

**11:375:201 Biological Principles of Environmental Science**  
**Fall Semester**

**Time/Place:** Tuesday & Thursday, 5<sup>th</sup> period, 3:55-5:15 p.m.  
Cook Campus

**Instructors:** Dr. Donna Fennell, e-mail: [fennell@envsci.rutgers.edu](mailto:fennell@envsci.rutgers.edu)  
231 Environmental & Natural Resource Sciences Bldg, 848-932-5748  
Office Hours: drop by any time - at your own risk & by appointment

Dr. Peter Strom, e-mail: [strom@aesop.rutgers.edu](mailto:strom@aesop.rutgers.edu) (course coordinator)  
228 Environmental & Natural Resource Sciences Bldg., phone 848-932-5709  
Office Hours: by appointment most afternoons (or drop by any time - at your own risk)

Dr. George van Orden, e-mail: [gvanorden@hanovertownship.com](mailto:gvanorden@hanovertownship.com)  
phone: 973-428-2485; Office Hours: by appointment

**Class website:** <http://envsci.rutgers.edu/~strom/201>

**Resources:**

Vaccari, D.A., P.F. Strom, & J.E. Alleman. 2006. Environmental Biology for Engineers and Scientists. John Wiley & Sons, Inc., New York (available for optional purchase at Cook-Douglass Bookstore; on reserve in Chang Library).  
Davis, M.L., & D. A. Cornwell. 1998. Introduction to Environmental Engineering. 3<sup>rd</sup> ed. McGraw-Hill, Boston.  
(assigned pages only, available on class website)  
Hardin, G. 1968. The Tragedy of the Commons. Science 162:1243-1248. (available on class website)  
Miller, G.T., Jr. 2007. Living in the Environment, 15<sup>th</sup> ed. Brooks/Cole – Thomson Learning, Pacific Grove, CA.  
(assigned pages only, available on class website)

**Requirements:**

1. Three exams: Exam 1, 60 pts.; Exam 2, 100 pts.; Exam 3, 80 pts. = 240 pts. total
2. Problem sets (2): 20 pts. each = 40 pts. total
3. Commons Game: 20 pts.
4. Poster presentation & evaluations: 60 pts.
5. Class participation: 10 pts.

**Learning Goals:** The learning goals for the Environmental Science major are posted on our website at [http://envsci.rutgers.edu/current\\_students/envsci\\_undergrad\\_program/learning\\_goals.shtml](http://envsci.rutgers.edu/current_students/envsci_undergrad_program/learning_goals.shtml)

This course is intended to contribute to meeting the following goals:

Students will be able to:

- \* 1. apply knowledge from the sciences and mathematics to environmental problems and solutions;
- 2. use the skills and modern environmental science techniques and tools necessary for a successful career in the field;
- 4. function effectively on multidisciplinary teams;
- 5. communicate technical information effectively (orally, in writing, and through electronic media).

Additionally, they will understand:

- 6. professional ethical responsibilities;
- \* 7. contemporary environmental science issues and the impact of environmental science in a global and societal context;
- 8. the need, and have the ability, to engage in lifelong learning and to participate in professional organizations.

Note: an \* signifies a major course learning goal.

**Attendance:** It is expected that you will attend every class, even though attendance usually is not recorded. You may report an absence using the University website <https://sims.rutgers.edu/ssra/>, which will automatically send an email to

me. You are still responsible for all course materials, including announcements and handouts; please arrange with a classmate (now!) to pick up materials and take notes for you if you are out.

**Students with a disability:** please see us immediately so that we may make any necessary arrangements to support a successful learning experience.

**Academic Dishonesty:** Academic dishonesty is a serious problem at Rutgers and nationwide. This includes cheating on tests and assignments, and plagiarism. This is of particular concern in Environmental Science and Engineering because of the need for integrity in fulfilling our professional responsibilities. Rutgers deals with academic dishonesty in the Code of Student Conduct and Policy on Academic Integrity (both available at <http://studentconduct.rutgers.edu/university-code-of-student-conduct>); penalties are stern, as is fitting for the seriousness of the offense. This can mean separation from the University even for a first offense.

While most students understand cheating, many students seem uncertain about plagiarism. Of course, you may not copy anything word for word without putting it in quotes and referencing it. However, **it is also plagiarism to report on someone else's work or ideas without referencing it.** These requirements refer to material from the Internet as well as from printed sources.

Every sentence or paragraph in a paper, poster, or presentation that you write or present will fall into one of three categories: 1) a direct quote from an article (or other source), which should be used sparingly (if at all), and which must be in quotes and referenced; 2) an idea from a source you used, expressed in your own words, which must be referenced; or 3) your own idea, or very general knowledge (such as the atomic mass of carbon), which need not be referenced. Often, it is desirable to include a few relevant figures and tables from other sources in your paper or poster or presentation. However, each figure or table caption must include a reference to its source. If you have questions, please ask! This is an important part of learning to be a scientist/engineer.

## Tentative Class Schedule

Class	speaker	Topic	Reading Assignment**
1	DF	The hydrological cycle and water quality	V ch.14: 456-457; M ch.14: 305-334
2	DF	Biogeochemical cycles I: The C, N, S and P cycles and their impact on contaminant fate	M ch.3: 70-79
3	DF	Biogeochemical cycles II: Quantification/redox reactions	V ch.13: 389-397, ch.14: 442-456
4	DF	Environmental contaminants I: Sources and types of contaminants	V ch.13: 414-428, ch.14: 457-463; NYTimes (Gertner, Love Canal, DDT)
5	DF	Environmental contaminants II: Bioaccumulation and biomagnification	V ch.13: 397-414; M ch.22: 533-547
6	DF	Environmental contaminants III: Attenuation and remediation	Loffler & Edwards
7	PS	Introduction to wastewater	
<b>8</b>		<b>EXAM 1 (classes 1-6)</b>	
9	PS	The Commons Game	Hardin (Note: class split)
10	PS	Water pollution – public health	V ch.12: 342-364
11	PS	Water pollution – indicator organisms	V ch.12: 382-5; ch.11: 305-309
12	PS	Water pollution –stream sanitation	D 35-41, 288-320; V ch.15: 530-536
13	PS	Overview of wastewater treatment	V ch.16: 577-582
14	PS	Wastewater – secondary treatment	V ch.16: 582-633
15	PS	Sludge management; digestion and composting	V ch.16: 633-659

16	PS	Potable water	V ch.16: 659-662
17	PS	Microscope lab – activated sludge	(Note: class split)
18	PS	Disinfection	V ch.16: 662-668
19	GV	Video: “The Estrogen Effect”	
<b>20</b>		<b>EXAM 2 (classes 7, 10-18)</b>	
21	GV	What is environmental toxicology?	V ch.17
22	GV	Dose response	V ch.19
23	GV	Toxicity test methods	V ch.20
24	GV	Route of exposure	V ch.18: 734-747
25	GV	Fate of toxins	V ch.18: 747-758
26	GV	Risk assessment	V ch.22
<b>27</b>		<b>Poster Session 1</b>	
<b>28</b>		<b>Poster Session 2</b>	
		<b>EXAM 3 (classes 19, 21-26)</b>	

\*\* D= Davis & Cornwell 1998; M = Miller 2007; V = Vaccari et al. 2006; ch. = chapter, other numbers = pages.

Assessment Plan for 11:375:201  
Fall 2012  
Draft, August 31, 2012

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### Instructional Activities

1. Lectures, class discussions, assigned readings, homework problems, poster presentations, exams
2. Lectures, class discussions, assigned readings, homework problems, poster presentations, microscope lab, exams
4. Team poster presentation; Commons Game
5. Team poster presentation
6. Lectures, class discussions, assigned readings, poster presentations

7. Lectures, class discussions, assigned readings, homework problems, poster presentations, Commons Game, exams
8. Lectures, class discussions, exam

### **Assessment for each Goal**

1. Specific exam and problem set questions
2. Specific exam and problem set questions; completion of microscope laboratory
4. Evaluation of team posters: teamwork score; grade on Commons Game
5. Evaluation of team posters: overall poster score
6. Evaluation of team posters: proper citations score
7. Specific exam questions; grade on Commons Game
8. Specific exam question; alumni questionnaire (not available until after graduation)