

**Chemistry 120 – Course Syllabus  
Spring 2010  
Oxford College of Emory University**

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Class Meets MWF, 8:30-10:25, Room 223 Pierce

Instructor: Jack F. Eichler, PhD

Office: 210 Pierce

Office Phone: (770) 784-8340

Email: jack.eichler@emory.edu

Office Hours: Tuesday/Thursday (9:30-11:30am), or by appointment

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### **Course Description**

Chemistry 120 is a course designed for pre-nursing students and/or non-science majors; this class is the second course of the two-course introductory chemistry requirement for pre-nursing students, and can also be taken by non-science majors to complete their laboratory science general education requirement for Oxford and Emory College. There is no pre-requisite for this course. The topics covered in CHEM 120 include a review of the periodic table and electron configurations, basic models of bonding, solution chemistry, acid/base chemistry, basic concepts of organic reaction chemistry, the structure and function of biological molecules, and the connections between chemistry and biology.

### **Course Goals**

The general goal of CHEM 120 is to provide an introduction to the connection between chemistry and biology. More specifically, this course aims to provide pre-nursing students with a rudimentary background in both solution chemistry and biological chemistry that will aid them in their future studies, and allow non-science majors the opportunity to enrich their knowledge of chemistry by exploring the connection between the physical and life sciences. The completion of this course should help increase the success of nursing students in their professional studies, and provide for all students a deeper understanding of how chemistry is relevant to one's life.

### **Student Learning Goals**

*Unit 1: The periodic table and electron configurations (sections 2.4-2.7)*

1) Students will be able to use the periodic table to write out electron configurations for atoms and ions.

*Unit 2: Basic models of chemical bonding (sections 4.2, 4.4, 4.5, 4.7, 4.11, 6.7)*

2) Students will be able to use electron configurations of atoms/ions to predict the type of bond that will form, and to draw basic models of molecules.

*Unit 3: Basic concepts of organic chemistry and organic reactions (sections 10.1, 10.3, 10.4, hybridization (handout), organic reaction mechanisms (handout), sections 8.1-8.4)*

3) Students will be able to identify organic functional groups, describe the bonding of carbon-based compounds, and use their knowledge of the structure of organic compounds to predict basic reaction mechanisms.

*Unit 4: Solution Chemistry (sections 7.2-7.6, 7.8)*

4) Students will be able to qualitatively and quantitatively describe the properties of solutes in solutions.

*Unit 5: Acids-bases (sections 9.1-9.3, 9.5-9.11)*

*Unit 6: Acid-base Chemistry of Organic Compounds and Amino Acids (handouts)*

5) Students will be able to identify acids and bases, qualitatively compare the strengths of acids and bases, including for organic compounds and amino acids, and will be able to calculate the pH and pKa for acids.

*Unit 7: Proteins (sections 22.1-22.11), Enzymes (sections 23.1, 23.4, 23.5, 23.7)*

6) Students will be able to describe the fundamental chemical bonds involved in protein formation, and the explain the fundamental structure and function of proteins and enzymes.

*Unit 8: Nucleotides and Nucleic Acids (sections 25.2, 25.3, 25.5-25.7, sections 26.1-26.5, 26.7, 26.8)*

7) Students will be able to describe the fundamental chemical bonds and intermolecular forces involved in nucleic acid formation, and explain the process in which nucleic acids are used to make protein.

*Unit 9: Nutrition, Metabolism, and Catabolism (sections 27.1-27.3, sections 28.1, 28.2, 28.5, sections 30.3-30.5)*

8) Students will apply their knowledge of proteins and fundamental organic compounds to describe how the human body uses compounds to create energy, and make connections between these energy creating processes and specific aspects of nutrition.

*Unit 10: Disease (sections 31.1-31.6, handouts)*

9) Students will apply their knowledge of proteins and fundamental organic compounds to describe the mechanism and potential therapeutic approaches for specific diseases.

## **Materials and Resources**

- Textbook (highly recommended): Introduction to General, Organic, and Biochemistry, 8<sup>th</sup> edition, Bettelheim/Brown/March (7<sup>th</sup> or 9<sup>th</sup> editions are acceptable substitutes)
- Accompanying student study guide and solutions manual (highly recommended)
- Carbon-copy lab notebook (required)
- Safety Glasses (required)
- Non-graphing scientific calculator (required)
- Access to Blackboard course site and Emory email (required)

## **Grading**

Your grade will be broken down into the following categories:

Case Studies/Debates	5%
Exam 1 <sup>1</sup>	15%
Exam 2 <sup>1</sup>	20%
Exam 3 <sup>1</sup>	20%
Laboratories	20%
Final Exam (cumulative) <sup>2</sup>	20%

<sup>1</sup>Unannounced extra credit quizzes will be given about once every week, and points earned on these quizzes will be applied to the exam which they immediately precede (note: this will be the only source of extra credit for your exams).

<sup>2</sup>Your final exam can be used to replace your lowest exam grade and will act as your makeup exam if you miss one of the semester exams.

### Case Studies/Debates

Information about how the case studies and debates will be structured and graded will be given at the time these assignments are completed.

### Laboratories

Laboratory activities will be graded based on written reports. Generally, this will be done in the form of a report sheet or a formal written summary. Descriptions for the lab report sheets and formal summaries can be found on the course Blackboard site.

The schedule of labs and weight of each lab grade will be given in a separate document, however it is noted that there will be 4 formal reports during the semester, and each student will be the "primary author" for at least one report during the course of the semester; you will work in groups of 3 or 4, and the role of primary author will rotate among your group members. The responsibilities of the primary author and contributing authors will be described in forthcoming 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 120:

- 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 must be done only by members of your group; collaboration between groups is not permitted
- any idea or thought used in a laboratory assignment, case study, and/or debate 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**

Week 1: Unit 1

Week 2: Unit 1

Week 3: Unit 2

Week 4: Unit 2/Unit 3

Week 5: Unit 3

#### **Exam I**

Week 6: Unit 4

Week 7: Unit 5

Week 8: Unit 5

Week 9: Unit 6

Week 10: Unit 6

#### **Exam II**

Week 11: Unit 7

Week 12: Unit 8

Week 13: Unit 8

Week 14: Unit 9

Week 15: Unit 10

#### **Exam III**

Week 16: Review

**Final Exam: Monday, May 3 (9:00am-12:00noon)**