



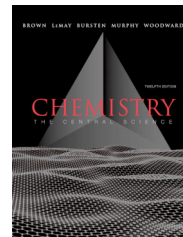
General Chemistry A (101)

Instructor: **Willetta Greene-Johnson, Ph. D.**, Room 307 Cudahy Science Hall 773-508-3537
wgreene@luc.edu

Who am I: A chemical physicist interested in surface optico-physical interactions and mildly interested in (1) thermodynamical (2) unstable systems; (3) producer, composer, orchestrator, pianist, sequencer, and conductor. I was a guest conductor with the Chicago Sinfonietta in 2012. My vocal ensemble also has recorded three compact discs. One of my songs was doubly tracked on a Grammy award winning choral CD in 2004. Since then it has been covered by five other groups.

Physical Office Hours: Wednesday 10:30 A – 11:30 A and by appointment

Required: **Chemistry, the Central Science**. 12th ed. Theodore L. Brown, *et. al.*. Boston: Pearson Prentice Hall: 2011 ISBN: 978-0-321-69672-4. (**The Mastering Chemistry asset is NOT required in my section, but may be required in a future Chemistry 102 section.**)



Chemistry 101 Course Packet, authored by the instructor. This essential lecture packet is available online at www.universityreaders.com. The course packet will be mailed to you within a few days of ordering, but you'll have immediate online access to the first 10 or so pages once order is completed.

Meetings: Lectures are scheduled MWF in FH-133, at 12:35 P – 1:25 P. You must also be registered in discussion section 014 or 015.

Discussions: meet on Thursdays according to the following schedule:

Section	Instructor	Location	Time
014	Dr. Greene-Johnson	MUN-204	Th 11:30 A – 12:20 P
015	Dr. Greene-Johnson	DUM-227	Th 2:30 P – 3:20 P



Due to the large number of students / focus sections that are matriculated through this course yearly, **there can be absolutely no alteration of this schedule.**

Course Description: A study of chemical principles and generalizations with emphasis on the development of a scientific attitude and an understanding of the fundamental concepts of chemistry.

Calculators: Any scientific calculator is probably sufficient, however calculators cannot be shared while exams are in progress and their cases/covers must be removed. Be sure that you are familiar with your calculator and that its batteries are in good condition, especially on the day of exams. The student is responsible for having his calculator on an exam day.

SAKAI Connection: The syllabus, homework assignments for the semester, discussions, and discussion answers will be posted at the following website: www.luc.edu, look under *Technology*, click on **Sakai**). Students possessing a Loyola email address are able to access this site.

Additional Information: For your convenience, test taking tips are listed on page 5 of this syllabus, as well as a protocol regarding soliciting a recommendation from me, should you desire one and qualify (see protocol). Additionally, the academic fall calendar and bookstore information is listed on page 7.

Objective of this course in grander detail:

By the conclusion of this course, the student should experience the following outcomes:

1. Understand the fundamental principles of physical chemistry
2. Acquire a knowledge base of basic terminology and classifications
3. Apply concepts creatively as well as methodically to solve multi-tiered problems
4. Know how to rank, estimate, analyze and critically evaluate a range of models
5. Gain a broader understanding of the role of chemistry in human endeavor
6. Appreciate the collaborative and global effort of the scientific enterprise


Specifically the engaged student should improve in her or his ability to

- **Grasp the fundamentals of chemistry:**
 - Standard calibrations and units of measurement, Stoichiometry, Conservation rules,
 - Ideal Gas Law, 1st Law of thermodynamics, Single component P-T phase diagram
 - Proto-quantum mechanics: Bohr and Einstein relations, Pauli Exclusion Principle, Hund's rule
 - Lewis Diagrams and VSEPR theory (applied to small or otherwise simple molecules)
- **Categorize general chemical processes:**
 - Broadly classify chemical properties (metals / non-metal, acids / bases, etc.).
 - Recognize and write reactions, including double exchange, combustion, precipitation, acid-base, and redox and to predict outcomes based upon these reactions
 - Categorize relative bonding strengths between atoms, ions or molecules
 - Predict and be able to sketch geometry of small or otherwise simple molecules
- **Assess outcome feasibility:** estimate energy cost of simpler chemical processes
- **Work and exchange ideas with others:** cordially solve weekly group problems together
- **Appreciate the impact of chemistry:** realize better how chemistry impacts life processes, technology, local, and global issues.
- **Contribute constructively:** as a science-literate, ethically responsible citizen and voter.

Later this semester, you will receive an emailed invitation to assess me via the **IDEA** (Individual Development and Educational Assessment). The form provides a thorough diagnostic of how successfully students think the instructor realized the objectives boxed above, as well as the value of the course and other contextual experiences. This opportunity will be available online at <http://www.luc.edu/IDEA> for a one-week time window only,

IDEA manual states: 'As student raters, please be aware that the results of your ratings for this class will be included as part of the information used to make decisions about promotion/tenure/salary increases for this instructor. Fairness to both the individual and the institution require accurate and honest answers.'

CHEMISTRY 101 Tentative Schedule of Topics

Week or Day	Topic	Chapter	approx. pages
8/26 – 8/30	Intro Matter, Measurements, Significant Figures, Conversions Periodic Table Overview / Atomic Model	1 1	3 – 15 16 – 30
9/2	LaBoR DaY –no classes		
9/4 – 9/6	Atomic/Formula Masses ; Mole	2	40 - 67; pg 66 = alkanes
9/9 – 9/13	Stoichiometric Calculations	3	77 - 85
9/16 – 9/20	Limiting Reactant; Theor./Actual Yield	3	86 – 104
9/23	Aqueous Rxns (1) precipitation ppt	4	119 – 124
9/25	Review for Exam 1		Opt'l—see disclaimer below
9/27 Friday	EXAM 1 - Remember your (uncovered!!!) calculator. Take your bags to the front. <u>Leave every 3rd row empty.</u> No phones, tablets, PDA's (smart or otherwise) while taking exam.	1 – 3 only parts covered	Concerning reviews, if student desires information, that student ONLY is responsible to ATTEND or otherwise obtain the information. Handouts MAY or MAY NOT be disseminated.
9/30 – 10/4	Aqueous Rxns (2) Acid Base Reactions (3) Redox Reactions	4	119-124; 116 – 119; 125 – 129; 130-135
10/7, 10/8	Mid-FALL break		Hurrah!
10/9, 10/11	Redox Reactions; Stoichiometric Applications	4	139 - 148
10/14–10/18	Ideal Gas; Calc'ns; Molar Mass Density / Stoichiometry; Dalton's Law /Kinetic Theory / Effusion	10 10	383 – 399 399 – 414
10/21	Thermochemical Eq'ns: calorimetry	5	175 – 180
10/23	Review for Exam 2		Optional—see disclaimer above
10/25 Friday	EXAM 2	4, 10, (5)	Obviously 5 we “got to”
10/28 – 11/1	Enthalpy Hess's Law; Light & Matter; Hydrogen Bohr Model	5 5 6	169 – 175; 183 – 188 181 – 183 207 – 212
Nov. 1	Last day to withdraw w/o penalty		
11/4 – 11/8	Pauli's Exclusion Principle PEP; e ⁻ conf'n / Quantum #s; Hund's Bus Rule; Orbital Diagrams Hund's, Paramagnetism, e ⁻ config'n	6 6 7	213 – 218 219 – 238 254 – 266 selected reading
11/11 – 11/15	Periodic Table Trends: size, EN, IP, EA; Covalent Bonding/Lewis structures; Resonance; VSEPR model; σ , π bonds	8 9 8	289 – 306; 309 – 321 332 – 344; Formal charge 307 – 309
11/18 – 11/20	Molecular Structures, continued		346 – 356
11/22	Review for Exam 3		Optional—see disclaimer above
11/25 Monday	EXAM 3 5-8*		5-8 *selected topics in 9
11/27 –11/30	...THANKSGIVING BREAK...		Enjoy!
12/2—12/6 IDEA Instructor Evaluation online	Hierarchy of Interstitial Forces Liquid/Vapor Equilibrium / Phase Diagram; OptL: Molecular Orbital Theory	11 11, 9	425 – 443 444 – 453; 358 – 372
12/11 Wed	REVIEW for FINAL		12:30 P location TBA
12/13 Friday	FINAL 9:00 A – 11:00 A	1 - 11	Location TBA, probably (maybe) FH-133

HOMEWORK¹: is not graded, but student is strongly encouraged to do it, and to do it well. A similar assessment is made via weekly discussion assignments. Additionally, **exam representative** problems will be distributed in discussions. **End-of-Chapter Problems**: Students who are making good progress in the course should be able to solve, independently, most or all of the end-of-chapter problems in the textbook, as well as a number of the problems in discussions. A group of exemplary problems is listed below as “assigned” problems. There are on average 15-20 of these per chapter.

- Chapter 1, pg. 31: 1, 5, 9, 11, 13, 15, 19, 23, 25, 27(a), 31, 35, 37, 39, 43, 47, 51 (you need two conversions : g to kg *and* L to ft²), 55, 59, 62, 71 ;
- Chapter 2, pg. 69: 1 opt'l (physics is everywhere), 3, 5-7, 9, 11, 25, 29, 31, 35, 37, 39, 43, 45, 47 (O = red, C = black, H = white), 49, 55, 57, 59, 63, 67, 73, 87, 89, 99, 101; Ch 7: 112, p. 287
- Chapter 3, pg. 105: 1, 3, 9, 11, 13, 17, 19, 21, 23 a-c, 29, 33, 35, 42, 43, 45, 51, 53(a), 67, 69, 71, 75, 69, 73 , 75. 81, 85, 93
- Chapter 4, pg. 150: 1-3, 7, 11, 15, 19, 21, 25, 29, 35, 39, 47, 49, 51, 59, 61, 63, 69, 77, 85, 87, 92, 96 (for the truly committed²) 94 (FYI pH: equil'm conc'n of H⁺ ions, [H⁺] = 10^{-pH})
- Chapter 10, pg. 415: 6 (hint, count the contents in each valve), 9 a-b, 25 $\Delta P = \rho gh$, 33, 35, 39b, 41, 49, 53, 57, 59a, 61, 65, 75 (how many moles of each?), 85, 89, 115, 125
- Chapter 5, pg. 196: 3-5, 8, 11, 15 (Kinetic energy = $\frac{1}{2} mv^2$ unit Joule (J)), 13, 17, 19, 23, 29, 33, 37, 41, 45, 47, 51, 53, 57, 63-65, 73, 75, 85. 89, 93, 97, 102
- Chapter 6, pg. 240: 1-3, 6, 7 (optional), 15, 17, 25, 27, 35, 37, 43, 51, 53, 55, 69, 70-72, 80 hc/λ is the energy per photon. Energy during CD play = (Power $\cdot\Delta t$), 97 **Brown's condensed electron config'n is my valence e⁻ config'n.** $\Delta E = \frac{1.196 \cdot 10^5 \frac{\text{kJ}\cdot\text{nm}}{\text{mol}}}{\lambda \text{ (nm)}}$; λ in nm
- Chapter 7, pg. 279: 25, 27, 30, 47-50, 61, 67 a (product = strong base) and c(product = strong acid), 73, 99 (think about it. Which element has the higher electron affinity?)
- Chapter 8, pg. 322: 1, 4, 9, 11, 13, 17, 19, 33, 35, 47, 51, 53, 63, 83, 101
- Chapter 9, pg. 374: 5, 19, 27 for a-f find instead the orbital and molecular geometries³, 31, 33, 35a, 39, 43, 51 (my parent / orbital geometry is book's e- domain geometry), 63: only answer: how many σ & π bonds), 69, 89, Note that the terminology electron domain corresponds to my electron pair. And term electron domain geom. corresponds to my orbital geometry
- Chapter 11, pg. 453: 2, 7, 8, 11, 21, 25b, 33, 39, 43, 45, 57, 59, 63, 83, use **Clausius Clapeyron Eq'n** and 2 data points to find ΔH_{vap} .

Examinations and Academic Honesty Three 50-minute exams and the final exam will be given on the dates below, also noted in the schedule.

Sept. 27, Oct. 25, Nov. 25

The 2-hour **final exam** will be administered on **Friday, Dec. 13** at **9:00 A – 11:00 A** at a location to be announced (most likely FH-133). Your course grade will be determined from these exams by a procedure elucidated in the next section. **The exams and the final exam are cumulative; expect exams after first to include concepts that have been tested on the previous exams.**

¹ The solutions to homework problems will be placed on 2-hour reserve at the Cudahy Library.

² Interpreted as needed

³ orb geom (a) thru' (f): AX₂, AX₃E, AX₄E, AX₆, AX₄, AX₂



Academic Integrity

All students are responsible for exercising the highest level of academic honesty while taking exams. They should peruse the College of Arts & Science policy on plagiarism/cheating, stated at: http://www.luc.edu/cas/pdfs/CAS_Academic_Integrity_Statement_December_07.pdf

As in the past, **cheating will be SEVERELY dealt with, *minimally* costing the offender** a grade of “zero” for the item that was submitted **and this grade cannot be dropped**. Additionally, the incident will be reported to the Chemistry Department Chair and the Office of the CAS Dean. Depending on the seriousness of the incident, additional sanctions may be imposed. Which has happened before.

Grading Scheme:

The scores of the three-hour exams, a final exam and *selected problems on the discussion worksheets* will be used to determine your course grade. **IF quizzes are administered, their points will count toward the discussion grade.** If an exam/discussion is missed for any reason, other than extenuating circumstances deemed admissible by the higher powers (University policy), that exam will be dropped, and/or that discussion will receive a score of 0 points. If a second exam must be missed, then in order to make up that second exam, a doctor’s note and/or a letter from a guardian, supervisor, etc., must verify proof of illness. This written request must be presented to the instructor no later than 3 calendar days after the exam date (the following Monday), or no make-up exam can be administered.

Course grade will be determined in one of two ways and by the grading scale shown:

Item	Method 1	Method 2
Exam 1	20 %	20 %
Exam 2	20	20
Exam 3	20	One dropped: Ex. 1 or 2 or 3
Discussion Worksheets/ Quizzes	10	10
Final Exam	30	50

GRADING SCALE (undergrad, Loyola Chemistry Dept.)

Grade Scale:	A	≥ 90	A-	87-89	
B+	84-86	B	80-83	B-	77-79
C+	74-76	C	70-73	C-	67-69
D+	64-66	D	60-63	D-	57-59
F	< 57				

Whichever scheme benefits the student at semester’s end will be employed. Caveat: No make-up exam will be given after 48 business hours of the scheduled exam. For a scheduled Friday exam, the make-up exam must occur the following Monday, or that exam will be dropped.



Missed Exams:

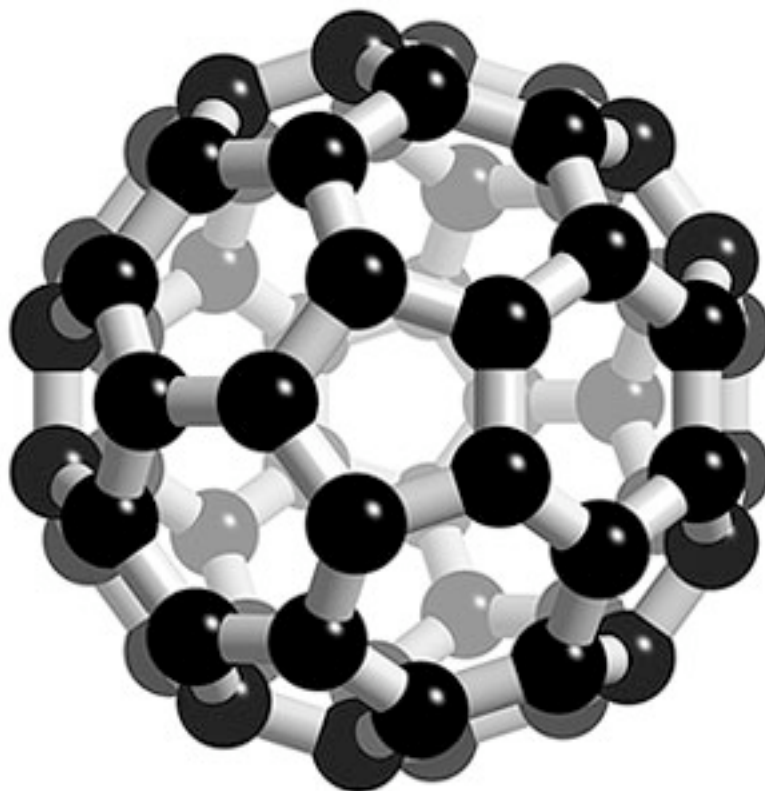
The first exam missed for any reason ⁴ will be dropped. For instance, say that you took exams 1 and 3 but had to miss exam 2. Then exam 2 is dropped and Method 2 grading scheme applies. If an *additional* exam date is missed for legitimate reason, that *second absence* can be made up within 48 hours after that scheduled exam (see above paragraph). Due to the size of enrollment and the volume of work in this course as well as the pace of the course, there can be no exceptions to this policy.

⁴ Exception: employed representatives of Loyola University Chicago.

Please make every attempt to take the final exam on time. If the final exam is missed, the student will receive an automatic WF. If no action is taken, the WF will automatically revert to an F. The student must have valid documentation of why the exam was missed, and must contact the Dean's office of the college that she is registered in. **It is the student's responsibility** to coordinate the make-up exam between the dean's office and the instructor.

Laboratory: Chemistry 111, the general chemistry laboratory course, should be taken concurrently with the lecture course in general chemistry. The lecture and the laboratory courses are graded independently. Students should first consult the Chemistry Dept. Bulletin opposite the wall facing the chemistry office for information or they can contact **Dr. Angela Boerger**, the administrator of the laboratories.

Nano-football, anyone?



Buckminster fullerene C_{60} , is shaped like a soccer ball. It possesses 32 faces, 20 hexagons and 12 pentagons, with carbon atoms at every vertex. This allotrope of carbon was first discovered in 1985 by principle investigators Sir Harold Kroto in the UK and Richard E. Smalley and Robert F. Curl, Jr in the US. These researchers shared the 1996 Nobel prize in chemistry for their discovery.

Room Instructions on Exam Days

- 1) Find a seat as quickly as you can. Do not try to sit with friends or near one's usual area. The exam is only 50 minutes, so excessive delays will cut into exam-taking times.
- 2) Place your student ID conspicuously on your desk so that attendance may be noted (during exam).
- 3) Have several pencils/pens, eraser, etc. and a calculator in good working order.
- 4) Proctors have been instructed to confiscate the exams of any student using a calculator with its slipcover in place.
- 5) **Read over the entire exam.** You may find a problem in the middle, or at the end, that suits you better to start. The three or so minutes spent glancing over the entire exam will be more than compensated for by the strategy and priorities that you formulate. The recommended order to do problems is:

- (1) what you know well FIRST
- (2) what you're sure you can at least start NEXT
- (3) what you haven't have a clue for LAST

I have tried to arrange problems in a reasonable order, but my perception and the student's will certainly differ from time to time. So, take a few minutes to read over the exam and devise your own strategy.

- 6) When you have concluded, turn in your exam to proctor or instructor. Leave as quietly and as expeditiously as possible as to not disturb other exam takers.
- 7) Normally, exams administered on Friday will be returned the following Wednesday. **Please** don't harangue the Chemistry staff (and certainly not the physics staff for a chemistry course!) As a general rule, I do not appraise them of my grading schedule. There is normally no issue, however final examination will take the longest to grade (about 6 days) because it is hand-graded. I promise you that I will move as swiftly and as accurately as I can!

Advanced Programs Recommendation Protocol

Later in your student career, you may require recommendations for graduate school, medical school, or the like. If I am chosen among your recommenders, the following policy ensues:



1. Student must generally possess GPA of 3.4 or above. However, if my time allows, a student might be considered if she or he presents a **written explanation** that reveals an exceptional circumstance accounting for a lower grade point average.
2. Student must provide a Microsoft Word-formatted document listing his/her official transcript GPA, contact information, deadline(s), and also all chemistry, biology and physics courses and labs that the student has take—in the following format (or Committee format, if you are applying through committee):
 - a. **GPA**
 - b. reliable, current email and telephone # that student checks *regularly*
 - c. **DEADLINE**
 - d. Table with header: course taken, instructor, grade

Example:

Course	Semester / year	Instructor	Grade
Chemistry 101	Fall /13	Dr. WGJ	B+
Biology 210	Spring /14	Dr. Barbara Haas	A

- e. If applying “outside the Committee”—see items 4,5 below, a list of all schools of the applicant and **ALL of their DEADLINES**.
- f. All cover forms, application packages, envelopes in one binder, folder, or otherwise secure containment, with like items paper-clipped together.
3. If I can do a recommendation for you, I'd love to read your personal statements, even in rough draft form. It tells me something about you and helps me to shape a recommendation. This article is not required, but I recommend it.
4. **It is STRONGLY recommended that the student applies through the Loyola Pre-Health Advisory Committee.** Well-regarded by the medical/dental/pharmaceutical community, the Committee's voice of endorsement will increase the merit of the student's application. Their method also assures that the student's personal statement is strong and well written. If the student applies via Committee, s(he) should provide me a cover sheet obtained from the Office of Pre-health (Sullivan Center 262).
5. **APPLICATIONS OUTSIDE COMMITTEE:** If a student who I can recommend elects to apply outside of committee (apart from the Pre-Health Advisory committee), then she/he must perform steps 1-3 and email me at wgreene@luc.edu (and one other e-address that will be provided). If certain places require accompanying documents that can be distributed via email, the student should those documents and email all the attachments, along with doc items request in steps 1 - 3 in one email, to myself.
6. **Deadline for recommendation requests: January 24, 2014.**

Potential Requesters: Please save/archive this page so you can access it later.

LOYOLA UNIVERSITY CHICAGO FALL CALENDAR 2013



August 25	Sunday	Open registration ends
August 26	Monday	Fall Semester begins
August 26	Monday	Late and change registration begins Late registration fees apply
August 30	Friday	Labor Day weekend begins Classes that begin at 4:15 p.m. or later do not meet
September 1	Sunday	Last day to withdraw from class(es) with a Bursar credit of 100%
September 2	Monday	Labor Day, Classes do not meet
September 3	Tuesday	Late and change registration ends Last day to withdraw without a "W" grade
September 3	Tuesday	Classes resume after Labor Day
September 9	Tuesday	Last day to convert from credit to audit or vice versa Last day to request or cancel pass/no pass option
September 22	Sunday	Last day to withdraw from class(es) with a Bursar credit of 50%
September 29	Sunday	Last day to withdraw from class(es) with a Bursar credit of 20% (zero credit thereafter)
October 1	Monday	Application for Degree. Last day to file, for degrees being awarded at the end of the Spring Semester and the Summer Term of the following year
October 4	Friday	Last day for students to submit assignments to change an "I" grade to a letter grade from the preceding Spring and Summer Semester/Terms to a letter grade; Faculty may set earlier deadlines with students
October 8	Sunday	Early alert process begins (Last day of the 3rd week of the semester)
October 7 - 8	Mon. & Tues.	Mid-Semester Break: No classes
October 9	Wednesday	Classes resume after Mid-Semester Break
November 1	Friday	Last day to withdraw with a grade of "W" After this date, the penalty grade of "WF" will be assigned
November 4	Monday	Graduate, Non-GSB, Spring Registration Begins
Nov. 27 - 30	Wed - Sun.	Thanksgiving Break: No classes
December 2	Monday	Classes resume after Thanksgiving Break
December 7	Saturday	Fall Semester ends
December 11	Wednesday	Study Day: No classes
December 13	Friday	9:00 AM – 11:00 AM CHEMISTRY 101 Final Examination

Lake Shore Bookstore Phone: 773-508-7350 6435 N. Sheridan Road
Store Manager: **Dionne Damico** Email Address: luc-lsc@bkstr.com