CHEM 101-004 (-005, -006, -007): General Chemistry – Semester 1
Spring 2015
Loyola University Chicago

Instructor:	Linda C. Brazdil, Ph.D.	
Office:	Cudahy Science 420	
Phone (office):	773.508.3103	
Email:	lbrazdil@luc.edu	
Office hours:	Wednesdays, 1:30 – 3:00 pm Fridays, 11:30 am – 1:30 pm	Thursdays, 10:00 – 11:30 am Other times by appointment

Class Meeting Times:	Monday, Wednesday, Friday 10:25 – 11:15 am, FH-Auditorium 005: Monday, 11:30 am – 12:20 pm, FH-Room 7 006: Monday, 12:35 – 1:25 pm, FH-Room 7 007: Monday, 2:45 – 3:35 pm, FH-Room 7

Course Description
This course is a lecture and discussion general chemistry course for science majors and students in pre-professional health studies. It includes the following topics: matter and measurement; atoms, molecules, and ions; mole mass relationships in chemistry, reactions in aqueous solution; thermochemistry; electronic structure and the periodic table; periodic trends; chemical bonding; molecular geometry and bonding theory; gas laws; and intermolecular forces. 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.

Prerequisites:
Satisfactory performance on the Loyola math proficiency test or Math 117 (or equivalent) with a grade of C- or better. A year of high school chemistry is recommended.

Required Resources
(1) Brown, LeMay, Bursten, Murphy, Woodward, Stoltzfus (2015). *Chemistry: The Central Science (with MasteringChemistry), 13th ed.* Pearson Prentice Hall. ISBN 978-0-321-91041-7. The *MasteringChemistry* website will be used for homework, quizzes, and exams. The course ID for this course is: **BRAZDIL101S15**
(2) Moog, R.S. & Farrell, J.J. (2015). *Chemistry: A Guided Inquiry, 6th Edition.* ISBN : 978-1-118-64004-3)
(3) *Sakai Connection*, sakai.luc.edu – the course is: **CHEM 101 004 SP15**
Group projects, individual assignments, and other useful information will be posted under the Resources section of Sakai. You will also be able to submit your group work (if desired) and projects (required) using Sakai. The instructor will monitor your progress in order to ask questions or provide suggestions to make sure you are learning important concepts in chemistry.

Course Objectives
Within various measures for student growth at Loyola this course aims to help the student in the following areas**:**

- *Essential Components of the Course (IDEA Objectives). This course aims to help students:*
    - Gain factual knowledge of chemistry (terminology, classification, methods, trends).
    - Learn fundamental chemistry principles, generalizations, or theories.
    - Learn to apply course material in order to improve thinking, problem solving and decision making.
    - Gain a broader understanding and appreciation of the intellectual/cultural activity of science, and
    - Acquire an interest in learning more by asking questions and seeking answers.

- *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.[1] 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 eliciting 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, when working with others and guided by a mentor.

[1] http://www.luc.edu/transformativeed/

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.

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

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 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 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

Criteria	Maximum Percent Value
Participation and group responses	10%
Online homework sets	10%
Quizzes	5%
Tests	40%
Final Exam	35%

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, including discussion sections, in order to receive credit for these assignments. Participation involves completing assignments and using 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.

Online quizzes will be administered via *MasteringChemistry* on Wednesday of each week except during weeks in which there is a test. Paper copies of quizzes will be available for students who do not have laptops or tablets to bring to class. Content from the text as well as 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 using *MasteringChemistry* will be assigned each week. Submitted responses must be the result of your individual effort and synthesis and must be submitted by 11:55 pm Central Time each Friday. While you can work with classmates on homework, you need to ensure that you understand how to do the assigned problems so that you are able to do them without help from others. Late assignments may not be accepted, and verification of reasons for late assignments may be requested. You are given up to four attempts to obtain correct answers on online homework problems. Except in the case of multiple choice questions, no points will be deducted for incorrect attempts if you obtain the correct answer within the allotted four attempts. Additionally, adaptive follow-up assignments designed based on the questions with which you had difficulty will be provided. Points will be added to your original assignment based on your performance on follow-up assignments. You can opt out of these assignments if you achieve at least a 90% on the original assignment.

Tests will be administered at two different points during the course. Each will primarily reflect the content and concepts developed during prior class sessions but may integrate prior content as well.

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

Percentage of Points Earned	Grade
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, including discussion sections, 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 Central Time 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 (11:55 pm Central Time) 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

Dates	Topics
Week 1: January 12-16	Monday, January 12: Matter and Measurement (BLBMWS, Chapter 1 - review); Atoms (Moog, CA 1; BLBMWS, Chapter 2, Sections 1-3)
	Wednesday, January 14: Atomic Number and Atomic Mass (Moog, CA 2; BLBMWS, Chapter 2, Sections 1-4; Chapter 3, Section 4)
	Friday, January 16: Coulombic attractions and the Shell Model of Atoms (Moog, CA 3; BLBMWS, Chapter 2, Section 5 and Chapter 7, Sections 1, 4)
Week 2: January 19-23	Monday, January 19: Martin Luther King Day, no classes
	Wednesday, January 21: Electron behavior & Periodic Properties (Moog, CA 4; BLBMWS, Chapter 2, Section 5 and Chapter 7, Sections 2, 4, 6)
	Friday, January 23: Electron Structure of Atoms and Periodic Properties (Moog, CA 5; BLBMWS, Chapter 2, Section 5 and Chapter 7, Sections 2, 4):
Week 3: January 26-30	Monday, January 26: Sizes of Atoms and Ions, Many-Electron Atoms (Moog, CA 6, 7; BLBMWS, Chapter 6, Sections 1-4; Chapter 7, Section 3)
	Wednesday, January 28 and Friday, January 30: Electronic Structure of Atoms, Orbital Representations (Moog, CA 8; BLBMWS, Chapter 6, Sections 1-4)
Week 4: February 2-6	Monday, February 2: Electronic Structure of Atoms (Moog, CA 9; BLBMWS Chapter 6, Sections 5-7)
	Wednesday, February 4: Electron Configurations (Moog, CA 10; BLBMWS Chapter 6, Sections 7, 8)
	Friday, February 6: Electron Configurations and the Periodic Table (Moog, CA 11; BLBMWS, Chapter 6, Section 9)

Week 5: February 9-13	Monday, February 9: Electron Spin (Moog, CA 12; BLBMWS, Chapter 6, Section 7)
	Wednesday, February 11 and Friday, February 13: Covalent Bonding and Lewis Structures (Moog, CA 13; BLBMWS, Chapter 2, Sections 6-9; Chapter 8, Sections 1, 3, 5)
Week 6: February 16-20	Monday, February 16: Lewis Structures, Bond Order, and Bond Strength (Moog, CA 14; BLBMWS, Chapter 8, Sections 3, 5, 8)
	Wednesday, February 18: Bond Order, Bond Strength, and Resonance Structures (Moog, CA 15; BLBMWS, Chapter 8, Sections 5, 6, 8)
	Friday, February 20: Lewis Structures and Formal Charge (Moog, CA 16; BLBMWS, Chapter 8, Section 5)
Week 7: February 23-27	Monday, February 23: Exceptions to the Octet Rule (Moog, CA 17; BLBMWS, Chapter 8, Section 7); Review for Exam 1
	Wednesday, February 25: Molecular Shapes (Moog, CA 18; BLBMWS, Chapter 9, Sections 1, 2,4)
	Friday, February 27: **Exam 1** (Moog, CAs 1-17; BLBMWS Chapters 1, 2, 6, 7, 8 (except Sections 2 & 4))
Week 8 March 2-6	Spring Break, no classes
Week 9: March 9-13	Monday, March 9: Hybrid Orbitals (Moog, CA 19; BLBMWS, Chapter 9, Sections 5, 6)
	Wednesday, March 11: Molecular Orbitals (BLBMWS, Chapter 9, Sections 7, 8)
	Friday, March 13: Polar, Nonpolar, and Ionic Bonds (Moog, CA 22; BLBMWS, Chapter 8, Sections 2, 4)
Week 10: March 16-20	Monday, March 16: Dipole Moment and Ionic Bonds (Moog, CA 23, 24; BLBMWS, Chapter 8, Sections 2, 4; Chapter 9, Section 3)
	Wednesday, March 18: Metallic Bonding (Moog, CA 25; BLBMWS, Chapter 12, Section 4)
	Friday, March 20: Liquids, Intermolecular Forces, and the Mole (Moog, CA 27; BLBMWS, Chapter 11; Chapter 3, Section 4)
Week 11: March 23-27	Monday, March 23: The Mole Concept and Chemical Equations (Moog, CA 28, 29; BLBMWS, Chapter 3, Sections 1, 4, 6)
	Wednesday, March 25: Chemical Equations (Moog, CA 29; BLBMWS, Chapter 3, Sections 1, 6; Chapter 4, Section 4)
	Friday, March 27: Limiting Reagents (Moog, CA 30; BLBMWS, Chapter 3, Section 7)
Week 12: March 30 – April 3	Monday, March 30: Empirical Formula (Moog, CA 31; BLBMWS, Chapter 3, Sections 3, 5)
	Wednesday, April 1: Solutions, Acids, and Bases, and Molarity (Moog, CA 32; BLBMWS, Chapter 4, Sections 1-3, 5)
	Friday, April 3: Easter break, no classes

Week 13: April 6-10	Monday, April 6: Easter break, no classes
	Wednesday, April 8: Solution Stoichiometry and Chemical Analysis (BLBMWS, Chapter 4, Section 6)
	Friday, April 10: Gases (Moog, CA 33; BLBMWS, Chapter 10)
Week 14: April 13-17	Monday, April 13: Gases (BLBMWS, Chapter 10), Review for Exam 2
	Wednesday, April 15: **Exam 2** (Moog, CAs 18, 19, 22-25, 29-33; BLBMWS Chapters 3, 4, 8 (Sections 2 & 4, 9, 10, 11)
	Friday, April 17: Enthalpy of Atom Combination (Moog, CA 24; BLBMWS, Chapter 5, Sections 1-3)
Week 15: April 20-24	Monday, April 20: Enthalpies of Reactions, Calorimetry (Moog, CA 25; BLBMWS, Chapter 5, Sections 4, 5)
	Wednesday, April 22: Hess's Law (BLBMWS, Chapter 5, Sections 6)
	Friday, April 24: Enthalpies of Formation (BLBMWS, Chapter 5, Section 7), Review for Final Exam
Exam Week: **Monday,** **April 27**	**FINAL EXAM, 9:00 – 11:00 am**

Information from other chapters may be introduced by the instructor as appropriate to specific topics.