

**Department of Civil, Environmental & Geomatics Engineering
Florida Atlantic University
Course Syllabus**

1. Course title/number, number of credit hours	
Environmental Fate and Transport (ENV4053)	3 credit hours
2. Course prerequisites, corequisites, and where the course fits in the program of study	
<p><i>Prerequisites:</i> CHM2046-General Chemistry 2 AND CHM2046L-General Chemistry 2 Lab AND ENV3001C-Environmental Engineering and Science, all with a minimum grade of "C" This is a senior level core course in BSEV and a technical elective for BSCV students</p>	
3. Course logistics	
<p><i>Term:</i> Spring 2019 <i>Class location and time:</i> Thursday 7:10 – 10:00 pm</p>	
4. Instructor contact information	
<p><i>Instructor's name</i> <i>Office address</i> <i>Office Hours</i> <i>Contact telephone number</i> <i>Email address</i></p>	<p>Dr. Gordon Brown FAU Honors Campus, Jupiter Saturday mornings, by appointment (352)246-1865 ghbrown@ufl.edu</p>
5. TA contact information	
<p><i>TA's name</i> <i>Office address</i> <i>Office Hours</i> <i>Contact telephone number</i> <i>Email address</i></p>	<p>Not applicable</p>
6. Course description	
<p>This course introduces students to the study of the major physical, chemical, and biological processes of pollutant transformation and transport between air, water, and the subsurface.</p> <p>The class meets for one 170-minute lecture per week. Homework assignments are typically given every other week. There will be three major exams, a case-study report, and there may be unannounced quizzes.</p>	
7. Course objectives/student learning outcomes/program outcomes	
<p><i>Course objectives</i></p>	<ol style="list-style-type: none"> I. Present the fundamental mechanisms of physical, chemical, and biological interactions underlying environmental processes. II. Present the fundamental principles applied in the analysis, design, modeling, and operation of engineered and natural solutions for environmental engineering. III. Expose students to the complex interaction between environmental problems and the needs of society.

**Department of Civil, Environmental & Geomatics Engineering
Florida Atlantic University
Course Syllabus**

<i>Student learning outcomes & relationship to ABET 1-7 objectives</i>	<p>A. Ability to understand the fundamental physical, chemical, biological, and ecological concepts necessary to analyze basic environmental engineering problems. (1,4,7)</p> <p>B. Ability to understand the fundamental processes of pollutant fate and transport necessary to conceptualize natural or engineered systems (1,4,6,7)</p> <p>C. Ability to apply knowledge of environmental processes to general modeling or problem solving (1,4,6,7)</p> <p>D. Ability to communicate effectively about issues in environmental engineering (3)</p>
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<i>Relationship to program educational objectives</i>	<p>Objective A. Practice environmental engineering within the general areas of water and wastewater, air quality, solid and hazardous waste, groundwater and soil remediation, and sustainability and pollution prevention in the organizations that employ them.</p>	H
	<p>Objective B: Advance their knowledge of environmental engineering, both formally and informally, by engaging in lifelong learning experiences including attainment of professional licensure, and/or graduate studies.</p>	H
	<p>Objective C: Serve as effective professionals, based on strong interpersonal and teamwork skills, an understanding of professional and ethical responsibility, and a willingness to take the initiative and seek progressive responsibilities.</p>	M
	<p>Objective D: Participate as leaders in activities that support service to, and/or economic development of, the region, the state and the nation</p>	H

8. Course evaluation method (note percentages subject to change)

Three Exams	60%	<i>Note:</i> The minimum grade required to pass the course is "C."
Quizzes, Case Study Reports/Presentations	5%	
Class Assignments, Homework	25%	
Book/Movie Report	5%	
Class Participation	5%	

Attendance to class is required. You are expected to participate in all class sessions and keep up with the material. You are not expected to be a distraction in the class. Final grades will be reduced by one letter for class disruption or lack of participation (as determined by the instructor). Participation in University-approved activities or religious observances, with prior notice, will not be penalized. Keep copies of all quizzes and homework assignments for ABET purposes. Exams are closed book, but students can bring 1 sheet of paper with formulas to the exams.

9. Course grading scale

Course grades are assigned according to the attached Department of Civil, Environmental & Geomatics Engineering Grading Guidelines. Assignments and reports must be prepared according to the required formats. The overall performance as related to course objectives and outcomes is evaluated and considered during grading. See the supplementary *Course Policies Document* for the program guidelines on course grading.

10. Policy on makeup tests, late work, and incompletes

**Department of Civil, Environmental & Geomatics Engineering
Florida Atlantic University
Course Syllabus**

1. *Exams* will be given only at the scheduled times and places, unless previous arrangements have been made no less than one (1) full week in advance. No one is exempt from exams.
2. *Makeups* are given only if there is solid evidence of a medical or otherwise serious emergency that prevented the student of participating in the exam. Makeup exams will be administered and proctored by department personnel unless there are other pre-approved arrangements.
3. *Late work* is not acceptable.
4. *Incomplete grades* are against the policy of the department. Unless there is solid evidence of medical or otherwise serious emergency situation, incomplete grades will not be given. Note: Incomplete grades are only reserved for those students who were passing but could not complete the required work due to exceptional circumstances.

11. Special course requirements

The goal of integrating writing in this course is to improve students' ability to produce professional quality engineering reports. Contact the University Center for Excellence in Writing at 561-297-3498 or www.fau.edu/UCEW for assistance.

If you need help finding appropriate research or background information for reports, try the libguide:

http://libguides.fau.edu/basic_engineering-boca

Report all technical problems in Canvas to the IRM helpdesk (<http://www.fau.edu/helpdesk>)

12. Classroom etiquette policy

University policy requires that in order to enhance and maintain a productive atmosphere for education, personal communication devices, such as cellular phones and laptops, are to be disabled in face-to-face class sessions. Please review the university Netiquette policy guidelines at

<http://www.fau.edu/irm/about/netiquette.php>.

Remember you are an adult—your communication with the professor and your classmates should be appropriate. You are responsible for reading all announcements posted by the instructor. Check the announcements each time you login to be sure you have read all of them since your last login session.

13. Attendance policy statement

Students are expected to attend all of their scheduled University classes and to satisfy all academic objectives as outlined by the instructor. The effect of absences upon grades is determined by the instructor, and the University reserves the right to deal at any time with individual cases of non-attendance.

Students are responsible for arranging to make up work missed because of legitimate class absence, such as illness, family emergencies, military obligation, court-imposed legal obligations or participation in University-approved activities. Examples of University-approved reasons for absences include participating on an athletic or scholastic team, musical and theatrical performances and debate activities. It is the student's responsibility to give the instructor notice prior to any anticipated absences and within a reasonable amount of time after an unanticipated absence, ordinarily by the next scheduled class meeting. Instructors must allow each student who is absent for a University-approved reason the opportunity to make up work missed without any reduction in the student's final course grade as a direct result of such absence.

14. Disability policy statement

In compliance with the Americans with Disabilities Act Amendments Act (ADAAA), students who require reasonable accommodations due to a disability to properly execute coursework must register with Student Accessibility Services (SAS) and follow all SAS procedures. SAS has offices across three of FAU's campuses – Boca Raton, Davie and Jupiter – however disability services are available for students on all campuses. For more information, please visit the SAS website at www.fau.edu/sas/.

15. Counseling and Psychological Services (CAPS) Center

**Department of Civil, Environmental & Geomatics Engineering
Florida Atlantic University
Course Syllabus**

Life as a university student can be challenging physically, mentally and emotionally. Students who find stress negatively affecting their ability to achieve academic or personal goals may wish to consider utilizing FAU's Counseling and Psychological Services (CAPS) Center. CAPS provides FAU students a range of services – individual counseling, support meetings, and psychiatric services, to name a few – offered to help improve and maintain emotional well-being. For more information, go to <http://www.fau.edu/counseling/>

16. Code of Academic Integrity policy statement

Students at Florida Atlantic University are expected to maintain the highest ethical standards. Academic dishonesty is considered a serious breach of these ethical standards, because it interferes with the university mission to provide a high quality education in which no student enjoys an unfair advantage over any other. Academic dishonesty is also destructive of the university community, which is grounded in a system of mutual trust and places high value on personal integrity and individual responsibility. Harsh penalties are associated with academic dishonesty. For more information, see University Regulation 4.001.

17. Required texts/reading

1. Walton, John C., Fate and Transport of Contaminants in the Environment, College Publishing, 2008. ISBN: 1932780041.
2. Handouts provided by instructor
3. Canvas registration

18. Supplementary/recommended readings

1. Hemond, H. and E. J. Fechner-Levy. Chemical Fate and Transport in the Environment, 2nd or 3rd edition.
2. Hornberger, Elements of Physical Hydrology, 1998.
3. Fetter, Applied Hydrogeology, 2000.
4. Fetter, C.W., Contaminant Hydrogeology, 2017.
5. Sawyer, McCarty, and Parkin. Chemistry for Environmental Engineering and Science, 5th Ed, 2003.
6. Schwarzenbach, Environmental Organic Chemistry, 2003.
7. Brimblecombe, Air Composition and Chemistry, 1996.
8. Schnoor, J.L. (1996), Environmental Modeling: Fate and Transport of Pollutants in Water, Air and Soil, John Wiley & Sons, New York, NY.
9. National Council of Examiners for Engineering and Surveying. Fundamentals of Engineering Supplied-Reference Handbook, 9th edition. www.ncees.org. ISBN: 978-1-932613-37-7
10. Davis, M.L. and Masten, S.J., Principles of Environmental Engineering and Science, McGraw Hill, 2003. ISBN#0-07-292186-2
11. Cooper, C.D., Dietz, J.D., and Reinhart, D.R. Foundations in Environmental Engineering, Waveland Press. 2000.
12. Henry, J.G. and Heinke, G.W., Environmental Science and Engineering, 2nd Edition, Prentice Hall, 1996.
13. W.J. Weber Jr. Environmental Systems and Processes. John Wiley & Sons, New York, 2001.
14. Thibodeaux, L.J. Environmental Chemodynamics: Movement of Chemicals in Air, Water, and Soil. Wiley-Interscience, New York, 1996
15. Weber, Jr., W.J. and DiGiano, F.A. Process Dynamics in Environmental Systems. Wiley-Europe, 1996.
16. Carberry, J.B. (1990). *Environmental Systems and Engineering*. Saunders College Publishing. ISBN: 0-03-029657-9
17. Hart, J. (1988). Consider a Spherical Cow: A Course in Environmental Problem Solving. University Science Books, Sausalito, CA. ISBN: 0-935702-58-X
18. Masters, G. M. and W. P. Ela. (2008). Introduction to Environmental Engineering and Science. Third Edition. Prentice Hall, Upper Saddle River NJ; 2008. ISBN: 0-13-148193-2.
19. Morel, F. M. M. And J. G. Hering. Principles and Applications of Aquatic Chemistry. John Wiley & Sons, Inc., New York; 1993. ISBN: 0-471-54896-0.

**Department of Civil, Environmental & Geomatics Engineering
Florida Atlantic University
Course Syllabus**

19. Course topical outline, including dates for exams/quizzes, papers, completion of reading

<i>Week</i>	<i>Topics</i>	<i>Assignments</i>
1	Introduction & Overview, Basic Environmental Chemistry	Chapter 1
2	Basic Environmental Chemistry & Engineering	Chapter 1 HW #1 due
3	Partitioning	Chapter 1
4	Partitioning Continued	Chapter 1 HW #2 due
5	Surface Water Fate & Transport	Chapter 2
6	Exam 1 (Material from Weeks 1-4)	
7	Wetland Hydrology	Chapter 2 HW# 3 due
8	Groundwater Hydrology	Chapter 3
9	Vadose Zone Hydrology, Subsurface Fate & Transport	Chapter 3 HW #4 due
10	Applied Environmental Chemistry	Chapter 2 & 3
11	Exam 2 (Material from Weeks 5-9)	
12	Applied Environmental Chemistry, Biodegradation & Bioremediation	Chapter 2 & 3 HW #5 due
13	Biodegradation & Bioremediation	Chapter 2 & 3 HW #6 due
14	Atmospheric Chemistry, Atmospheric Fate & Transport	Chapter 4 Report Due
15	Exam 3 (Material from Weeks 10-14)	