

**Course Syllabus
Chemistry 141Z
Fall 2008
Oxford College of Emory University**

Class Meets TTh, 10:00-11:15, Th 2:30-5:30 Room 223 Pierce

Instructor: Jack F. Eichler, PhD

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Office Hours: Tuesday/Thursday (11:30-1:00 am) or by appointment

What is a Liberal Arts Education?

A liberal arts education is an interdisciplinary education including courses in humanities, natural sciences, social sciences, and physical education.

Why Pursue a Liberal Arts Education?

This course aims to use chemistry as a springboard into a liberal arts education by helping YOU develop your human capacities, that is the "qualities, capacities, domains, and/or dispositions native to us as human beings that allow education to occur in the first place."¹ Marshall Gregory, Ice Professor of English, Liberal Education, and Pedagogy at Butler University, breaks down these capacities into eight categories:

- 1) Language
- 2) Reason
- 3) Imagination
- 4) Introspection
- 5) Aesthetic Responsiveness
- 6) Moral and Ethical Deliberation
- 7) Sociability
- 8) Physicality

One may see the goal of a liberal arts education as the advanced development of all of these human capacities. By doing so, YOU will be better equipped to live an "autonomous, socially responsible, intellectually perspicuous, and morally defensible life."¹

¹Marshall Gregory, "Forgetting, Learning, and Living: A Pedagogical Theory of How Education Makes a Difference Even Though We Forget Most of What We Learn" 2006.

Course Description

Chemistry 141/141Z is the first course in a two-semester sequence for General Chemistry. This class fulfills one half of the introductory chemistry requirement for science majors at Emory University. It can also be taken by non-science majors to complete their laboratory science general education requirement. CHEM 141Z in particular covers the traditional content of CHEM 141 while focusing on environmental issues. CHEM 141Z can be used to fulfill a 100-level focus course elective for the Environmental Studies major at Emory. The topics covered in CHEM 141Z include: 1) experimental design and measurement; 2) fundamental properties of matter; 3)

states of matter and the properties of gases; 4) aqueous solutions; 5) chemical reactions; 6) energy and thermochemistry; and 7) environmental sustainability.

Course Goals

The general goal of CHEM 141Z is to provide an introduction to the study of matter and the various changes it can undergo and to demonstrate how/why the study of chemistry is relevant to YOUR life. In the course of completing this goal, the various concepts of chemistry that are discussed will aid in developing your human capacities and contribute to your liberal arts education. More specifically, by completing the ground-level ozone study, you will: 1) begin to develop problem solving and critical thinking skills; 2) become better acquainted with experimental design (including data collection and analysis); 3) practice effective communication; and 4) show you how a chemist can solve a real problem and reveal the interdisciplinarity of a social issue such as air quality.

Materials and Resources

- Textbook: Chemistry, by Darrel Ebbing (required)
- Student study guide and solutions manual (accompaniment to textbook; optional)
- Carbon-copy lab notebook (required)
- Safety Glasses (required)
- Non-graphing scientific calculator (required)
- PRS Interwrite Remote (required)
- Blackboard Class Conference – General Chemistry with Lab (<https://classes.emory.edu>)
- Emory email (ex: jeichle@emory.edu)

Grading

Your grade will be broken down into the following categories:

Blackboard Assignments	5%
Exam 1 (Unit 1 and 2)	20%
Exam 2 (Unit 3 and 4)	20%
Exam 3 (Unit 5 and 6)	15%
Final Exam (cumulative) ¹	20%
Laboratories*	15%
Ground Level Ozone Project	5%

¹Your final exam can be used to replace your lowest exam grade.

Laboratories

You will do 7 labs in the course of the semester:

- 1) Experimental Design Lab (formal report)
- 2) Atomic Spectra Lab (problem sheet)
- 3) Lewis Structure Dry Lab (problem sheet)
- 4) Imploding Can Lab (formal report)
- 5) Stoichiometry Lab (formal report)
- 6) Redox Titration (problem sheets)
- 7) Calorimetry Lab (formal report)

Guidelines for the lab formal reports will be provided in separate documents.

*Note: If you complete all of the assigned SALG surveys and submit a course reflective statement at the end of the semester, your lowest lab grade will be dropped. Missed labs due to absence CANNOT be made up and will result in a grade of 0 (if you miss class during a laboratory experiment, you will not receive credit for the formal report or problem sheet assigned for that lab).

Ground-level Ozone Project

Each student will complete a ground level ozone detection study by working in a collaborative group with three other students. The initial problem will be given to you in the form of a case study. Once the major learning goals have been identified in the case study during the course of the semester, each group will research the necessary background information required to address any unresolved learning objectives. Included in this will be why ground-level ozone in Newton County needs to be measured and how one could actually go about measuring it. Each group will then construct ground-level ozone detectors and design an experimental protocol for collecting ozone concentration data. Subsequently, each group will create a media document (written report, video, poster, etc.) that summarizes all of the pertinent background information, as well as the ozone concentration data and analysis. This document will be given to the local environmental agencies Keep Covington/Newton Beautiful and The Center for Urban Preservation and Planning. The ground-level ozone project will be graded based on the background presentations and the final media document. Guidelines for these assignments will be given in separate documents.

Final letter grades will be assigned as shown below:

A	(93-100%)
A-	(90-92%)
B+	(87-89%)
B	(83-86%)
B-	(80-82%)
C+	(77-79%)
C	(73-76%)
C-	(70-72%)
D+	(67-69%)
D	(60-66%)

Honor Code

It is assumed that all Oxford College students will adhere to the highest standards of academic honesty and will uphold the Oxford College Honor Code.

Specific things to keep in mind for CHEM 141:

- you are expected to do your own work when taking an exam.
- only a non-programmable calculator, pencil, and other pre-approved documents are permitted in the exam.
- no cell phones are allowed in class during an exam period.
- all work handed in for lab is done as a group, however there is to be NO collaboration between lab groups for any formal report or problem sheet.
- any unoriginal idea or thought used in a laboratory assignment must be properly referenced.

It is my duty, according to the Honor Code, to report any incidences of misconduct to the Honor Council. Anyone who is found guilty of violating the Honor Code may receive a grade of F for the course. It is strongly recommended that each student carefully read through the Oxford College Student Honor Code.

Tentative Schedule (chapters from Ebbing in parentheses)

Week 1: units, dimensional analysis, experimental design (CH 1)

Week 2: *atomic structure, electron configurations* (CH 2, CH 7, CH 8)

Week 3: periodic trends (CH 8)

Week 4: chemical bonding and Lewis structures, formulas and names (CH 2, CH 9, CH 10)

Week 5: chemical bonding and Lewis structures, formulas and names

Exam I

Week 6: molecular geometry and dipoles (CH 10, CH 11)

Week 7: intermolecular forces (CH 11)

Week 8: gas laws (CH 5)

Exam II

Week 9: moles and stoichiometry (CH 3)

Week 10: chemical reactions and aqueous solutions (CH 4, CH 12)

Week 11: chemical reactions and aqueous solutions

Week 12: thermochemistry (CH 6)

Exam III

Week 13: ground level ozone detection study

Week 14: ground level ozone detection study

Week 15: ground level ozone detection study

Final Ground Level Ozone Media Document due December 9

Final Exam: Tuesday, December 16, 2-5 pm

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Chemistry 221
Fall 2008
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Class Meets MWF (8:30-9:20 and 9:35-10:25) Room 101 Pierce

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Email: jack.eichler@emory.edu

Office Hours: Tuesday/Thursday (11:30am-1:00pm), Friday 1-2pm, or by appointment

Course Description

Chemistry 221 is the first course in a two-semester sequence for Organic Chemistry. This class fulfills one half of the organic chemistry requirement for chemistry majors at Emory University. It can also be taken by non-chemistry majors to complete their organic chemistry requirement for medical school or other medical-related school admissions. The topics covered in CHEM 221 include: 1) review of basic chemical bonding theories and acid/base properties of organic compounds; 2) hybridization and molecular orbital theory, and the specific chemical bonding modes in organic compounds; 3) stereochemistry of organic compounds; 4) fundamental reaction mechanisms of organic transformations (substitution, elimination, free radical, etc.); and 5) structure, synthesis, and chemical reactions of alkanes, alkenes, alkynes, and alcohols.

Course Goals

The general goal of CHEM 221 is to provide you with an understanding of the fundamental properties of organic compounds, including:

- 1) the basic chemical bonding involved in organic compounds;
- 2) the physical and chemical properties of specific organic functional groups; and
- 3) the fundamental reaction mechanisms involved in organic reactions and transformations.

By successfully completing these goals, you will be prepared to continue working with organic reactions and transformations in CHEM 222, as well as in other upper level chemistry courses. Achieving the course goals in CHEM 221 will also provide the basic knowledge and understanding of organic chemistry required for the MCAT.

Materials and Resources

- Textbook: Organic Chemistry, by Leroy Wade (required)
- Student study guide and solutions manual (accompaniment to textbook; optional)
- Non-graphing scientific calculator (required)
- PRS Interwrite Remote (required)
- Molecular model kit (highly recommended)
- Blackboard Class Conference – Organic Chemistry (<https://classes.emory.edu>)
- Emory email (ex: jeichle@emory.edu)

Grading

Your grade will be broken down into the following categories:

In-class quizzes	5%
Exam 1	25%
Exam 2	25%
Exam 3	20%
Exam 4	25%

Each exam may include concepts from previous exams. Exam 4 can be used to replace your lowest grade from Exams 1-3.

There will be one quiz for each chapter (11 quizzes total). These will be given in class using the Interwrite PRS clicker and will be unannounced. You will be able to drop your lowest quiz grade.

Final letter grades will be assigned as shown below:

A	(93-100%)
A-	(90-92%)
B+	(87-89%)
B	(83-86%)
B-	(80-82%)
C+	(77-79%)
C	(73-76%)
C-	(70-72%)
D+	(67-69%)
D	(60-66%)

Honor Code

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Specific things to keep in mind for CHEM 221:

- you are expected to do your own work when taking an exam.
- only a non-programmable calculator, pencil, molecular model kit, and other pre-approved documents are permitted in the exam.
- no cell phones are allowed in class during an exam or quiz.

It is my duty, according to the Honor Code, to report any incidences of misconduct to the Honor Council. Anyone who is found guilty of violating the Honor Code may receive a grade of F for the course. It is strongly recommended that each student carefully read through the Oxford College Student Honor Code.

Tentative Schedule

Week 1: Chapter 1
Week 2: Chapter 2
Week 3: Chapter 5
Week 4: Chapter 5
Week 5: Chapter 3
Exam I
Week 6: Chapter 4

Week 7: Chapter 4

Week 8: Chapter 6

Week 9: Chapter 6

Exam II

Week 10: Chapter 7

Week 11: Chapter 8

Week 12: Chapter 9

Exam III

Week 13: Chapter 10

Week 14: Chapter 11

Week 15: Review

Exam IV Friday, December 5

