

University of Maryland Baltimore County
ENCH 410 – Environmental Chemistry
Fall ##### Syllabus

GENERAL INFORMATION

Lecture: TBD
Location: TBD
Instructor: Dr. Brian Reed
Office Hours: TBD
Textbook: Water Chemistry – 2nd edition (2015)
Mark M. Benjamin
Waveland Press, Inc., Long Grove, IL ISBN 9781478623083
Suggested: Aquatic Chemistry: Chemical Equilibria and Rates in Natural Waters (3rd edition, 1996)
Werner Stumm and James J. Morgan
John Wiley & Sons, Inc., New York, NY ISBN 9780471511854

COURSE AND LEARNING OBJECTIVES

This course is focused on the following learning objectives:

- *To develop* a theoretical basis for determining the composition of natural waters;
- *To show* how fundamental chemical principles can be applied to understanding the fate of environmentally-relevant species;
- *To describe* how the chemistry of water or wastewater streams affects the removal of select contaminants in treatment systems; and,
- *To employ* an advanced software platform for solving complex water chemistry problems.

GRADING

Grades will be based on a 1000 point system. The breakdown of course points follows:

- Homework Assignments (7 assignments).....300 points
- MINEQL+ Project.....100 points
- Midterm Exams (2 in-class exams).....300 points
- Final Exam (take-home).....300 points

While a curve may be applied at the end of the semester, the point totals listed below will guarantee you the associated grade. Depending on the course outcomes, these cutoff values may be lowered; however, they will not be raised.

- 866 points.....A
- 766 points.....B
- 666 points.....C
- 600 points.....D
- < 600 points.....F

DESCRIPTION OF GRADED WORKS

Homework Assignments. There will be seven homework assignments throughout the course of the semester. In total, homework will account for 300 points, which is 30% of the total grade. Select homework assignments will be worth more points than others; the points for each assignment/question will be indicated on the problem set. **Homework will not be accepted if it is turned in more than 24 hours late; late homework will result in a 20% deduction from the total amount of points.**

Students may work together to solve homework problems; however, each student must turn in a unique solution. Many homework problems will require you to use Excel (or similar software) to accurately plot your answers as a function of pH, time, or concentration. You should have a general understanding of how to use such programs; I can provide additional help during office hours. Throughout the semester, we will collaboratively develop Excel-based templates that you can modify for homework problems.

MINEQL+ Project. MINEQL+ is a chemical equilibrium modeling software. The software is used to assess water chemistry for a variety of applications including the following: predicting precipitation in membrane processes, understanding hydrogen sulfide generation in sewer systems, and estimating the geochemical impacts of acid rain. Students will work in groups of three on this project and each team will define their problem. More information will be provided after the second midterm exam; however, the project will take the form of a proposal to fund research on resource recovery from waste streams (*i.e.*, industrial wastewater, wastewater sludge, landfill leachate, etc.), although I am open to other ideas that incorporate the aquatic chemistry principles discussed throughout the semester.

Midterm Exams. There will be two in-class midterm examinations. Midterms are not cumulative. Each exam will be worth 150 points, *i.e.*, 15% of the total grade. These exams will be closed book; however, students will be allowed to bring a one page (two side) cheat sheet. During the second exam, students can also bring the cheat sheet from the first midterm.

Final Examination. The final exam will be cumulative and will count for 300 points (30% of the total grade). Students will be expected to apply understanding of the concepts covered throughout the course to solve comprehensive problems. The final will be a take-home exam and students will have 24 hours to complete the exam. No assistance from other people (*e.g.*, students, professors, etc.) is allowed; however, students may use class notes, homework solutions, and textbooks to solve the problems. I will be available to answer general questions.

ACADEMIC INTEGRITY

By enrolling in this course, each student assumes the responsibilities of an active participant in UMBC's scholarly community in which everyone's academic work and behavior are held to the highest standards of honesty. Cheating, fabrication, plagiarism, and helping others to commit these acts are all forms of academic dishonesty. Academic misconduct could result in disciplinary action that may include suspension or dismissal. To read the full Student Academic Conduct Policy, consult the UMBC Student Handbook, the Faculty Handbook, the UMBC Integrity web page (www.umbc.edu/integrity), or the UMBC Policies section of UMBC directory.

President Hrabowski has stated, "Academic integrity has everything to do with one's character. I often say to students that character has everything to do with who a person is, not only when others are watching, but even more important, when no one is watching." This course, as with all others in the Department of Chemical, Biochemical and Environmental Engineering, is designed to enhance *your* learning and *your* education. By cheating, you are hurting yourself, the other students, and me. Anyone found cheating or plagiarizing on homework problems, exams, or the project will be subject to penalties and will be referred to the Academic Conduct Committee.

STUDENT DISABILITY SERVICES (SDS)

UMBC is committed to eliminating discriminatory obstacles that may disadvantage students based on disability. Services for students with disabilities are provided for all students qualified under the Americans with Disabilities Act of 1990, the ADAA of 2009, and Section 504 of the Rehabilitation Act who request and are eligible for accommodations. The Office of Student Disability Services (SDS) is the UMBC department designated to coordinate accommodations that would allow for students to have equal access and inclusion in their courses.

If you have a documented disability and need to request academic accommodations, please refer to the SDS website at sds.umbc.edu for registration information or visit the SDS office in the Math/Psychology Building, Room 212. For questions or concerns, you may contact us at disAbility@umbc.edu or (410) 455-2459. If you require accommodations for this class, make an appointment to meet with me to discuss your SDS-approved accommodations.