

# ENVIRONMENTAL SCIENCE: SUSTAINABILITY

Spring 2013 Per. 5 M/W sections 01 – 04; Per. 5 T/Th sections 05-08 Lecture Hall

Lecturer: Dr. Sandra Swenson

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Office Hours: M-W 1 – 2:30 PM or by appointment

During this course of study, students will:

This course examines the core topics in environmental science and how environmental science informs sustainability, environmental policies, economics, and personal choices. Students will learn principles from the sciences of ecology and toxicology to study the relationships between living organisms, including humans, and their physical environment. The course will also consider environmental risks due to economic, political and cultural factors. Discussion will focus on how the Earth's resources are limited, and how these resources can best be used to benefit ecosystems and leave the environment healthy for future generations.

## 1. Identify and apply the fundamental concepts and methods of a life or physical science.

*Develop scientific literacy by participating in two major projects where students will:*

- Acquire broad background knowledge in the physical and biological sciences;
- Correctly use basic terminology in biology and chemistry;
- Outline the basic concepts of environmental science, including:
  - sustainability
  - human impact
  - toxicology
  - ecology
- Recognize fundamental concepts of risk assessment and management.

## 2. Apply the scientific method to explore natural phenomena, including hypothesis development, observation, experimentation, measurement, data analysis, and data presentation.

- By examining local superfund clean-up sites in a group field-study project, students will critically evaluate major conflicts within the realm of the environmental sciences;
- Understand the role of creativity in problem solving and the application of scientific principles in gathering and interpreting scientific data;
- Recognize the significance of the scientific process in understanding controversial issues;
- Learn how to draw appropriate scientific conclusions from evidence and experimental data in both research and legal settings;
- Consider the dynamic relationship between politics, economics & societal issues that might influence scientific research.

## 3. Use the tools of a scientific discipline to carry out collaborative laboratory investigations.

- While performing laboratory experiments students will demonstrate lab safety and proper laboratory protocol;
- Test various products for the presence of potentially toxic substances (e.g aluminum, lead) and investigate the potential effects of heavy metals in the environment;
- Students will practice the skills of collaborative learning in a laboratory environment by working in groups to fulfill laboratory exercises. They will do this by allocating specific responsibility to each lab member, discussing their procedure, and finalizing their results. Ultimately, students are responsible for completing their own lab report. Students will assess themselves on how responsible they are for their own work as well as how well the whole group works together. (See Rubric)
- Develop competence in oral and written forms of scientific communication.

## 4. Gather, analyze, and interpret data and present it in an effective written laboratory or fieldwork report.

- Students will practically apply observation and/or measurement in a larger scientific context and thereby assess the validity of the data they collect;

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- Participate in field studies in the NY City urban environment, including, but not limited to, Superfund cleanup sites and Jamaica Bay National Park;
- Describe the basic practices of testing resource quality and the impacts of waste disposal on the environment.

### 5. Identify and apply research ethics and unbiased assessment in gathering and reporting scientific data.

- Students will discriminate between scientific and non-scientific resources by describing the basic components of a scientific investigation, and contrast this with non-scientific statements;
- Interpret environmental research findings as published in the popular media;
- Interpret environmental research findings in primary documents;
- Recognize and communicate the difference between research on environmental issues and non-research based statements.

**Course website & Readings:** Important course announcements, course readings, homework assignments, and other resources will be posted to the course Blackboard. There are extensive web links and news articles that students are responsible for reading.

Course material: Turning Technologies Response Card: Register on line at: <http://www.turningtechnologies.com/>

I recommend renting the response card from the JJ Bookstore.

Readings: All assignments can be found on the John Jay College Blackboard. Any changes or announcements will be made on that site. You should check Blackboard and your John Jay College email regularly for course information. You must have a valid John Jay email account and have access to BlackBoard for ongoing updates and notifications.

Blackboard Student Support is provided by ITSS. Students should be directed to contact ITSS at

blackboardstudent@jjay.cuny.edu<mailto:blackboardstudent@jjay.cuny.edu> and through the Help Desk at 212.237.8200.

- Essentials of Environmental Science by Andrew Friedland. WH Freeman Company: Ebooks access through the bookstore.  
Author: Friedland, et al.

EBOOK: ESSENTIALS OF ENVIRONMENTAL SCIENCE

ISBN: 9781464109836

Author: Friedland, et al.

LAB MANUAL IS AVAILABLE ON BB under "Information" but you can purchase it in the bookstore if you want to.

TURNING TECHNOLOGIES RESPONSE CARD ISBN: 9781934931394

### Extra Credit Reading

Hot, Flat, and Crowded by Thomas L. Friedman ISBN-13 970-0-374-16685-4 Easy to buy used.

Or research on hydraulic fracturing. All assignments are on BB.

### Summary of Course Requirements:

Students are responsible for bringing the Response Cards (Turning Technologies) to every class and for accessing Blackboard once to check for new announcements. Please use your John Jay email for this class. Students must learn how to use the Discussion Board section on BB. See help options under Blackboard 9.1

Cell phones and similar devices must be turned off in class. No electronic devices of any type (phones, computers, calculators, iPods, etc.) are allowed in course exams. Students found using phones or other electronic devices during an exam will not be given credit for that exam. Students must take exams during the scheduled times. Students with a documented conflict should speak with the professor.

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### Grading Scale:

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#### Grading Scale:

Midterm	=	15 Points
Quizzes, Case Studies HW (Podcasts, etc.) and in-class projects (includes attendance)	=	40 Points
Final Exam	=	15 Points
Lab Grade	=	30 Points
All beepers, phones, headphones, etc. MUST be turned off in class.		

- Personal Photo-ID MUST be present at all lecture exams.
- This is an important component of the course and requires participation by all students. All in-class work is due the same day and cannot be made up.
- ALL examinations must be taken in the class period in which you are registered.
- Plagiarism or cheating will not be tolerated. Any student suspected of cheating will be recommended for expulsion.

### ATTENDANCE

An important part of the course grade is earned through in-class participation and laboratory work; therefore, it is essential for students to attend lecture and lab if they wish to be successful. No make-ups will be given for missed in-class activities and laboratory work unless there is a documented medical excuse. If you miss an exam (or foresee that you will miss an exam) for any reason, you **MUST** contact the instructor as soon as possible.

Course Structure: Env Sci 108 consists of a lecture component and a laboratory component, completion of both is mandatory. There are two (2) lecture exams consisting of ~50 - 60 questions. All students must take the exams during the indicated periods. If you have a documented emergency, please see me to discuss options. Both exams count; no grade is dropped. The laboratory portion, worth 30% of the final course grade, will be derived from the scores of two (2) practical exams, quizzes, in-class activities, and class participation. Any student having difficulty with the class should see the instructor as soon as possible.

No extra help can be given after the final exam is administered.

### Grade of INC (Incomplete)

An Incomplete Grade may be given only to those students who would pass the course if they were to satisfactorily complete course requirements. It is within the discretion of the faculty member as to whether or not to give the grade of Incomplete.

Accommodations for Students with Disabilities: Students with hearing, visual, or mobility impairments; learning disabilities and attention deficit disorders; chronic illnesses and psychological impairments may be entitled to special accommodation under the Americans with Disabilities Act (ADA). In order to receive accommodation, students must register with the Office of Accessibility Services (O.A.S., Room 1233-N, 212-237-8031, <http://www.jjay.cuny.edu/2023.php>) which will define, for both students and faculty, the appropriate accommodations. Faculty is not allowed to work directly with students to attempt to accommodate disabilities, and accommodations cannot be applied retroactively (after-the-fact).

Statement of the College Policy on Plagiarism: Plagiarism is the presentation of someone else's ideas, words, or artistic, scientific, or technical work as one's own creation. Using the ideas or work of another is permissible only when the original author is identified. Paraphrasing and summarizing, as well as direct quotations, require citations to the original source. Plagiarism may be intentional or unintentional. Lack of dishonest intent does not necessarily absolve a student of responsibility for plagiarism. It is the student's responsibility to recognize the difference between statements that are common knowledge (which do not require documentations) and restatements of the ideas of others. Paraphrase, summary, and direct quotation are acceptable forms of restatement, as long as the source is cited. Students who are unsure how and when to provide documentation are advised to consult with their instructors. The library has free guides designed to help students with problems of documentation.

This course will utilize the services of Turnitin.com, a plagiarism prevention system approved by the College Council. All students must submit an electronic copy of their final paper using either the Word, WordPerfect, RTF, PDF or HTML format (including the reference page) to Turnitin.com for processing by the date listed. In addition, a printed original must be submitted to the lab instructor by the scheduled date (instructors may also require an electronic copy). All electronic files should be scanned for viruses before submission. Students transmitting electronic viruses will be heavily penalized.

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### COURSE OUTLINE

<u>Date</u>	<u>Lecture Subject</u>	<u>Readings</u>
Week 1	Introduction to Environmental Science Historical perspective and an Overview Matter, Energy, and Change Describe the discipline of environmental science as related to individuals, communities, and public policy. Assignment: Introduce yourself on Blackboard.	Website: <a href="http://www.epa.gov/">http://www.epa.gov/</a> PPT 1 & 2 and Ch 1 & 2
Week 2	Ecosystem Ecology and Biomes Describe the basic principles of ecology In class assignment: Mini Case Study: Reversing the Deforestation of Haiti <i>HW: Podcast: PRI: The World – under assignments on BB</i>	PPT 3 & Ch 3
Week 3	Evolution, Biodiversity, and Community Ecology Explain the concept of biodiversity and its underlying mechanisms. Urban biodiversity: <a href="http://natureinthecity.org/urbanbiodiversity.php">http://natureinthecity.org/urbanbiodiversity.php</a> Blog: <a href="http://cityparksblog.org/2012/05/17/celebrating-national-urban-biodiversity-week/">http://cityparksblog.org/2012/05/17/celebrating-national-urban-biodiversity-week/</a> Of interest: <u>Field Guide to the Natural World of New York City</u> by Leslie Day 2007 <i>HW: ON BB refers to: <a href="http://www.urbanecologycollaborative.org/uec/">http://www.urbanecologycollaborative.org/uec/</a></i>	PPT 4 & Ch 4
Week 4	Human Population Growth Describe the potential limits to human population growth and analyze relationships among changes in population size, economic development, and resource consumption at global and local scales. In-class case study: Curitiba, Brazil	PPT 5 & Ch 5
Week 5	Nonrenewable and Renewable Energy Describe how energy use has varied over time and compare the energy efficiencies of the extraction and conversion of different fuels as well as the various means of generating electricity.	PPT 8 & Ch 8
Week 6	Water Resources and Water Pollution Identify Earth's natural sources of water and identify the factors that will affect the future availability of water. NYC RiverKeeper: <a href="http://www.riverkeeper.org/">http://www.riverkeeper.org/</a> Begin Field Study Group Project due week 10	PPT 9 & Ch 9
Week 7	Solid Waste Generation and Disposal Define waste generation from an ecological and systems perspective. In-class case study: Jamaica Bay	PPT 11 & Ch 11
Week 8	Air Pollution Identify major air pollutants and where they come from and examine various approaches to the control and prevention of outdoor pollution. <a href="http://www.nyc.gov/html/dep/html/air/index.shtml">http://www.nyc.gov/html/dep/html/air/index.shtml</a>	PPT 10 & Ch 10
Week 9	Land Resources and Agriculture	

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Explain how human land use affects the environment and describe approaches and policies that promote sustainable land use.  
Pesticides and Fertilizers & Rachel Carson Biography

PPT 7 & Ch 7

Week 10	Field Study papers posted on BB and submitted through Turnitin.com	
Week 11	Human Health Risk Identify the three major categories of human health risk and explain risk analysis. Group Case Study: Metals in the Environment due week 14	PPT 12 & Ch 12
Week 12	Conservation of Biodiversity Identify the causes of declining biodiversity and describe conservation.	PPT 13 & Ch 13
Week 13	Climate Alteration and Global Warming Distinguish among global change, global climate change, and global warming. Explain how solar radiation and greenhouse gases warm our planet and affect our oceans.	PPT 14 & Ch 14
Week 14	Environmental Economics and Equity Discuss sustainability in a variety of environmental contexts including human well-being.	PPT 15 & Ch 15
Week 15	Environmental Policy Pollutant Regulation - The Environmental Protection Agency (EPA)	
Final Exam	M/W sections 01 – 04 PER 5 12:30 – 2:30 5/20/2013 T/Th sections 05 – 08 PER 5 12:30 – 2:30 5/21/2013 Please do not ask to switch exam times. Exams must be taken on the day they are administered.	

### Grades for Completed Courses

Grades for courses that have been completed through the final examination are as follows.

Grade	Numerical Value	Percentage Equivalent
A	4.0	93.0-100.0
A-	3.7	90.0- 92.9
B+	3.3	87.1- 89.9
B	3.0	83.0- 87.0
B-	2.7	80.0- 82.9
C+	2.3	77.1- 79.9
C	2.0	73.0- 77.0
C-	1.7	70.0- 72.9
D+	1.3	67.1- 69.9
D	1.0	63.0- 67.0
D-	0.7	60.0- 62.9
F	0.0	Below 60.0

**Environmental Science 108 Laboratory Evaluation – Fall 2012**  
**The Laboratory constitutes 30% of the overall grade for the course ENV108.**

Each student will be evaluated in the laboratory during the semester as follows:

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<b>Lab constitutes</b>	<b>30% of the Lecture Grade:</b>			
	<b>7%</b>	<b>Research Paper</b>	<b>5%</b>	<b>Attendance, Participation/Other</b>
	<b>6%</b>	<b>Exam 1</b>	<b>6%</b>	<b>Lab Manual Reports (In-Class)</b>
	<b>6%</b>	<b>Exam 2</b>		

**Parameter of Evaluation**

**1. Research Paper (7%)**

Each student is expected to write and submit a detailed research paper (a hard copy and electronic submission to turnitin.com). A separate handout will provide additional details on the requirements for the successful completion of this assignment. All papers must be turned in at Turnitin.com; please register.

**Research Paper will be due on 11/8/12** NO REPORTS WILL BE ACCEPTED AFTER THIS DATE. The report MUST be type written (Font 12; double spaced). The lab report must be written in the past tense and be grammatically correct. Please see additional Handout for Research Guidelines.

**2. Attendance, Participation and Punctuality (5%)**

Attendance and Punctuality are mandatory. Each student is required to attend each laboratory recitation and exercise and to stay for its duration. Attendance will be taken for each lab and it is the student's responsibility to make sure that the instructor records their attendance. Each absence is equivalent to approximately 0.5%, which will be deducted from the 5%. In case of sickness the respective student is responsible for communicating with the Laboratory Instructor and to provide the necessary documentation to verify said absence. Irrespective of the reason for the absence, there will be **No Make-up Labs or Exams**. It is your responsibility to sign in for each day of lab.

Lab participation includes adherence to safety rules, involvement in experimental procedures and station cleanup. Students will be required to work in groups and each student should participate in the Laboratory exercises. The Instructor will observe each student's involvement in the laboratory recitations and exercises and the students will be evaluated accordingly. The Lab safety rules will be strictly enforced at all times and students are expected to observe them while in the Lab. In that respect, under no circumstance should food be brought into lab or dispose of food in waste receptacles.

**3. Lab Manual Reports (6%)**

The Lab Manual Reports are to be completed during the Laboratory exercise and should be handed in at the end of each Lab (prior to the student leaving the Lab). The Reports are to be neatly completed (legible) and all results noted, calculations completed and questions answered as related to the respective laboratory exercise. Each report is valued 0.5%. **If you do not participate in the lab you may not turn in a lab report.** NOTE: EACH STUDENT IS REQUIRED TO PROCURE A COPY OF THE LABORATORY MANUAL AND SAFETY GOGGLES. **NO STUDENT WILL BE ALLOWED TO CONDUCT LABORATORY EXERCISE WITHOUT HIS/HER SAFETY GOGGLES. LABS CANNOT BE MADE UP.**

**4. Exam 1 and 2 (6% each)**

There will be 2 exams for the ENV 108 Lab. Each exam will cover information discussed in the Recitation as related to the laboratory exercises, and also the laboratory exercises (calculations, interpretation etc). NO Personal phones or PDA's may be used.

**Exam 1 will be administered on 10/25/12 and Exam 2 will be on 12/11/12. THERE WILL BE ABSOLUTELY NO MAKE-UP EXAMS OR LABS.**

JOHN JAY COLLEGE OF CRIMINAL JUSTICE  
The City University of New York  
ENVIRONMENTAL SCIENCE 108 LAB SYLLABUS

**Instructor:**  
**Office hours:**

**Email:**

Lab Manual: Environmental Science 108 Laboratory Manual 5<sup>th</sup> Edition

Fall 2012

<u>Recitation</u>	<u>Lab</u>	<u>Lab#</u>	<u>Experiment</u>	<u>Manual Page</u>
T 1/29	Th 1/31	-	Intro ENV 108 Lab – Course Outline, Lab Safety, Perils of Plagiarism, Preview to Measurements, Scientific Notation & Significant Figures	
T 2/5	Th 2/7	1	Laboratory Equipment and Measurements	1
T 2/12	Th 2/14	6	Aluminum Detection	16
T 2/19	Th 9/21	5	Lead Detection and Toxicity	13
T 2/26	Th 2/28	7	Sulfur Dioxide Detection in Foods	18
T 3/5	Th 3/7	10	Solids in Smoke	25
T 3/12	Th 3/14	3	Drug Analysis – Color Tests	6
T 13/19	<b>Th 3/21</b>	-	Review & <b>EXAM # 1</b>	
T (HW)	Th 4/4	2	Drug Analysis - Thin Layer Chromatography	3
T 4/9	Th 4/11	4	Drug Analysis - Crystal Tests <b>LAB REPORT DUE (11/8/12)</b>	8
T 4/16	Th 4/18	9	Testing Sunscreens	23
T 4/23	Th 4/25	8	Alcohol Detection (lab will be on T 11/20)	20
T 4/30	Th 5/2	12	Clarification of Water	28
T 5/7	Th 5/9	11	Water Quality Testing (Exam Review on T 12/4)	27
<b>T 5/14</b>	<b>Th 5/16</b>		<b>Review and FINAL LAB EXAM #2</b>	

JOHN JAY COLLEGE OF CRIMINAL JUSTICE  
The City University of New York  
ENVIRONMENTAL SCIENCE 108 LAB SYLLABUS

“Qualified students with disabilities will be provided reasonable academic accommodations if determined eligible by the Office of Accessibility Services (OAS). Prior to granting disability accommodations in this course, the instructor must receive written verification of a student’s eligibility from the OAS which is located at L66 in the new building (212-237-8031). It is the student’s responsibility to initiate contact with the office and to follow the established procedures for having the accommodation notice sent to the instructor.”

**Statement of the College Policy on Plagiarism**

Plagiarism is the presentation of someone else’s ideas, words, or artistic, scientific, or technical work as one’s own creation. Using the ideas or work of another is permissible only when the original author is identified. Paraphrasing and summarizing, as well as direct quotations require citations to the original source.

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It is the student’s responsibility to recognize the difference between statements that are common knowledge (which do not require documentation) and restatements of the ideas of others. Paraphrase, summary, and direct quotation are acceptable forms of restatement, as long as the source is cited.

Students who are unsure how and when to provide documentation are advised to consult with their instructors. The Library has free guides designed to help students with problems of documentation. (*John Jay College of Criminal Justice Undergraduate Bulletin*, <http://www.jjay.cuny.edu/academics/654.php> , see Chapter IV Academic Standards)

**Grade of IN (Incomplete)**

The grade of IN (Incomplete) is given by an instructor only when there is reasonable expectation that a student will successfully complete course requirements. If this grade is unresolved after the sixth week of the following semester, it will automatically convert to the grade of F.

**Grades for Completed Courses**

Grades for courses that have been completed through the final examination are as follows.

<b>Grade</b>	<b>Numerical Value</b>	<b>Percentage Equivalent</b>
A	4.0	93.0-100.0
A-	3.7	90.0- 92.9
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B-	2.7	80.0- 82.9
C+	2.3	77.1- 79.9
C	2.0	73.0- 77.0
C-	1.7	70.0- 72.9
D+	1.3	67.1- 69.9
D	1.0	63.0- 67.0
D-	0.7	60.0- 62.9
F	0.0	Below 60.0