

Chemistry 489 Advanced Environmental Chemistry – Spring 2020
Part I: Introduction to Green Chemistry

GENERAL INFORMATION:

Dr. Ed Brush: DMF 407
Office Hours: Tuesday, Wednesday 11-1, or by appointment.
Office Phone: 508-531-2116
e-mail: ebrush@bridgew.edu
web page: <http://webhost.bridgew.edu/ebrush/>
Class: TR, DMF 476, 9:30 - 10:45

Course Description: CHEM 489 Advanced Environmental Chemistry (3 credits). *Prerequisite: CHEM 244 with a minimum grade of "C-" and consent of instructor.* This course will deal with processes for minimizing hazardous waste, toxicological chemistry of inorganic and organic substances, and chemical analysis of waste, water, air and solids. In addition, recent advances in the field of environmental chemistry will be discussed.

In Spring 2020, this course will focus on an Introduction to Green Chemistry (Dr. Brush) and Environmental Chemical Analysis (Dr. DeRamos-King). The course will stress readings from the current literature, worksheets, and oral class presentations. *This is an advanced course in chemistry and it is expected that students will take the responsibility for mastering the course material.*

Dr. Ed Brush – Green Chemistry (January 23 – March 5). Potential Lecture Topics:

- Definition of Green & Sustainable Chemistry
- Unintended Consequences of Chemicals on Society
- 12 Principles of Green Chemistry
- Reaction Efficiency: Atom Economy, PMI
- Successful Applications of Green Chemistry
- Solvent-free solid state chemistry applications
- Catalysts from Earth-abundant elements
- Green polymers and plastics
- Toxicology
- Textiles
- Systems thinking
- Molecular Design
- Life Cycle analysis
- UN Sustainable Development Goals

GRADING POLICY (Part I: Dr. Brush)

	<u>% of Part I Grade</u>
• Class participation and Attendance (10 points)	5%
• Worksheets (30 points)	15%
• Class paper (20 points)	10%
• Journal Club Presentations (40 points)	20%
• Class Presentation (50 points)	25%
• Exam (50 points)	25%
• TOTAL (200 points)	100%

CLASS ATTENDANCE IS MANDATORY. You are expected to arrive on time for class, and be prepared to participate in class discussions. You are allowed one absence without penalty, but there is a 5-point penalty for each missed class after that (including arriving late), except for a valid personal emergency. If you miss class you are responsible for obtaining missed lecture notes and assignments.

Responsibilities of the student. By registering for this *advanced level course*, you have accepted the responsibilities expected of all BSU students. Foremost of these, ***it is the student's responsibility to take the initiative to learn the course material!*** Examples of some of these responsibilities include: attending and participating in lecture; taking the scheduled exam; completing assignments on time.

BSU Policy on Academic Integrity and Classroom Conduct. Academic honesty is expected of all students; plagiarism and cheating are not condoned and are subject to academic penalty, which may result in a failure for the course in which the violation took place. A record of the violation is kept and may result in suspension or dismissal from the college. Academic dishonesty may include cheating on exams; plagiarism; blatant copying of lab reports,

problem sets; signing in for another student on the attendance sheet; and other infractions identified by the instructor, any of which may result in dismissal from the course with an F grade.

Green Chemistry Web Sites. Refer to the CHEM 489 course web page for links to these sites and more. (<http://webhost.bridgew.edu/ebrush/>)

- American Chemical Society - The Green Chemistry Institute
- American Chemical Society - Green Chemistry Resources
- EPA's Green Chemistry Program
- The Presidential Green Chemistry Challenge Awards
- Beyond Benign (green chemistry education resources)
- American Chemical Society journals website. You have free access to all ACS journals via the BSU campus network, including the ability to download articles as pdf documents.

Take-Home Worksheets. Every Thursday I will assign a take-home worksheet that will be due on the following Tuesday. You are encouraged to work together on these worksheets! However, there is a difference between working together and copying. If I determine that students have copied each other's work, all students involved will receive a zero grade on the worksheet for the 1st offense, and an F in the course for the 2nd offense. There are no make-ups for missed worksheets, and they will not be accepted late.

Journal Club Thursday. Each Thursday a green chemistry topic will be assigned, and students will research the topic by identifying **one article from a professional journal** obtained through internet sources or Maxwell Library. On the following Tuesday you must send me your article as a **PDF email attachment**. Each student must have a different article, so first-come-first-served! On Thursday, you will give a brief (5 minute) summary of the article that includes the green chemistry relevance. Grading will be done on a 10-point scale: providing article on time (2 points), relevance and quality of the article (2 points), identifying and clearly stating the green chemistry relevance (3 points), preparation and answering questions (3 points). You are expected and strongly encouraged to take notes during each presentation, as worksheet and exam questions on journal club topics are fair game!

Class Paper. What is Green & Sustainable Chemistry? The final product will be due on the last day of class (March 5). One page, single space, one inch margins, 12 pt Times New Roman font. You must include one image, and have a minimum of three references that I must approve.

Formal Class Presentations: February 27 & March 3. Each student will prepare and present to the class a 15 minute power point report on an innovative Green Chemistry method or technology taken from the Presidential Green Chemistry Challenge Awards (<http://www.epa.gov/greenchemistry/past.html>). Each student must present a different topic, and one that has not been discussed in class. Once you have chosen your topic you must notify me by email. The format for these reports will be discussed later. Get started now!

Part I Final Exam: March 5-6. Exam material will be based on: class discussions, handouts, worksheets, and student presentations. If you miss the exam you must provide me with a written, verifiable excuse. It is then up to my discretion to allow a make-up exam. ***Illness requiring a doctor's care or personal emergencies are the only acceptable excuses.*** All other excuses will result in a zero exam grade and an F in the course. Make-up exams must be turned in within 48 hours of the scheduled exam date.

CHEM 489 Green Chemistry Course Schedule (Subject to Change!)

Date	Topic	Date	Topic
January 23 (R)	Syllabus, Introduction to Green Chemistry	February 18 (T)	WS-3 due, Lecture
January 28 (T)	Lecture	February 20 (R)	Journal Club-4, WS-4 handout, Lecture
January 30 (R)	Journal Club-1, WS-1 handout, Lecture	February 25 (T)	WS-4 due, Final lecture
February 4 (T)	WS-1 due, Lecture	February 27 (R)	Student Presentations
February 6 (R)	Journal Club-2, WS-2 handout, Lecture	March 3 (T)	Student Presentations
February 11 (T)	WS-2 due, Lecture	March 5-6 (R/F)	Exam (take-home due on March 6)
February 13 (R)	Journal Club-3, WS-3 handout, Lecture		