Food	GMO Foods (Part 2)	10
3/27	Exam 3 Review	Independent Research Project Notebook Check	
3/29	Exam 3	Independent Research Project	
4/3	Biodiversity and Conservation Biology	Center for a Sustainable Future Tree Identification	11
4/5	Global Climate Change	Benthic Macroinvertebrate Sampling	18
4/10	Fossil Fuels	Tree Identification Practical	19
4/12	Energy Conservation	Research Project Rough Drafts Due 4-14	19
4/17	Conventional Energy Alternatives	Making Biodiesel & Ethanol (Part 1)	20
4/19	New Renewable Energy Alternatives	Making Biodiesel & Ethanol (Part 2)	21
4/24	Sustainable Solutions/Exam 4 Review	How to Make a Scientific Presentation	24
4/26	Exam 4	Independent Research Project Finalization	
5/1	Student Presentations	Student Presentations Independent Research Project Paper Due	
5/3	Final Exam		