



**CHEM 102-012 (013, 014): General Chemistry**  
**Spring 2013**  
**Loyola University Chicago**

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Office hours: Monday 1:00-2:15 pm, Thursday, 1:00-2:00 pm, Friday, 9:30-11:00 am

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Class Meeting Times: Tuesday & Thursday 11:30 am-12:45 pm, Flanner Hall Auditorium  
013: Monday 11:30 am-12:20 pm  
014: Monday 2:45-3:35 pm

### **Course Description**

This course is a lecture and discussion course for students who are not chemistry majors and is a continuation of CHEM 101. It includes the following topics: properties of solutions, kinetics, basics of equilibrium, chemistry of acids and bases, titrations and solubility equilibria, coordination chemistry, free energy and spontaneous processes, electrochemistry, and radiochemistry. Historical and current developments in chemistry as well as real-world problems that chemists address will be incorporated into the course.

The emphasis of this course is on understanding, application, and prediction rather than memorization. This means that students must foster their problem solving skills and their ability to make claims based on evidence. It is not enough to know *what* happens in chemistry, students must also be able to explain *why* it happens.

### **Course Prerequisites**

Successful completion (C- or better) of CHEM 105 or CHEM 101 and MATH 118 or higher

### **Required Resources**

- (1) Brown, LeMay, Bursten, Murphy, Woodward (2012). *Chemistry: The Central Science (with MasteringChemistry)*. Pearson Prentice Hall. ISBN 978-0-321-74105-9. If you have an access code from first semester, it is still valid. However, you need to log into your current course, click on My Courses on the top left of the page, and then Enroll in a New Course. If you did not use MasteringChemistry last semester, you need to purchase an access code. Please make sure to purchase it from an approved vendor; access codes that have been previously used cannot be reused. Whether you had an access code last semester or not, the course ID for this course is BRAZDIL102S13.
- (2) *Sakai Connection*, sakai.luc.edu

## Connection to the “Hungers” of Loyola University’s Transformative Education

Within the spirit of Jesuit education traditions and practices, this course seeks to assist each student in fostering hungers associated with the University’s model of transformative education.<sup>1</sup> The study of introductory chemistry can also assist in development of the specific hungers below:

- A Hunger for Integrated Knowledge – by building an understanding of a variety of chemical concepts and applying them to problems in many contexts.
- A Hunger for a Moral Compass – by examining the variables, benefits, and detriments that exist at the interface of applied science, technology, environment, and society.
- A Hunger for a Global Paradigm – by examining the variables, benefits, and detriments that exist at the interface of applied science, technology, environment, and society.

## Instructional Format

This course will not follow a traditional lecture format for delivery of course content and skill development. While there may be some lectures, the course will focus more on determining students’ current ideas and thoughts about sets of data or presented models. Then, through guided questions about the presented information, students, in small groups, discuss ideas and come to consensus about answers to questions. Ideas are further developed in questions that force application of the agreed upon concepts. The instructor is the guide on this journey, pointing out areas that are particularly relevant or that may need attention. This format is designed based on the idea that learning cannot be directly transmitted from one person to another. Knowledge must be built by the learner which results from interpretation and reflection on experiences in particular contexts, such as the chemistry classroom, and when working with others.

## Academic Honesty

Academic honesty is an expression of interpersonal justice, responsibility and care, applicable to Loyola University faculty, students, and staff, which demands that the pursuit of knowledge in the university community be carried out with sincerity and integrity. The School of Education’s Policy on Academic Integrity can be found at:

[http://www.luc.edu/education/academics\\_policies\\_integrity.shtml](http://www.luc.edu/education/academics_policies_integrity.shtml). The definitions of cheating, plagiarism, fabrication, and falsification are given at this site will be used in determining whether a student has violated academic integrity. Additionally, a clear and thorough discussion of plagiarism, including examples, can be found on the English Department’s website at <http://www.luc.edu/english/writing.shtml#source>

All students in this course are expected to have read and to abide by the demanding standard of personal honesty, drafted by the College of Arts & Sciences, that can be viewed at:

[http://www.luc.edu/cas/pdfs/CAS\\_Academic\\_Integrity\\_Statement\\_December\\_07.pdf](http://www.luc.edu/cas/pdfs/CAS_Academic_Integrity_Statement_December_07.pdf)

Anything you submit that is incorporated as part of your grade in this course (*e.g.*, quiz, examination, homework, paper, presentation) must represent your own work. Any student found to have cheated on, plagiarized, fabricated, or falsified any portion of a test or assignment will receive a zero on that test or assignment and this grade cannot be dropped. The student has the right to

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<sup>1</sup><http://www.luc.edu/transformatived/>

appeal the instructor's decision. If the student does so, the Academic Grievance Procedure described at [http://www.luc.edu/academics/catalog/undergrad/reg\\_academicgrievance.shtml](http://www.luc.edu/academics/catalog/undergrad/reg_academicgrievance.shtml) will be followed. If a student is found to have cheated on, plagiarized, fabricated, or falsified any portion of a test or assignment for a second time in this class, they will receive an F for the class. In all cases of academic dishonesty, the instructor will report the incident to the Office of the CAS Dean. Depending on the seriousness of the incident, additional sanctions may be imposed.

### **Accessibility**

Students who have disabilities which they believe entitle them to accommodations under the Americans with Disabilities Act should register with the Services for Students with Disabilities (SSWD) office. To request accommodations, students must schedule an appointment with an SSWD coordinator. Students should contact SSWD at least four weeks before their first semester or term at Loyola. Returning students should schedule an appointment within the first two weeks of the semester or term. The University policy on accommodations and participation in courses is available at: <http://www.luc.edu/sswd/>

### **Harassment (Bias Reporting)**

It is unacceptable and a violation of university policy to harass, discriminate against or abuse any person because of his or her race, color, national origin, gender, sexual orientation, disability, religion, age or any other characteristic protected by applicable law. Such behavior threatens to destroy the environment of tolerance and mutual respect that must prevail for this university to fulfill its educational and health care mission. For this reason, every incident of harassment, discrimination or abuse undermines the aspirations and attacks the ideals of our community. The university qualifies these incidents as incidents of bias.

In order to uphold our mission of being Chicago's Jesuit Catholic University-- a diverse community seeking God in all things and working to expand knowledge in the service of humanity through learning, justice and faith, any incident(s) of bias must be reported and appropriately addressed. Therefore, the Bias Response (BR) Team was created to assist members of the Loyola University Chicago community in bringing incidents of bias to the attention of the university. If you believe you are subject to such bias, you should notify the Bias Response Team at this link: <http://webapps.luc.edu/biasreporting/>

### **Course Evaluation**

Grades will be assigned in the course according to the following sources:

Table 1. Grade Criteria

| <b>Criteria</b>                             | <b>Maximum Percent Value</b> |
|---|------------------------------|
| Participation, group responses, and reports | 10%                          |
| Quizzes and online homework sets            | 10%                          |
| Projects                                    | 10%                          |
| Tests                                       | 40%                          |
| Final Exam                                  | 30%                          |

*Participation, group responses, and reports* will be an important part of the class. This work will be a combination of individual and group work. Students must be present during class sessions in order to receive credit for these assignments. Participation will be graded on your ability to correctly complete assignments and your use of pertinent data to take part in group work, add to discussions, and make reasoned conclusions or decisions. This will include being able to ask questions of others and to evaluate arguments and conclusions made by others. The two lowest scores on these assignments will be dropped from your course evaluation.

*Quizzes* will be administered nearly each week. Content from the previous sessions (whole class and small group) will be the source of material on each quiz. The two lowest quiz scores will be dropped from your course evaluation.

*Online Homework Sets* will usually be assigned weekly. Submitted responses must be the result of your individual effort and synthesis and must be submitted by the end of the day (11:59 pm) on the due date. Please note that the due date may or may not be a date that the class meets. Late assignments will not be accepted without proper verification of reasons. The two lowest homework set scores will be dropped from your course evaluation.

Two *Projects* will be assigned that involve analysis of issues that involve aspects of chemistry and that are important in the world today but that are not directly covered in this beginning course in chemistry. These will incorporate scientific, economic, and policy considerations of current issues. Further details regarding these projects, including grading rubrics, will be presented in class.

*Tests* will be administered at two different points during the course. Each will primarily reflect the content and concepts developed during prior class sessions.

The *Final Exam* will be designed to assess students comprehensive knowledge of concepts developed during the work of the semester.

Grades will be assigned according to the grading scale presented in Table 2.

Table 2: Grading Scale

| <b>Percentage of Points Earned</b> | <b>Grade</b> |
|------------------------------------|--------------|
| 92% or greater                     | A            |
| <92% - 90%                         | A-           |
| <90% - 88%                         | B+           |
| <88% - 82%                         | B            |
| <82% - 80%                         | B-           |
| <80% - 78%                         | C+           |
| <78% - 72%                         | C            |
| <72% - 70%                         | C-           |
| <70% - 68%                         | D+           |
| <68% - 60%                         | D            |
| <60%                               | F            |

### **Practices for Success**

Supporting claims with evidence, making applications, solving and analyzing problems, and using scientific principles to explain phenomena are critical skills in the field of science. The development of these skills is not without some frustration, but it carries the reward of deepening one's ability to think critically and solve problems in any field. To do this, one may have to assess, evaluate, and possibly revise approaches to learning. The use of targeted, guiding questions, regularly scheduled work, and strategic study plans can greatly assist the learning of science. With such a focus, hopefully any frustration will quickly turn to appreciation and fascination for the relevance and connectedness of science in your life and the world around you. Solving and analyzing problems is the most important feature of this work. If, at any time, you need assistance framing such plans for your work in science, please do not hesitate to ask the instructor.

### **Norms of Course Proceedings**

The classroom is to be a safe place to question and explore ideas. Student and teacher voices are important to this work. Collegial disagreement can be a healthy part of this process, but must always include respect for all members of the class.

Course activities will be designed to help students reach the goal of learning chemistry content and developing thinking skills. This will more often be driven by the use of data and reasoning to discover concepts and solutions rather than the identification and exchange of facts and algorithms.

Class sessions will begin and end on time. All students should attend class regularly and participate in class discussions. Multiple absences could affect one's ability to learn chemistry during this semester. Anticipated absences should be discussed with the instructor two class days before the absence. Proper documents may be requested to verify the reason for any absence. This is particularly relevant to days missed that include an in-class assessment for which a student is asking for a make-up.

Class time is designed to engage students in activities that advance their understanding of chemistry. Electronic media, including cell phone, texting devices, laptops, and tablets should be used only as they enhance the activity of the class. In general, cell phones and texting devices should be turned off during class time. If you expect that you might receive an emergency phone call or text during class, please set your phone so that it will not distract other participants in the course and sit in a place where you can easily step into the hallway to answer a call if necessary.

Email messages and other electronic communication among students in the course should be respectful, appropriate, and professional. The instructor will respond to emails and phone messages as quickly as possible and at a minimum within 24 hours except on weekends. Only emails from your Loyola University account will be accepted, and the instructor will only send emails to your Loyola University account. Communications received after 3:00 pm on Friday or over a weekend will be answered on Monday morning at the latest.

Completed course assignments must be submitted by the end of the day (11:59 pm) on the due date. Please note that the due date may or may not be a date that the class meets. Late assignments will not be accepted without proper verification of reasons.

## Course Schedule and Assignments

Table 3. Proposed Semester Topics & Schedule

| <b>Dates</b>                    | <b>Topics</b>  |
|---------------------------------|--|
| January 14-18                   | Properties of Solutions<br>(Chapter 13)                  |
| January 22-February 1           | Chemical Kinetics<br>(Chapter 14)                        |
| February 4-15                   | Chemical Equilibrium<br>(Chapter 15)                     |
| February 18-27                  | Acid-Base Equilibria<br>(Chapter 16)                     |
| <b>February 19</b>              | <b>First Project Due</b>                                 |
| <b>February 28</b>              | <b>Exam on Chapters 13-16</b>                            |
| March 11-15                     | Additional Aspects of Aqueous Equilibria<br>(Chapter 17) |
| March 18-22                     | Coordination Chemistry<br>(Chapter 23)                   |
| March 25-April 5                | Free Energy and Spontaneous Processes<br>(Chapter 19)    |
| April 8-17                      | Electrochemistry<br>(Chapter 20)                         |
| <b>April 11</b>                 | <b>Second Project Due</b>                                |
| <b>April 18</b>                 | <b>Exam on Chapters 17, 19, 20, and 23</b>               |
| April 22-26                     | Nuclear Chemistry<br>(Chapter 21)                        |
| Exam Week:<br>Tuesday, April 30 | FINAL EXAM, 9:00-11:00 am                                |

Information from other chapters may be introduced by the instructor as appropriate to specific topics. Additionally, other chapters may be helpful to students in completion of the course projects.