

# CHEM 101: General Chemistry A

## Fall 2013

**Lecture:** Mon., Wed., & Fri. 8:15 - 9:05 AM ..... Flanner Hall 133

**Discussion:** Fri. 9:20 - 10:10 AM ..... Cuneo 002  
Fri. 10:25 - 11:15 AM ..... Cuneo 002

**Instructor:** George Chlipala, Ph.D.

**Email:** gchlipala@luc.edu - begin subject line with "CHEM 101-001" to receive a response

**Office:** Flanner 200A

**Office Hours:** Mon. & Wed. 10:00 - 11:00 AM, Fri. 1:00 - 2:00 PM

### Course Description

This course is the first part of a two-semester sequence in general chemistry. The course deals with the development of basic chemical principles. Topics include atomic and molecular structures, states of matter, energetics and stoichiometry of reactions.

**Prerequisite:** A satisfactory performance on the Loyola math proficiency test; or completion of Math 117 with a grade of C- or better.

**Co-requisite:** CHEM 111 - General Chemistry Laboratory A

**Intended audience:** For non chemistry majors and students in the B.A. Chemistry program.

### Required Texts and Materials

**Text:** *Chemistry: The Central Science* 12<sup>th</sup> ed. (2011) Brown, T. E.; LeMay H. E. H.; Bursten, B. E.; Murphy, C.; Woodward, P. Prentice Hall. 2011. ISBN: 978-0-321-69672-4

**Online access:** Access to MasteringChemistry

**Scientific calculator:** Any scientific calculator is acceptable as long as it is capable of scientific notation. The ability to graph is NOT required. You are responsible for understanding how to use your calculator prior to any quizzes or exams. Please bring your calculator to every class session, *especially* quizzes and exams. Sharing of calculators during quizzes or exams is not allowed. The instructor will **NOT** provide calculators. ***Use of cell phones as a calculator will NOT be permitted during quizzes or exams.***

## Course Objectives

Upon successful completion of this course, students will be able to:

- Understand the philosophy, methodology, terminology and scientific method used in chemistry.
- Have sufficient knowledge of physical and chemical properties of common substances.
- Apply knowledge acquired in this class to related disciplines as well as daily issues of public interest.

## Method of Instruction

Lecture, group discussion, online exercises, assignments and research updates. Students are encouraged to come into the office during the instructor's office hours for help of the course. Also tutorial services are made available by the college.

## Academic Integrity

Students are encouraged to study with other students, however assignments, quizzes, and examinations are designed to evaluate the knowledge and understanding of an *individual* and should be the product of one's own work. Plagiarism and cheating of any kind are serious violations and will result, minimally, in the grade of *zero* for the item with the possibility of an automatic failing grade for the course as well as referral to the Dean's office. For more information on the Academic Integrity policy at Loyola University please visit: [http://luc.edu/academics/catalog/undergrad/reg\\_academicintegrity.shtml](http://luc.edu/academics/catalog/undergrad/reg_academicintegrity.shtml)



## Student Conduct

Students are expected to conduct themselves in a manner which is considerate of the rights of others and which will not impair the educational mission of the University. Misconduct for which students are subject to disciplinary action by the University may include the following:

1. all forms of dishonesty such as stealing, forgery,
2. obstruction or disruption of teaching, research, administration, disciplinary proceeding, and
3. physical or verbal abuse, threats, intimidation, harassment, and/or other conduct that threatens or endangers the health or safety of any person.

## Email communications

Emails between the instructor and students are formal communications, and I expect the language and format of your emails to reflect that. When you send me an email, use a subject line that reflects the purpose of your email. It is always best to put "CHEM 101" in the subject line. It is also inappropriate to begin the body of an email without a salutation such as "Dear Dr. Chlipala." "Hey" is not a proper salutation. I expect full sentences and proper language in emails, and may not respond to emails in inappropriate formats.

E-mail may provide us access to rapid communication but do not expect an immediate response. I will try to respond in a timely fashion but, I may not be able to respond to your email if I am away from the office, e.g. teaching, weekends, or after 5pm.

### Classroom Etiquette

Students are expected to conduct themselves in a manner appropriate to a place of study and knowledge.

- The following items are specifically forbidden during exams and quizzes
  - **Cellphones** as a calculator
  - Periodic table (I will provide it for you), notes, homework and scratch paper
  - Formulas (on occasion, I will provide formulas, otherwise you have to memorize them)
- Students are required to treat other students and instructors with respect.
- Refrain from talking and laughing and other destructive behavior. If you have questions, ask the instructor.

### Grading

The final grade will be based on the following:

2 (of 3) midterm exams × 100 points = 200
10 (of 12) quizzes × 10 points = 100
10 (of 11) online exercises × 10 points = 100
Final exam = 200
<b>TOTAL = 600 points</b>

### Grading Scale

Percentage	Points	Grade
≥ 93%	≥ 558	A
< 93% – 89%	557 – 534	A-
< 89% – 85%	533 – 510	B+
< 85% – 82%	509 – 492	B
< 82% – 78%	491 – 468	B-
< 78% – 74%	467 – 444	C+
< 74% – 69%	443 – 414	C
< 69% – 65%	413 – 390	C-
< 65% – 50%	390 – 300	D
< 50%	< 300	F

*The course will not be graded on a curve*

Grades will be available on Sakai (<http://sakai.luc.edu>). It is the students responsibility to check his/her grade. You have two weeks from when the grade is posted to report errors. If I do not receive an email, the grade posted will stand.



**I will give you many opportunities to gather points, Your Final grade is *SOLELY* dependent on your points *ACCUMULATED* throughout the semester.**

### Examinations

Each major examination will focus on specific chapters/topics but may include any concepts that have been discussed before, helping the students to integrate the materials. Make-up examination will be given **ONLY** for **reasonable & documented** excuses, e.g. illness, court appearance, religious obligation, death of close relative, and representing the University in an official capacity.

### Quizzes

There will be a minimum of twelve (12) quizzes given during the discussion sections. The best ten (10) scores will be used for grading and there will be **NO** makeup quizzes. If we have a quiz and you are late, you are cutting your own quiz time. I will not extend the quiz time for you.

### Online exercises

MasteringChemistry will be used for online exercises. You will need to register with MasteringChemistry to access these exercises. A separate information sheet is attached that details instructions on accessing the course website for MasteringChemistry. Online exercises will be available for all 11 chapters covered in this course. The best 10 scores will be used in calculating your final grade.



### Final Exam

The final exam will be held Monday, December 10<sup>th</sup> at 9:00 - 11:00 AM. This exam will be cumulative, i.e. covering chapters 1-11.

**Practice problems**

Additional practice problems are given to reinforce and review basic concepts. Students are strongly encouraged to solve these problems. If you have any questions about some particular problems, ask during discussion sections or stop by during office hours. Some questions from the practice problem set might be included in major exams.

Solving chemistry problems requires practice. Students who solve practice problems correctly, generally do well in quizzes and exams.

- Solve each of these problems individually or with a fellow classmate.
- Some of these problems might be given in exercises, quizzes or major exams.
- Some problems have answers at the back of your book, you may use the solutions notebook as a resource in open notes group discussions and problem solving.

**Chapter 1:** 5, 7, 9, 11, 13, 17, 19, 23, 25, 27, 29, 33, 35, 37, 39, 43, 45, 47, 53, 62, 65, 71, 77

**Chapter 2:** 1, 4, 6, 15, 17, 19, 21, 23, 27, 29, 31, 39, 41, 43, 45, 47, 49, 53, 57, 59, 63, 65, 69, 73, 87, 90, 93, 98, 101, 104

**Chapter 3:** 1, 3, 5, 7, 11, 13, 17, 19, 23, 27, 29, 31, 33, 39, 43, 47, 51, 53, 57, 61, 63, 67, 69, 71, 75, 77, 81, 83, 85, 89, 93, 101, 105

**Chapter 4:** 1, 5, 7, 9, 15, 17, 21, 23, 27, 31, 37, 39, 41, 45, 49, 51, 55, 61, 63, 67, 69, 71, 73, 75, 79, 81, 83, 85, 87, 89, 92, 94, 96, 99, 103, 106, 109, 112

**Chapter 5:** 5, 11, 13, 19, 21, 25, 27, 31, 37, 39, 41, 43, 45, 47, 51, 53, 55, 61, 63, 65, 67, 69, 73, 75, 79, 102, 106

**Chapter 6:** 2, 5, 8, 11, 13, 15, 17, 23, 27, 31, 33, 35, 39, 43, 45, 49, 51, 53, 55, 59, 63, 67, 69, 71, 73, 75, 85, 90, 94, 97

**Chapter 7:** 7, 11, 15, 21, 23, 25, 27, 29, 31, 33, 37, 39, 41, 45, 47, 53, 55, 61, 63, 65, 71, 77, 88, 95, 103

**Chapter 8:** 1, 4, 7, 9, 13, 15, 19, 31, 33, 35, 37, 39, 41, 45, 47, 49, 51, 53, 55, 57, 59, 63, 65, 69, 71, 73, 75, 77, 85, 90, 107

**Chapter 9:** 1, 3, 5, 6, 11, 13, 15, 19, 21, 23, 25, 27, 29, 31, 37, 39, 41, 43, 47, 49, 51, 53, 55, 57, 59, 61, 63, 65, 67, 69, 89, 92, 94, 101, 110

**Chapter 10:** 4, 7, 10, 13, 21, 23, 27, 29, 31, 33, 37, 41, 43, 47, 49, 51, 53, 57, 59, 61, 63, 65, 67, 71, 75, 77, 79, 83, 85, 93, 95, 101, 108, 111, 123

**Chapter 11:** 1, 5, 6, 7, 11, 15, 17, 19, 21, 23, 25, 27, 29, 33, 35, 39, 41, 45, 47, 51, 53, 55, 57, 59, 61, 63, 73, 77, 82, 90

## Topical Outline & Course Calendar

Week	Day	Topic
1	M 8/26	Course introduction, 1. Chemistry & Matter
	W 8/28	1. Properties & Measurement
	F 8/30	1. Significant figures & Dimensional analysis
2	M 9/2	<b>Labor Day NO CLASS</b>
	W 9/4	2. Atoms & Elements: Structure & Properties
	F 9/6	2. Molecules: Structure & Naming
3	M 9/9	2. Ions: Properties & Naming
	W 9/11	3. Chemical Reactions & Equations
	F 9/13	3. Formula Mass & Moles
4	M 9/16	3. Molecular formulæ
	W 9/18	3. Formulæ, Stoichiometry & Reaction yields
	F 9/20	4. Aqueous solutions & Precipitation
5	M 9/23	<b>EXAM 1</b> (Chapters 1-3)
	W 9/25	4. Acids, Bases & Neutralization
	F 9/27	4. Redox Reactions
6	M 9/30	4. Concentration, Stoichiometry & Chemical analysis
	W 10/2	5. Energy & Thermodynamics
	F 10/4	5. Enthalpy & Calorimetry
7	M 10/7	<b>Mid-Semester Break NO CLASS</b>
	W 10/9	5. Enthalpy & Calorimetry cont.
	F 10/11	5. Hess Law & Formation Enthalpies
8	M 10/14	6. Photons, Atoms & Bohr model
	W 10/16	6. Uncertainty, Quantum mechanics, & Atomic orbitals
	F 10/18	6. Electron configurations & Periodic table
9	M 10/21	<b>EXAM 2</b> (Chapters 4-6)
	W 10/23	7. Periodic Properties: Nuclear charge & Atomic size
	F 10/25	7. Periodic Properties: Ionization energy & Electron affinities
10	M 10/28	7. Metals, Metalloids, Non-metals & Periodic groups
	W 10/30	8. Octet rule & Ions
	F 11/1	8. Covalent bonding, Polar bonds & Enthalpy
11	M 11/4	8. Lewis structures, Formal charge, & Resonance
	W 11/6	9. Molecular shapes & VSEPR model
	F 11/8	9. Molecular shape and polarity & Orbital hybridization
12	M 11/11	9. Resonance & Molecular orbital (MO) theory
	W 11/13	<b>EXAM 3</b> (Chapters 7-9)
	F 11/15	10. Gases, Pressure, & Gas laws
13	M 11/18	10. Ideal gas law & Mixtures and partial pressure
	W 11/20	10. Kinetic and molecular nature of gases & Real gases
	F 11/22	11. Phases of matter & Intermolecular forces
14	M 11/25	11. Intermolecular forces
	W 11/27	<b>Thanksgiving Break NO CLASS</b>
	F 11/29	<b>Thanksgiving Break NO CLASS</b>
15	M 12/2	11. Properties of liquids, Phase changes, Vapor pressure
	W 12/4	11. Phase diagrams & Liquid crystals
	F 12/6	Final exam review & Course wrap-up

**Note:** *The instructor reserves the right to change the course calendar as needed.*