

# **CHE 101 ONLINE: Molecular Science for Citizens**

## **UNIVERSITY OF KENTUCKY, COLLEGE OF ARTS AND SCIENCES**

Instructor:	Dr. Kim Woodrum
Semester:	Summer 2012
Contact	(859) 257-1551
Information:	Kim.woodrum@uky.edu
Office Location:	135 Chemistry Physics Building
Teaching Asst.	
Prerequisites:	None.
Textbook:	Molecular Science for Citizens, Custom Edition for University of Kentucky.
Required Supplies:	Darling Models for Glucose. Ability to access the University of Kentucky Online System, Blackboard. All University of Kentucky students enrolled in the course will have free access to this resource. Ability to take digital photos. Common cooking items, as described in Hand-On Activity.

### **COURSE PRIMARY LEARNING GOAL**

This course is designed to enable you to identify and understand the chemistry around you in your everyday life. You should be able to recognize the chemicals and be able to classify them according to various classification schemes used by chemists. Upon classifying the chemical you should be able to make judgments as to their physical and chemical properties.

### **COURSE'S SECONDARY LEARNING GOALS**

This course will be divided into four parts. Part 1: General Chemistry Concepts and Inorganic Chemistry; Part 2: Organic Chemistry; Part 3: Biochemistry; and Part 4: Scientific Method. In the course of covering the topics to meet the primary goal, you will also develop critical thinking skills, reading comprehension skills, and an understanding and implementation of the scientific method.

### **COURSE LEARNING OUTCOMES**

1. Describe methods of inquiry that lead to chemical knowledge, and distinguish scientific fact from pseudoscience.
2. Explain fundamental principles of chemistry.
3. Apply chemical principles to interpret and make predictions.
4. Demonstrate an understanding of discoveries that changed our understanding of the world.
5. Give examples of how chemistry interacts with society.
6. Develop a scientific project using scientific methods and produce a laboratory report on the design, data collection, analysis and conclusions of the project.
7. Recognize when information is needed and demonstrate the ability to find, evaluate, and use sources of chemical information.

## ADMINISTRATIVE INFORMATION

1. This course is part of the UK Core Program and can be taken to fulfill the General Education Inquiry into Natural, Physical and Mathematical Science requirement.
2. Professor Stephen Testa, Director of General Chemistry, and the Assistant to the Director, coordinate and administer all of the general chemistry courses. They are located in the Office of General Chemistry (CP-120) and can be contacted via email ([GenChemOffice@uky.edu](mailto:GenChemOffice@uky.edu)), by phone (257-3882), or by visiting the office during normal office hours (8:00 AM to 4:30 PM).
3. If you have a documented disability that requires academic accommodations in this course, please make your request to the University Disability Resource Center. The Center will require current disability documentation. When accommodations are approved, the Center will provide the instructor with a Letter of Accommodation that details the recommended accommodations. Contact Jake Karnes, the Director of the Disability Resource Center, at 859-257-2754 or [jkarnes@email.uky.edu](mailto:jkarnes@email.uky.edu)
4. Students will be provided with a Midterm Evaluation of course performance based on the criteria in the syllabus.
5. All Distance Learning Services can be found at <http://www.uky.edu/DistanceLearning/>. Distance Learning Library Services can be found at <http://www.uky.edu/Libraries/DLLS>  
Carla Cantagallo, DL Librarian, Email: [dlservice@email.uky.edu](mailto:dlservice@email.uky.edu)  
Local phone number: 859. 257.0500, ext. 2171  
Long-distance phone number: (800) 828-0439 (option #6)

### Administrative dates:

May 8

First day of the course

For important dates concerning withdrawing from the course visit: <http://www.uky.edu/Summer/partofterm.htm>

June 19

Last day of the course

## CHEATING

According to the University Senate Rules (6.3.2), cheating includes, but is not limited to, the wrongful giving, taking, or presenting of any information or material by a student with the intent of aiding himself/herself or another on any academic work which is considered in any way in the determination of the final grade. Presenting falsified documents to obtain an excuse from an exam, assignment, or class constitutes cheating and will result in a grade of “E” for the course. The fact that a student could not have benefited from an action is not by itself proof that the action does not constitute cheating. The penalty for cheating is a minimum of an “E” on the assignment involved and can be as severe as an “E” for the course. Sanctions imposed may include, and have included, suspension, dismissal, and expulsion from the University.

## COURSE MATERIAL

Textbooks may be purchased from the following:

- Kennedy Bookstore, 405 S. Limestone, (859) 252-0331 <http://www.kennedys.com>
- UK Bookstore 106 Student Center Annex, (859) 257-6304 <http://www.uk.bkstr.com>

- Wildcat Text Books, 563 S. Limestone, (859) 225-7771 <http://www.wildcattext.com>

Darling Models for Glucose:

- [http://www.darlingmodels.com/Individual-Orders-Molecular-Model-Kits/University-of-Kentucky-Carbohydrate-Kit/prod\\_74.html](http://www.darlingmodels.com/Individual-Orders-Molecular-Model-Kits/University-of-Kentucky-Carbohydrate-Kit/prod_74.html)

Digital camera: You will need access to a camera for uploading of images for the Model Project in Unit 3.

Other materials will be provided, as appropriate in Blackboard within your learning units. Information as to how to access Blackboard will follow.

## GRADING

Grades for the course will be assigned on the basis of the scale shown below. Total points: 800

A: 900 - 1000 pts    B: 800 - 899 pts    C: 700 - 799 pts    D: 600 - 699 pts    E: < 600 pts

**The Course will be divided into four units. The point break-down is as follows:**

Unit 1: General and Inorganic Chemistry

- |  |          |   |         |
|--|----------|---|---------|
| A. Blackboard assignments and quizzes, averaged for a total of | 50 pts.  | } | 250 pts |
| B. Exam I  | 150 pts. |   |         |
| C. "Real Life" activity I                                      | 50 pts   |   |         |

Unit 2: Organic Chemistry

- |  |         |   |         |
|--|---------|---|---------|
| A. Blackboard assignments and quizzes, averaged for a total of | 50 pts. | } | 250 pts |
| B. Exam II   | 150 pts |   |         |
| C. "Real Life" activity II                                     | 50 pts  |   |         |

Unit 3: Biochemistry

- |   |         |   |         |
|---|---------|---|---------|
| Blackboard assignments and quizzes, averaged for a total of | 50 pts  | } | 250 pts |
| Exam III  | 150 pts |   |         |
| Understanding Molecular Models                              | 50 pts  |   |         |

Unit 4: Hands on Project Using Scientific Method

- |                           |         |   |         |
|---------------------------|---------|---|---------|
| A. Experiment Design      | 50 pts  | } | 250 pts |
| B. Data and Results       | 100 pts |   |         |
| C. Conclusion and Summery | 100 pts |   |         |

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Grand toal

**1000 pts**

The Department of Chemistry adheres rigorously to University policy about awarding grades of "I" (Incomplete). See "Student Rights and Responsibilities" at:

[www.uky.edu/StudentAffairs/Code/](http://www.uky.edu/StudentAffairs/Code/). Go to Part II: Rules of University Senate, Section V, 5.1.3.2.

## **EXAMINATIONS AND PROCTORING CENTERS**

There will be three 50-minute examinations in this course. Students in or near Lexington can take the exam on the University of Kentucky campus from 7:00 – 8:15 PM on the exam dates. Students near Lexington who cannot make the 7:00 exam time, or students outside of Lexington must make arrangements to take the exam at one of the Distance Learning Proctoring Locations between the hours of 8:00 AM and 8:00 PM on the day of the exam. There is a fee required to take the exam at the Proctoring Locations. Instructions for finding and scheduling a proctoring site can be found at <http://www.as.uky.edu/proctoring>.

*Excused Absences from Exams.* For those students who miss one of the regular examinations with a legitimate, documented excuse under the guidelines outlined in the University Senate Rules, and who obtain permission within a week of the regular exam date, a make-up exam will be administered. This too must be arranged through the proctoring center once an exam is excused. To be excused, you must contact the Assistant to the Director of General Chemistry with legitimate documentation within a week of the exam. No exceptions to this policy will be made. Purchase of airline tickets and participation in weddings are not legitimate reasons to be excused from an exam.

## **ON-LINE UNITS**

The Four Units have corresponding buttons in Blackboard. These units have activities and assignments which HAVE DUE DATES. Enter each Unit and complete the activities and assignments by the due dates specified. Each assignment or quiz will be equally weighted within a unit with the lowest assignment of each unit dropped. Complete instructions on how to complete the assignments or quizzes will be provided with the assignment. Be sure to complete the assignment well in advance of the due time for the unit so that if technical difficulties arise you will have an opportunity to resolve the issue prior to the due date and time. Not submitting the assignment or quiz by the due date will result in zero credit unless legitimate documentation for the missed assignment is provided.

### “Real-Life” Activity

You will be assigned 2 activities during the course of the semester. I will provide you with a picture where chemistry exists in your everyday world. You are to examine the picture and tell about the chemicals present and anything you know about the chemistry of the chemicals. You are to use the concepts and properties you learned in class in your presentation. You are not to look it up on the internet and present what you found there. The activity is to show your ability to take what you have learned and apply it to a real-life situation where chemistry exists. A breakdown of how these Real Life activities will be graded will be given within Blackboard.

### Understanding Molecular Models

A big part of chemistry is to learn how models we write on paper and models we put together in space relate to the real molecules we study. Information is given in the COURSE MATERIALS

section on the molecular model kits you will need to purchase for the course. Various assignments in Unit 3 along with a final assessment of our knowledge of the models will constitute this portion of your grade.

### Hands-on Project

This project is designed to teach a chemical concept and the scientific method. You are to design the experiment, collect the data, analyze the data and present a summary of the results and a conclusion. You will turn in a written report of your activity, again instruction are in Blackboard. The details for this project are located in Unit 4 of Blackboard. You can work on and turn this portion in at any time. It will be due no later than midnight on the last day of class, June 19.

### **WHOM TO CONTACT and GETTING HELP**

*University of Kentucky Technical Support:* The University of Kentucky maintains a wide range of resources to aid students with technological problems. If you have problems regarding your computer and accessing Blackboard contact the UKIT Help Desk at (859) 218-Help (4357) or email them at [helpdesk@uky.edu](mailto:helpdesk@uky.edu). Online support can also be obtained at <http://wiki.uky.edu/blackboard/Wiki%20Pages/Home.aspx>

*Your Teaching Assistant ( ):* The teaching assistant is your first resource for help. Do you not the material? How to complete an assignment? All issues regarding homework, including technical difficulties, questions about material, questions about grades, help regarding course material, exam material, and exam grades. E-mail your teaching assistant. Set office hours are also available using Adobe Connect will assist you.

*Your Instructor (Dr. Woodrum):* The TA will forward all questions to Dr. Woodrum that he/she is unable to answer. Anytime you feel you are not getting proper assistance from the assistant, don't hesitate to contact Dr. Woodrum.

*Assistant to the Director of General Chemistry.* Excused absences, alternate exams, and certified disability forms. If you are in doubt about whom to contact and if your question is not related to homework then contact the Assistant to the Director.

*Director of General Chemistry (Professor Stephen Testa).* Anything you would like to discuss regarding the administration of the course, including issues with your instructor.

*Blackboard Resources.* The "Course Help" button in Blackboard lists your instructor's office hours and other helpful information.

*Email Communication.* In all e-mails to faculty or staff in General Chemistry, please include the following:

- In the subject field: Course / Subject. For example, a student in CHE 101 with a question about homework would write the following: CHE 101 Homework.
- In the body of the message: Full name and UK student ID number.
- E-mails containing inappropriate or offensive language or tone may not be answered. We will respond to emails within 1 business day.

## OFFICE HOURS

You are encouraged to make use of your instructor's office hours. Office hours for the CHE 105 instructors are as follows:

Instructor	Phone/E-mail	Office Hours
Dr. Woodrum, Sr. Lecturer	(859) 257-1551 <a href="mailto:kim.woodrum@uky.edu">kim.woodrum@uky.edu</a>	Via Adobe Connect: <a href="http://connect.uky.edu/che101/">http://connect.uky.edu/che101/</a> T, W, R noon – 1:00
TA info here		Via Adobe Connect:

## APPROPRIATE ONLINE BEHAVIOR

Students are expected to maintain decorum that includes respect for other students and the instructor, to regularly log in to the course, and to display an attitude that seeks to take full advantage of the educational opportunity. All students are expected to be prepared to work and actively participate in class activities. Virtual communication and discussion "in cyberspace" occur in a social environment where normal rules of social interaction apply. The remoteness of the recipients is no excuse to behave in an anti-social manner and post unacceptable messages. Unacceptable messages include those that harass, intimidate, threaten, belittle, ridicule, expressed hatred for, or aggression toward others. Let us be mindful to avoid words that imply that some groups of people are less worthy than others (e.g., avoid racist, sexist, anti-Semitic, age-ist, and homophobic language). Discussion board and other electronic communication for this course should relate only to the course subject matter, generally respond to the instructor threads, and always seek to further the aims of that particular discussion forum or chat session (e.g. stay on topic). Contributions to discussion boards and synchronous chat are the intellectual property of the authors. Students who quote another person in class projects, publications or even in remarks made on the discussion board should always acknowledge the source of that quote (e.g., do not plagiarize your classmates). Personal comments about other users and their views should not be placed in any of our Blackboard course areas that are viewable by other users. Do not copy private messages to another person without the author's explicit permission. Consult the UK Student Rights and Responsibilities regarding the steps for addressing unresolved academic issues at <http://www.uky.edu/StudentAffairs/Code/part2.html>

## COPYRIGHT

All course material is copyrighted (either by the instructor or others). Therefore, transcribing and then selling, publishing, or posting any of the lecture material presented in class is strictly prohibited. This policy applies especially to "professional" note-taking services and companies that publish such material on the internet, in written form, or in any audio format.

## COURSE SCHEDULE

The schedule will be detailed in Blackboard for each unit. A brief overview is provided here:

May 1 – May 20	<b>UNIT 1: General Chemistry and Inorganic Compounds.</b> <ul style="list-style-type: none"><li>• Introduction to Chemistry</li><li>• Understanding Atoms</li><li>• Classification of Matter: Pure Substances and Mixtures</li><li>• Elements of Interest</li><li>• Electron Configuration</li><li>• Chemical Bonding and Nomenclature</li><li>• Gas Phase,</li><li>• Physical Change, Chemical Change.</li><li>• Balancing Equations</li></ul>
May 17	<b>Exam I, General Inorganic Chemistry</b>
May 20	<b>Real-Life Activity I Due</b>
May 21 – June 4	<b>UNIT 2: Organic Compounds</b> <ul style="list-style-type: none"><li>• Understanding Shorthand Structures or Organic Compounds</li><li>• Hydrocarbon Nomenclature</li><li>• Hydrocarbon Properties</li><li>• Making Polymers from Monomers, Properties of Polymers</li><li>• Organic compounds containing oxygen</li><li>• Condensation Polymerization</li></ul>
May 31	<b>Exam 2, Organic Chemistry</b>
June 3	<b>Real-Life Activity II Due</b>
June 4 – June 14	<b>UNIT 3: Biochemistry</b> <ul style="list-style-type: none"><li>• Carbohydrates</li><li>• Sugar bonding and nomenclature,</li><li>• Understand difference between cellulose and starch</li><li>• Fats, triglycerides,</li><li>• Organic Compounds Containing Nitrogen</li><li>• Anti-depressants and Stimulants</li><li>• Half-Life</li></ul>
June 13	<b>Carbohydrate Model Project Due</b>
June 14	<b>Exam 3, Biochemistry</b>
? – June 19	<b>UNIT 4: Hands-On Project.</b> <ul style="list-style-type: none"><li>• Begin work at any time during the 6-week term.</li></ul>
June 19	<b>Hand-On Project Final Report is Due.</b>

## TECHNOLOGY REQUIREMENTS

Complete the following steps to make sure your computer is correctly configured and the necessary software is installed. Note: You will not be able to access course material if you fail to complete these steps.

1. Go to this site to check the minimum hardware, software and browser requirements: <http://wiki.uky.edu/blackboard/Wiki%20Pages/Bb9%20Hardware%20and%20Software%20Requirements.aspx>
2. Internet Explorer is NOT recommended for Blackboard. Firefox is the recommended Internet browser for the course. Go to <https://download.uky.edu/> to download a free version of Firefox. Log in with your LINK BLUE id and password and search for Firefox.
3. Go to <http://java.com> and click on the Free Java Download button. Run the installer to get the latest version.
4. You will also need Flash, Adobe Acrobat Reader and QuickTime movie player. Go to <http://wiki.uky.edu/blackboard/Wiki%20Pages/Browser%20Check.aspx> then click BbGO! If you do not have these installed, you can download them from this site.
5. To download Windows Media Player, click this link: <http://www.microsoft.com/windows/windowsmedia/player/10/default.aspx>
6. Students and faculty can download Microsoft Office Suite (including Word and PowerPoint) from this site: <https://download.uky.edu/>.
7. Adobe Connect is accessed via: <http://connect.uky.edu/che101/> for technical information regarding the use of Adobe Connect, go to: <http://www.uky.edu/acadtrain/connect>
8. To access Blackboard, go to <http://myuk.uky.edu>. Follow the links to Blackboard. Your username and password are the same as your UK e-mail address. It is your responsibility to log in and not to miss announcements and assignments. Computer problems or ignorance of an assignment's due date is no excuse for missing assignments.

*Help with Blackboard.* If you need technical assistance with Blackboard, contact the UK-IT Customer Service Center by calling 218-4357, or if on the University of Kentucky campus by visiting McVey Hall, Room 111 (M-F, 7 AM – 6 PM), by visiting the Student Center, Room 255 (M-F 10 AM – 6PM), or by visiting The HUB at the W.T. Young Library (Sunday- Thursday, 1 PM – 10 PM). You may also e-mail your questions to [helpdesk@uky.edu](mailto:helpdesk@uky.edu). Keep in mind that the helpdesk may be slower in responding to e-mail requests than to phone calls.

Once in Blackboard, click on the link for CHE 101 Molecular Science for Citizens.

This course is designed to meet the Learning Outcomes for a General Education Inquiry in Natural, Physical, and Mathematical Sciences. The table on the following pages explains how each learning goal is met in CHE 101 Molecular Science for Citizens.



## *Learning Outcomes – Course Specific vs. General Education Criteria*

<b>Course Specific Learning Outcomes (CHE101)</b>		<b>Intellectual Inquiry – Nat/Phy/Math Sciences</b>
<b>Foundational Knowledge</b>		<b>Learning Outcome 2 &amp; 4.</b>
Description	Using means of lecture (via videos), reading comprehension, and POGIL activities (see below), students will learn the concepts of classification of matter, chemical vs. physical change, atomic structure and the way that structure determines chemical properties. Organic chemistry and biochemistry topics will also be covered.	<p>2. Explain fundamental principles in a branch of science.</p> <p>4. Demonstrate an understanding of a least one scientific discovery that changed the way scientists understand the world. This learning outcome will be addressed in many ways. Example include: 1) the understanding of the atom; 2) the discovery and understanding of polymers; 3) the understanding of biological impact of trans-fats and omega-3 fatty acids.</p>
Assessment	Students will be given quizzes and exams to test their understanding of these concepts.	
<b>Critical Thinking</b>		<b>Learning Outcome 2 &amp; 3.</b>
Description	Using POGIL activities, students will learn to examine models of chemical concepts, analyze the data, and draw conclusion of chemical behavior and concepts. The concept will then be reinforced through application problems.	<p>3. Apply fundamental principles to interpret and make predictions in a branch of science.</p>
Assessment	The students will be graded on the activities based upon participation. Exams will measure whether they appropriately learned to apply the concept or not.	
<b>Reading Comprehension</b>		<b>Learning Outcome 2.</b>
Description	Students will be assigned reading passages from their textbook on a regular basis.	<p>2. Explain fundamental principles in a branch of science.</p>
Assessment	For EACH reading assignment, students will be quizzed to see that they gained reading comprehension of the topic. They will be permitted to use notes they took from their reading. Students will also be tested on their exams on the content of what they read. This material (from reading comprehension) will NOT be covered in class in the form of a video lecture, though students will be encouraged to ask questions if needed.	

<b>Understanding and Using the Scientific Method</b>		<b>Learning Outcomes 1, 6 &amp; 7.</b>
Description	Students will be taught, via video recordings, the scientific method and the concepts behind an experiment they will conduct. Students will design their experiment. They will write a report of their data, analysis, and conclusion. They will research their results to try to identify an unknown substance based upon their conclusions. They will discuss alternate approaches as well as future studies of the concepts learned.	<ol style="list-style-type: none"> <li>1. Describe methods of inquiry that lead to scientific knowledge and distinguish scientific fact from pseudosciences.</li> <li>6. Conduct a hands-on project using scientific methods to include design, data collection, analysis, summary of the results, conclusions, alternative approaches, and future studies.</li> <li>7. Recognize when information is needed and demonstrate the ability to find, evaluate and use effectively sources of scientific information.</li> </ol>
Assessment	This report will be graded to see that they met the criteria for good experimental design. It will also be graded for clarity in reporting the data, results and conclusions. Students will also be given exam questions to test their understanding of the scientific method and the concepts learned in this activity.	
<b>Recognizing Chemistry in Everyday World</b>		<b>Learning Outcome 5 &amp; 7.</b>
Description	A year or more after this course is finished I hope that students will be able to recognize the role of chemistry in their everyday world.	<ol style="list-style-type: none"> <li>5. Give examples of how science interacts with society.</li> <li>7. Recognize when information is needed and demonstrate the ability to find, evaluate and use effectively sources of scientific information.</li> </ol>
Assessment	Students will be assigned two "Real-Life" activities (one for inorganic chemistry and one for organic chemistry) in which they will be presented with a picture of a product label. They will identify and classify the substances and tell what properties (chemical and physical) they know of the product based upon what they have learned in class.	

POIL: Process-Oriented Guided Inquiry Learning. These activities have the following components:

1. Students in groups of four (each student will be assigned a specific role) are presented with a model to examine.
2. Students are given a series of critical thinking questions based upon the model to help guide them to an understanding of a concept the activity is to teach.
3. Concept is reinforced with skill development exercises or application questions.