

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

Time/Place: Tuesday & Thursday, 5th period, 3:55-5:15 p.m., Cook Campus, CDL 110

Instructors: Dr. Donna Fennell, email: fennell@envsci.rutgers.edu
231 Environmental & Natural Resource Sciences Bldg., phone 848-932-5748
Office Hours: drop by any time - at your own risk & by appointment

Dr. Peter Strom, email: strom@envsci.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, email: george.vanorden@rutgers.edu
239 Environmental & Natural Resource Sciences Bldg., phone 973-810-6712
Office Hours: by appointment

Course Assistant: TBA
Environmental & Natural Resource Sciences Bldg.,
Office Hours: by appointment

Class website: Sakai [<https://sakai.rutgers.edu>]; you should see the class site when you log in

Resources: Vaccari, D.A., P.F. Strom, & J.E. Alleman. 2006. Environmental Biology for Engineers and Scientists. John Wiley & Sons, Inc., New York; on reserve in Chang Library; available for optional purchase at Rutgers Bookstore (<https://tinyurl.com/F18-Course-Materials-375201>).

Davis, M.L., & D. A. Cornwell. 1998. Introduction to Environmental Engineering. 3rd 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, 15th 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, 70 pts. = 230 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: up to 10 pts.

Learning Goals: The learning goals for the Environmental Science major are posted at http://envsci.rutgers.edu/academics/envsci/learning_goals.html

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;

Note: an * signifies a major course learning goal.

The learning goals (student outcomes) for the Bioenvironmental Engineering major are posted at <http://soe.rutgers.edu/abet-bioenvironmental-engineering-bee>

Specific student outcomes addressed in this course are:

- a. an ability to apply knowledge of mathematics, science, and engineering;
- h. the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context;
- j. a knowledge of contemporary issues.

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 Dr. Strom. 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 Dr. Strom immediately so that we may make any necessary arrangements to support a successful learning experience. To formally request accommodations, please follow the procedures outlined at <https://ods.rutgers.edu/students/registration-form>. Full policies and procedures are available at <https://ods.rutgers.edu/>

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 (<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.

UNIVERSITY STATEMENT on ACADEMIC INTEGRITY

The university's policy on Academic Integrity is available at <http://academicintegrity.rutgers.edu/academic-integrity-policy>. The principles of academic integrity require that a student:

- properly acknowledge and cite all use of the ideas, results, or words of others.
- properly acknowledge all contributors to a given piece of work.
- make sure that all work submitted as his or her own in a course or other academic activity is produced without the aid of impermissible materials or impermissible collaboration.

- obtain all data or results by ethical means and report them accurately without suppressing any results inconsistent with his or her interpretation or conclusions.
- treat all other students in an ethical manner, respecting their integrity and right to pursue their educational goals without interference. This requires that a student neither facilitate academic dishonesty by others nor obstruct their academic progress.
- uphold the canons of the ethical or professional code of the profession for which he or she is preparing.

Adherence to these principles is necessary in order to ensure that

- everyone is given proper credit for his or her ideas, words, results, and other scholarly accomplishments.
- all student work is fairly evaluated and no student has an inappropriate advantage over others.
- the academic and ethical development of all students is fostered.
- the reputation of the University for integrity in its teaching, research, and scholarship is maintained and enhanced.

Failure to uphold these principles of academic integrity threatens both the reputation of the University and the value of the degrees awarded to its students. Every member of the University community therefore bears a responsibility for ensuring that the highest standards of academic integrity are upheld.

Student Wellness Services: (The RU Student Assembly urges inclusion in every syllabus.)

Counseling, ADAP & Psychiatric Services (CAPS) (848) 932-7884 / 17 Senior Street, New Brunswick, NJ 08901 / www.rhscaps.rutgers.edu/ CAPS is a University mental health support service that includes counseling, alcohol and other drug assistance, and psychiatric services staffed by a team of professional within Rutgers Health services to support students' efforts to succeed at Rutgers University. CAPS offers a variety of services that include: individual therapy, group therapy and workshops, crisis intervention, referral to specialists in the community and consultation and collaboration with campus partners.

Violence Prevention & Victim Assistance (VPVA) (848) 932-1181 / 3 Bartlett Street, New Brunswick, NJ 08901 / www.vpva.rutgers.edu/ The Office for Violence Prevention and Victim Assistance provides confidential crisis intervention, counseling and advocacy for victims of sexual and relationship violence and stalking to students, staff and faculty. To reach staff during office hours when the university is open or to reach an advocate after hours, call 848-932-1181.

Disability Services (848) 445-6800 / Lucy Stone Hall, Suite A145, Livingston Campus, 54 Joyce Kilmer Avenue, Piscataway, NJ 08854 / <https://ods.rutgers.edu/> Rutgers University welcomes students with disabilities into all of the University's educational programs. In order to receive consideration for reasonable accommodations, a student with a disability must contact the appropriate disability services office at the campus where you are officially enrolled, participate in an intake interview, and provide documentation: <https://ods.rutgers.edu/students/documentation-guidelines>. If the documentation supports your request for reasonable accommodations, your campus's disability services office will provide you with a Letter of Accommodations. Please share this letter with your instructors and discuss the accommodations with them as early in your courses as possible. To begin this process, please complete the Registration form on the ODS web site at: <https://ods.rutgers.edu/students/registration-form>.

Tentative Class Schedule

Class	Date (speak.)	Topic	Reading Assignment*
1	9/4 (PS)	The hydrological cycle and water quality	V ch.14: 456-457; M ch.14: 305-334
2	9/6 (DF)	Biogeochemical cycles I: The C, N, S and P cycles and their impact on contaminant fate	M ch.3: 70-79
3	9/11 (DF)	Biogeochemical cycles II: Quantification/redox reactions	V ch.13: 389-397, ch.14: 442-456
4	9/13 (DF)	Environmental contaminants I: Sources and types of contaminants	V ch.13: 414-428, ch.14: 457-463
5	9/18 (DF)	Environmental contaminants II: Bioaccumulation and biomagnification	V ch.13: 397-414; M ch.22: 533-547
6	9/20 (DF)	Environmental contaminants III: Attenuation and remediation	Bragg et al. 1994 Atlas and Hazen 2011
7	9/25 (PS)	Introduction to wastewater	
8	9/27 (PS)	The Commons Game	Hardin
9	10/2	EXAM 1 (classes 1-6)	
10	10/4 (PS)	Water pollution – public health	V ch.12: 342-364
11	10/9 (PS)	Water pollution – indicator organisms	V ch.12: 382-5; ch.11: 305-309
12	10/11 (PS)	Water pollution –stream sanitation	D 35-41, 288-320; V ch.15: 530-536
13	10/16 (PS)	Overview of wastewater treatment	V ch.16: 577-582
14	10/18 (PS)	Wastewater – secondary treatment	V ch.16: 582-633
15	10/23 (PS)	Sludge management; digestion, composting	V ch.16: 633-659
16	10/25 (PS)	Potable water	V ch.16: 659-662
17	10/30 (PS)	Microscope lab – activated sludge	(Note: class split; ENR 203/205)
18	11/1 (PS)	Disinfection	V ch.16: 662-668
19	11/6 (GV)	Video: “The Estrogen Effect”	
20	11/8	EXAM 2 (classes 7, 10-18)	
21	11/13 (GV)	What is environmental toxicology?	V ch.17
22	11/15 (GV)	Dose response	V ch.19
23	11/20 (GV)	Toxicity test methods	V ch.20
-	11/22	Thanksgiving Holiday	
24	11/27 (GV)	Route of exposure	V ch.18: 734-747
25	11/29 (GV)	Fate of toxins	V ch.18: 747-758
26	12/4 (GV)	Risk assessment	V ch.22
27	12/6	Poster Session 1	
28	12/11	Poster Session 2	
	12/14 (Fri.)	EXAM 3 (classes 19, 21-26) - 9:15 am	

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