



CHEM F631

Fate and Transport

Spring 2016

CRN: 37501 or 35455, 3 credits

Instructor: Jennifer Guerard, Ph.D.

Office: REIC 180

Office Hours: M 1030-1200 and F 200-330

Lecture: REIC 204, 915am MWF

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Course Description (from UAF catalog). Examination of the physical properties that govern the behavior, fate and transport of contaminants released into the environment. Topics include air-water partitioning and exchange, organic solvent-water partitioning, diffusion, sorption, chemical and biological transformation reactions, and modeling concepts.

Textbook. *Environmental Organic Chemistry* second edition (2003) by R.P. Schwarzenbach, P.M. Gschwend and D.M. Imboden. **ISBN-13: 978-0471357506**

Important Dates

Jan. 15th First day of class

Jan. 22nd: Deadline for adding classes

Jan. 29th: Last day for 100% refund

Jan. 29th: Last drop day with no listing on academic record

Mar. 25th: Last drop date with W/Faculty initiated withdrawals.

May 2nd: Last day of instruction

May 5th: FINAL EXAM, 8-10am

May 11th: Grades Posted

Course Goals. This course is designed to teach students how to determine what happens to a compound when released into the environment. We will focus on organic compounds, but the principles applied to the organic compounds can also be applied to inorganic compounds.

Student-Learning Outcomes. You will become familiar with the principles and techniques to describe the behavior, fate, and transport of chemicals released into the environment, including how to obtain property information for use in determining the compound's fate and potential impacts. At the end of the course, you should be able to perform a risk assessment for any compound released into the environment.

Course Structure. The coursework will follow the textbook in the order described on the Tentative Lecture Schedule. The instructor will lecture on the theoretical aspects of organic chemistry, using a combination of slides and whiteboard, providing copies of notes to the students via Blackboard. Clickers will be used in class to assess student understanding of concepts.

Evaluation and Grade Assignment

Point Breakdown.

Homework (10 pts each)	100 points
EXAM 1 (Feb. 19 th):	100 points
EXAM II (Mar. 30 th):	100 points
Paper Reviews (50 pts each)	100 points
Paper (due Apr 20 th)	100 points
Final Exam	100 points

Total Course Points: 600 points

Grading.

A =	≥ 90%	(≥ 540 points)
B =	80 – 89%	(480 – 539 points)
C =	70 – 79%	(420 – 479 points)
D =	60 – 69%	(360 – 419 points)
F =	< 60%	(< 360 points)

I may elect to lower the grade point cutoffs, but will not raise them. I will not be using +/- grading.

Notes and Policies

Homework. Homework assignments are listed on the tentative course schedule in this syllabus and are due in class on the days shown. **Late assignments are not accepted.** Homework is a very important component of this class. You must practice using the concepts and doing the mathematics required to solve environmental problems to do well in the course. The homework problems provide you with an opportunity to learn how to approach a problem and the mechanics of actually doing the problem. I encourage you to work in groups to solve the homework problems. However, your work must be your own - just copying someone else's solution violates the Honor Code (see below).

Exams. No electronic devices are allowed during exams other than a non-programmable scientific calculator. You must turn in your exam before leaving the room. *Use of cell phones or electronic devices other than a non-programmable scientific calculator during exams constitutes cheating and will result in an F in the course as per the policy of the Chemistry Department (see Honor code).* **Make-up exams** are only allowed in the event of a legitimate excuse as determined by the instructor. If you anticipate an absence from an exam, bring it to my attention *before* the exam date, or in the case of unexpected absences, within one business day.

Honor Code. Chemistry Department policy states that any student caught cheating on graded work will be assigned a course grade of F. Course drop forms will not be signed in these cases.

Instructor-Initiated Withdrawals. Until **Friday, March 25th**, the instructor has the right to withdraw a student who has not participated substantially in the course. Any of the following constitute non-participation: 1) Exam I missed without an excused absence, 2) At least 2 incomplete homework assignments,

Class Projects

Literature Review Paper. Papers should consist of a literature review on your chosen topics of interest. Proposed titles are due Jan. 29th. First draft (must include 5 pages properly formatted text and at least 5 annotated references) due Mar. 11th. Final paper is due Apr. 20th. Format Requirements: 10-15 pages (not including references), double spaced, 1" margins, Times New Roman 12 pt. font. References should follow *Environmental Science & Technology* format. You will be required to present a 15-minute synopsis of your topic in class (10 minute talk and five minutes for class discussion) and participate in peer-review of student papers and presentations. More detailed point breakdown to follow.

The introduction should provide a concise description of the chosen topic and the broader environmental context. The body of the paper should discuss the issues in the context of environmental partitioning and transformations (and transport), providing a review of information from the literature relevant to "understanding" environmental fate and transport. Your conclusions should provide a critical assessment of the literature on your topic, and suggestions for future investigations.

Paper Reviews (2). Two 1-page critical reviews of published journal articles of your choice relevant to the course material will be required during the term (see Tentative Schedule). Selected articles to review must be submitted to the instructor by Feb. 12th. The first review is due Mar. 4th. The second review is due Apr. 25th. Details to follow.

Support & Accommodations

Disabilities Services. The Office of Disability Services implements the Americans with Disabilities Act (ADA), and ensures that UAF students have equal access to the campus and course materials. Students with documented disabilities who may need reasonable academic accommodations should discuss these with me during the first two weeks of class. I will work with the Office of Disabilities Services

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(*208 Whitaker, 474-5655) to provide reasonable accommodation to students with disabilities. You will need to provide documentation of your disability to Disability Services.

Veteran Support Services. Walter Crary (wecrary@alaska.edu) is the Veterans Service Officer at the Veterans Resource Center, 111 Eielson Building, 474-2475. Fairbanks Vet Center: 456-4238. VA Community Based Outpatient Clinic at Ft. Wainwright: 361-6370.

Student Support Services. The Student Support Services (SSS) program located in 512 Greuning (474-6844), provides opportunities for academic development, assists students with college requirements, and serves to motivate students toward successful completion of their degree program.

Amending this Syllabus: *Before the drop date, I may slightly revise the syllabus to correct for any errors. Revision at a later time would require majority vote by students present in class on day issue is decided. Any revisions will be distributed to all students via Blackboard and announced in class. Adjustments to the tentative lecture schedule, homework due dates and readings will be made throughout the course at the instructor's discretion and if so, communicated to students via Blackboard.*

Tentative Lecture Schedule

Week	Date	Topic/Reading	Assignments
WEEK 1 – (Ch 1-3) Intro & Thermodynamics	F 1/15	Ch 1-2	HW 1 open
	W 1/20	Ch 3	
	F 1/22		
WEEK 2 – (Ch 4) Vapor Pressure	M 1/25	Ch 4	HW 2 open
	W 1/27		HW 1 due
	F 1/29		Lit. Rev. Title Due
WEEK 3 – (Ch 5) Aqueous Solubility	M 2/1	Ch 5	HW 3 open
	W 2/3		HW2 due
	F 2/5		
WEEK 4 – (Ch 6) Air-solvent partitioning	M 2/8	Ch 6	HW 4 open
	W 2/10		HW 3 due
	F 2/12		Crit. Rev. Titles Due.
WEEK 5	M 2/15	Examples & Problems	
	W 2/17	Examples & Problems	HW 4 due
	F 2/19	EXAM I	
WEEK 6 – (Ch 7) Organic liquid-water partitioning	M 2/22	Ch 7	HW 5 open
	W 2/24		
	F 2/26		
WEEK 7– (Ch 8) Organic acids & bases	M 2/29	Ch 8	HW 5 due, HW 6 open
	W 3/2		
	F 3/4		1st critical review due
WEEK 8 – (Ch 9, 10) Sorption to organic matter	M 3/7	Ch 9	HW 7 open
	W 3/9		HW 6 due
	F 3/11	Ch 10	Paper draft due
WEEK 9 – (Ch 11) Sorption to inorganic surfaces	M 3/21	Ch 11	HW 8 open
	W 3/23		HW 7 due
	F 3/25		
WEEK 10	M 3/28	Examples & Problems	HW 8 due
	W 3/30	EXAM II	
	F 4/1	Ch 12	HW 9 open
WEEK 11 – (Ch 12-13) Organic Transformations	M 4/4		
	W 4/6	Ch 13	
	F 4/8		
WEEK 12 (Ch 14, 15) Redox Transformations, Photolysis	M 4/11	Ch 14	HW 10 open
	W 4/13		HW 9 due
	F 4/15	Ch 15	
WEEK 13 – (Ch 15,16) Photolysis	M 4/18		
	W 4/20	Ch 16	Final Paper due
WEEK 14 – (Ch 17) Biotransformation	M 4/25	Ch 17	
	W 4/27		HW 10 due
	F 4/29	<i>Student Presentations</i>	2nd critical review due
WEEK 15	M 5/2	<i>Student Presentations</i>	
	R 5/5	FINAL EXAM 8-10am	