

Chemistry 111 - Introduction to Green Chemistry

Instructor: Dr. Richard Rediske

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331-3047

Lecture will be Tuesday & Thursday 4:00-5:15 p.m. in MAK A1165

My Office Hours: Tuesday & Thursday 5:15-6:00 p.m. MAK B4209

Friday 1 - 2:30 p.m.

Overall Subject Matter: Green Chemistry, known also as sustainable chemistry, is the design of chemical products and processes that reduce or eliminate the use or generation of hazardous substances. The course presents basic concepts of green chemistry and engineering. It is not applicable for chemistry majors or minors. Fulfills Physical Sciences Foundations.

Organization of the class:

The focus of the course is on understanding green chemistry - the chemistry of reducing or eliminating the hazards associated with chemicals needed in modern manufacturing and processes. In order to understand green chemistry, we must first understand the basics of chemistry. This will constitute the first unit of the course. We will spend the majority of our time beyond this first unit investigating various sources of chemical hazards and possible green alternatives. There is no textbook and supplemental reading materials will be assigned. The lecture powerpoints will be posted one week in advance and should be reviewed prior to class. Review of the lecture powerpoints is considered a daily reading assignment and necessary for class participation.

We will have an exam after the first unit covering the basics of chemistry. Subsequent evaluation will take the form of short student group presentations on a topic covered in each of three green chemistry units, participation in class discussions and presentations, and a final individual presentation on a topic. **Significant outside of class work is required for this course! Please do not leave work for the last minute!**

Schedule

Topic:	Time Span
Unit 1 - The basics of sustainability, green chemistry, and general chemistry	Weeks 1 - 2
Review discussion on Jan 24.	Week 3
Exam Jan 26	
Unit 2 - Chemical Production (the old and new) Energy (Fossil fuel, batteries, biofuels, solar) Plastics (petroleum and biopolymers)	Weeks 4 - 5

Unit 3 - The fate of chemicals in the environment: Pesticides, heavy metals, pharmaceuticals and personal care products Week 6-7

8 minute group presentations on Feb 23

Review discussion on Feb 28 Week 8

Exam on Mar 1

Spring Break Week 9

Unit 4 - Air pollution (Acid rain, global warming, ozone) Week 10

Unit 5 - Toxicity (Mercury, BPA, carcinogens, endocrine disrupters) Week 11 - 13

Individual Presentations and Final Exam Review Week 13-15

Final Exam April 26 4-5:50

Evaluation

Exam 1	20%
8 minute presentation	15%
Mid Term Exam	20%
Final Presentation	20%
Final Exam	25%

Grade Distribution

A	A-	B	B	B	C	C	C	D	D	F
100-92	92-90	90-88	88-82	82-80	80-78	78-72	72-70	70-68	58-60	60-0

Presentations

A group and individual presentation are required for this class. The 8 minute group presentation will be on a pollution or green chemistry topic similar to what we discussed in class. Topics are due the third week of class. Each student will make a 10 minute presentation + 2 minute Q&A as a final with the topic of "How will you personally make a significant change in the world?" This talk will focus on your own goals and the topic of green chemistry. The topic needs to be substantial and ideas like I will stop drinking bottled water or I will recycle the Lanthorn are not acceptable.

You and your group should provide the following at the start of the class period where you give

- your presentation: An outline of what you will talk about
- Each group member's name
- Your assigned group number for this presentation
- For your evaluation of each other group's presentations:

You individually will evaluate the presentation given on several categories as assigned in the evaluation handout. You will be graded on how accurately and honestly you evaluate the presentations of your fellow students. Consistently evaluating all presentations with top marks will not result in a high mark for this portion of your grade!

Grade for presentations:

Your grade for the presentation will be based on the outline your group provided, the depth and accuracy of knowledge conveyed, your group member's evaluation of your participation in the preparation of the talk, and the quality of the presentation of the information. The evaluations given by your fellow students who listen to the talk will be responsible for a portion of the grade for the presentation.

Presentation outlines

Outlines should follow an outline format as described in class with references following at the end. Each outline should provide enough space for comments and should take up approximately one full page. Outlines must be typed, not hand-written.

Missing Presentations

Missing a presentation will result in a mark of zero for that unit for both your presentation grade and for your evaluation grade unless a serious and documented excuse is given. There is no time for makeup presentations during the semester. You must be at and participate in your group's talk to receive points for the presentation.

Academic Integrity

Students will do original work and will not take or receive the efforts of another person on any test or assignment, use unauthorized resources on quizzes or tests, plagiarize, or give/sell other students papers or assignments not authorized by the instructor. You are responsible for making yourself aware of and for understanding the policies and procedures that pertain to academic integrity. To that end, be sure to familiarize yourself with the GVSU Student Code [Section 223.01] related to academic integrity. Furthermore, be sure to reference sources at all times. If you are uncertain about such an issue prior to submission of an assignment, project, or test, please see me so we can eliminate that uncertainty.

Disability

If there is any student in this class who has special needs because of a learning, physical, or other disability, please contact me and Disability Support Services (DSS) at (616) 331-2490. Furthermore, if you have a disability and think you will need assistance evacuating this classroom and/or building in an emergency, please make me aware so that the university and I can develop a plan to assist you. It is the student's responsibility to request assistance from DSS.



This course is part of GVSU's General Education Program.

The goal of the program is to prepare you for intelligent participation in public dialogues that consider the issues of humane living and responsible action in local, national, and global communities.

The program is designed to increase your knowledge and skills in the following areas:

Knowledge Goals

1. The major areas of human investigation and accomplishment - the arts, the humanities, the mathematical sciences, the natural sciences, the social sciences, and writing.
2. An understanding of one's own culture and the cultures of others.
3. The tradition of humane inquiry that informs moral and ethical choices.

Skills goals

1. To engage in articulate expression through effective writing
2. To engage in articulate expression through effective speaking.
3. To think critically and creatively.
4. To locate, evaluate, and use information effectively.
5. To integrate different areas of knowledge and view ideas from multiple perspectives.

Ensuring that undergraduate students receive a broad general education has been a primary goal of colleges and universities since their inception. In this era of increasing specialization and growing demand for professional expertise, it is vital that we continue to emphasize the value of general learning.

GVSU maintains that a complete education involves more than preparation for a particular career. A career occurs in the context of a life, and a sound general education helps one "make a life" as well as "make a living." The university is committed to assuring that all undergraduate students, regardless of academic major, receive a broad education rooted in the arts and sciences.

Teaching in the liberal tradition is at the heart of Grand Valley's identity, and this focus is critical in our General Education Program. Liberal education transcends the acquisition of information; it goes beyond the factual to ask important evaluative and philosophical questions. Liberal learning holds the fundamental principles and suppositions of a body of knowledge up to inquiry, question, and discussion. It helps a person recognize the assumptions under which he or she operates and encourages the examination and questioning of those assumptions. Liberal learning begins in the General Education Program and continues through the more specialized studies comprising each student's major and minor areas of study.

Grand Valley State University educates students to shape their lives, their professions, and their societies.