

<b>CHM 2046</b>	<b>General Chemistry 2 (Gower Sections)</b>	<b>Spring 2019</b>
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**INSTRUCTOR:** George (Jeff) Gower ([jgower@chem.ufl.edu](mailto:jgower@chem.ufl.edu))

**Lectures:** MWF (8<sup>th</sup> period) (CLB 130)

**Discussion Sections:** each Tuesday (rooms depend on section number)

**Office hours:** MWRF 9<sup>th</sup> period (CLB 314, phone: 392-2155)

**TEXT:** **Chemistry: The Molecular Nature of Matter and Change (any edition)**

by Martin Silberberg (McGraw-Hill)

Any quality college-level General Chemistry textbook is OK (feel free to ask me if you want advice on selecting a textbook), but it is STRONGLY recommended that all students obtain and READ a quality college-level textbook during this course.

**LECTURES:** It will be fully expected that all students are physically present and attentive at every lecture during the period for which the student is registered. The official UF attendance policy can be found at the following link.

<https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx>

<b>Planned Lecture Schedule (dates are flexible)</b>	<b>Chapter(s)</b>
<b>Jan 7 – 11:</b> Review of Chemical Kinetics: Reaction Rates; Activation Energy; Reaction Mechanisms; Catalysts	16
<b>Jan 14 – 23:</b> Gas-Phase and Heterogenous Equilibria; Le Châtelier's Principle; Reaction Yield Optimization	17
<b>PROGRESS EXAM 1 – Tuesday, Jan 29 (8:20–9:50pm)</b>	<b>16–17</b>
<b>Jan 25 – 30:</b> Brønsted-Lowry Acids and Bases; pH and $K_a$	18.1–18.3
<b>Feb 1 – 6:</b> Brønsted-Lowry Acid-Base Potential and Equilibria	18.4–18.8
<b>Feb 8 – 15:</b> Acid-Base Titrations and Buffers	19.1–19.2
<b>Feb 18 – 20:</b> Lewis Acid-Base (Electrophile-Nucleophile) Reactions and Mechanisms	18.9
<b>PROGRESS EXAM 2 – Wednesday, Feb 27 (8:20–9:50pm)</b>	<b>16–19.2</b>
<b>Feb 22 – Mar 1:</b> Solubility Equilibria; Selective Precipitation; Complex Ions and Amphoteric Hydroxides	19.3–19.4
<b>Mar 11 – 20:</b> Equilibrium Thermodynamics	20
<b>Mar 22 – Apr 1:</b> Oxidation/Reduction Potential; Redox Reactions; Electrochemistry and Equilibria; Voltaic & Electrolytic Systems	21
<b>PROGRESS EXAM 3 – Thursday, Apr 4 (8:20–9:50pm)</b>	<b>16–21</b>
<b>Apr 3 – 8:</b> Review and Applications of Elemental and Chemical Potential; Learning to “Think Like a Chemist”	17–21,14**
<b>Apr 10 – 15:</b> Transition Elements and Coordination Chemistry	23**
<b>Apr 17 – 19:</b> Introduction to Nuclear Chemistry	24**
<b>PROGRESS EXAM 3 – Monday, Apr 22 (8:20–9:50pm)</b>	<b>16–24</b>
<b>Apr 22 – 24:</b> Introduction to Organic Chemistry	15**
<b>FINAL EXAM – Saturday, Apr 27 (5:30–7:30pm)</b>	<b>Cumulative</b>

\*\* Topics from these chapters will be selective – lecture coverage will dictate content.

**OFFICIAL UF HOLIDAYS (no classes):** Jan 21 (MLKJr), Mar 4–8 (Spring Break)

**OFFICE HOURS:** Chemistry and course-content queries should be made in person during office hours (and not by email – see below) in CLB 314 during 4<sup>th</sup> and 9<sup>th</sup> periods on Mondays, Wednesdays, or Fridays, or immediately after lectures in CLB 130 if time permits. Please always bring your self-assessment notebook and completed work to office hours. Please also understand that office hours are not study sessions. When you come to office hours, be sure your queries are pre-prepared and that you are ready to discuss the queries as soon as you arrive; do not plan to sit and study or do practice problems during office hour time. If you are not able to attend my office hours, and you

have questions regarding chemistry understanding, please visit the Chemistry Learning Center (CLC) (see below) where TAs are available to help you.

**EMAIL:** Course administrative queries only can be emailed to me (from your official UF email account: [student@ufl.edu](mailto:student@ufl.edu) only - students must use your official @ufl.edu email or have your @ufl.edu emails automatically forwarded to your preferred email address). You may also email me from our e-Learning/Canvas site if you wish (see below).

**Please be sure to indicate whether you are a CHM2045 or a CHM2046 student in your email.**

**E-LEARNING (Canvas)** (<http://elearning.ufl.edu>) If you have any problems with your GatorLink name or password, you should either go on-line <http://helpdesk.ufl.edu/self-help/>, contact the Help Desk at 392-HELP, or go to 520 CSE for personal assistance. For other computer assistance, visit <http://helpdesk.ufl.edu/>.

**“HOW TO SUCCEED IN COLLEGE CHEMISTRY”:** This document is posted in the Files folder in Canvas. Read it carefully and do exactly as it says. The detailed structured method of **self-assessment** strategic study skills in this document has been proven to work many times by many different students over many years (including yours truly). For most students, it is the only way to succeed in the course (and in other courses like this one). Trust me on this: failure to read and do exactly as it says in this document will most likely result in frustration and lack of success in this course for the majority of students. Please do not disregard this advice. **Self-assessment is essential!**

**LECTURES:** Your attendance and attentiveness is expected during every lecture (during the lecture period for which you are registered). While attendance will not be monitored, it is fully expected that every student is present and attentive at every lecture.

**If You Miss a Lecture:** Since lecture attendance does not count toward your course grade, you do not need to provide any notification or documentation regarding a missed lecture. However, it is STRONGLY recommended that you obtain the lecture notes from a trusted fellow student if you have to miss a lecture due to illness or emergency.

**DISCUSSION CLASSES:** Students and TAs will collectively work on worksheets that relate to the current lecture material. Participation will contribute toward your course grade (see under “Grades”), so it is therefore important that you go only to the Discussion Class section for which you are registered. You must be present for the entire Discussion Class to earn credit for the class/worksheet. No worksheets nor worksheet credit will be given outside of class. Students: be sure to confirm that your TA properly notes your presence each week – once the class is over, it is impossible to confirm your presence. Worksheet answers will be posted online after each week’s Discussion classes are over.

**If You Miss a Discussion Class:** To assuage any concerns over having to miss a Discussion Class worksheet due to personal matter, emergency, illness, or other conflict at all, only 10 of the 12 worksheets will count toward your grade (meaning that you can miss two worksheets). No additional accommodations will be considered, nor will any "make-up" Discussion Class worksheets will be offered for any reason - no exceptions.

**ONLINE HOMEWORK PROBLEMS:** Chapter-specific Online Homework Problem sets will be posted online on **Canvas (under “Quizzes”)**. These Homework Problems will walk students through each chapter’s content, pointing out important components of each chapter, and give the students an opportunity to assess their understanding and competence with the material via multiple-choice exam-derived questions that are sequenced in logical order to help facilitate learning. The purpose of the Homework Problems is to help students to self-identify individual weaknesses and calculational mis-steps so that the students will be aware of these weaknesses before the exams do this for them. The proper way to approach the problem sets is to first go through them “cold” so that students can self-assess and self-grade themselves on the material; then, students can work with focus and efficiency to address their own individual weaknesses during subsequent attempts as detailed in the “How To Succeed In College Chemistry” document. Be sure to write down your answers while doing the Homework Problems so that you will have them readily available if you wish to re-submit your answers on successive attempts. These Homework Problems will count toward your grade; you will have ten (10) chances to answer the questions correctly. Correct answers will not be shown for the problems at any time, but you will know when you have obtained the correct answer when your answer is no longer marked as incorrect (i.e., you will have to continue working on the problems, resubmitting your answers, until you get them

correct, in order to know the correct answer to the problems). It is 100% up to YOU to know when each Homework Problem set is due.

**If You Miss a Homework Problem Set Due Date:** To assuage any concerns over having to miss a Homework Problem due date, only 10 of the 12 Homework Problem sets will count toward your grade (meaning that you can miss two problem sets). No additional accommodations will be considered, nor will any due-date extensions be granted for ANY reason - no exceptions.

**TEXTBOOK READING and END-OF-CHAPTER HOMEWORK:** I strongly recommend that all students READ the relevant chapters of a quality college-level General Chemistry textbook as the material is covered in lectures (in fact, you should read the textbook chapters BEFORE the material is covered in lecture). As for end-of-chapter textbook problems, I recommend that students FIRST do the Online Practice Problem Sets ("Homework") for each chapter (see above) to self-assess for weaknesses with the material, and to let the results of that self-assessment guide the students as to which End-Of-Chapter textbook problems need to be done. But let me say this: the more problems you do, the more you develop your skills at solving problems and understanding concepts. If success in this course is important to your goals, do not short-change yourself by merely doing the minimum work needed to "get by". Think about it.

**ONLINE QUIZZES:** Online Quizzes will be administered via e-Learning/Canvas (under "Quizzes"). These quizzes will occur weekly, beginning during the 2<sup>nd</sup> week of classes, and each quiz will be announced via Canvas.

**If You Miss an Online Quiz:** To assuage any concerns over having to miss a Online Quiz due to personal emergency, illness, or other conflict, you will be allowed to miss two (2) online quizzes with no penalty to your course grade. More than two (2) missed online quizzes will not be accommodated. No "make-up" online quizzes will be offered for any reason - no exceptions.

**EXAMS:** Progress Exams (during-term exams) will be taken in the evenings outside of class and the Exam Room Assignments for each exam will be posted in Canvas prior to each exam. You may only use a non-graphing non-programmable scientific calculator on exams (with log, ln, root, and exponent (scientific notation) functions). Be sure to bring pencils, your section number, and your UF ID card. No notes, papers, cell phones or other electronic devices can be in view during exams.

**Exam Conflict/Absence Policy:** No make-up Progress Exams will be given after the regularly scheduled Progress Exam date for any reason.

- (1) If you know in advance that you must be absent for a Progress Exam or for the Final Exam due to a documented and approved academic or UF athletic conflict or other pre-approved conflict, bring the applicable documentation to me at least one week prior to the scheduled exam, and an early conflict exam will be arranged for you. Failure to bring documentation and/or obtain one-week pre-approval for the early conflict exam will result in your request being denied. (continued on next page.....)
- (2) If you experience a last-minute unavoidable emergent situation (illness, accident, emergency, etc.) that prevents you from attending an exam, you **must** do the following: (1) go to the Dean Of Students office and have them confirm your conflict documentation and have them email their confirmation to me, and then you must (2) see me in person as soon as you are **no longer ill** (no rush – wait until you are well) and/or as soon as you are able to do so. Failure to do these two steps will result in a zero score for the missed exam.

(More information can be found in the General Chemistry Exam Absence Policy document located in the "Files" folder on the course web site.)

**Progress Exam "Average/Replace" Policy:** (Applies to all students). No Progress Exam scores will be dropped for any reason. However, to help alleviate the stress of potential issues that do not fall under the officially-sanctioned absences described above, and that may affect a Progress Exam score (for example, unapproved exam absence or poor exam performance), the lowest score of the four Progress Exams will be replaced by the average score of all four of the Progress Exam scores:

Example (unapproved absence):

Exam 1, 70%; Exam 2, 0%; Exam 3, 90%; Exam 4, 80%

The Progress Exam 2 score (0%) will be replaced by  $\{(70+0+90+80) / 4\} = 60\%$ .

Example (poor exam performance):

Exam 1, 70%; Exam 2, 40%; Exam 3, 90%; Exam 4, 80%

The Progress Exam 2 score (40%) will be replaced by  $\{(70+40+90+80) / 4\} = 70\%$ .

**Missing scores (or questionable zero scores) and checking your scantron:** If your exam score is MISSING from your e-Learning gradebook, or if your exam score is ZERO and you do not think this score is correct, please contact me ASAP. It could be that your UF ID was not properly bubbled in. Scantrons may be viewed during the one-week period following the posting date of the exam score in your Canvas gradebook (to view your scantron, email [julia@chem.ufl.edu](mailto:julia@chem.ufl.edu) to set an appointment with Julia to do so). Bubbling errors made on scantrons (mis-bubbled exam question answers or mis-bubbled Form Code) can not be negotiated. Misbubbled Form Codes will result in a 20% exam score penalty, so be VERY CAREFUL when bubbling your Form Code on your scantron.

**CHEMISTRY LEARNING CENTER (CLC):** There is free help to be had from graduate student teaching assistants in the CLC Monday through Friday in Hernandez Hall room 105. Your discussion TA will have office hours in the CLC, but you may go there anytime any TA is assigned there to get help on questions pertaining to chemistry. A schedule of the TA schedules will be posted in the corridor outside the CLC and also on e-Learning.

And, there is the **TEACHING CENTER** located on the ground floor of Broward Hall, if you'd like to use that resource. Their web site is <http://www.teachingcenter.ufl.edu>.

**COURSE GRADES:** Course grades for the term will be earned as follows:

Assignment/Assessment Type	Points / % of Grade
Progress Exams	60%
Online Quizzes	5%
Online Homework	5%
Discussion Worksheets	5%
Final Exam	25%
<b>TOTAL</b>	<b>100%</b>

The following grade cutoffs will be used (these are non-negotiable; no curves):

92-100% = A	84-87.9% = B+	72-75.9% = C+	64-67.9% = D+	< 56 = E
88-91.9% = A-	80-83.9% = B	68-71.9% = C	60-63.9% = D	
	76-79.9% = B-		56-59.9% = D-	

For further information on UF's Grades and Grading Policies, go to <https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx>

**HONOR CODE:** The UF Student Honor Code applies to all exams and assessments given in this course. Please understand that absolutely no leniency will be extended in any case of academic dishonesty.

**INSTRUCTOR EVALUATIONS:** Students are expected to provide feedback on the instruction in this course by completing online evaluations at <https://evaluations.ufl.edu> during the last two or three weeks of the semester. Students will be emailed with specific times when the online evaluations are open. Summarized results of previous evaluations are available to students at <https://evaluations.ufl.edu/results/>.

**DISABILITIES / STUDENT MENTAL HEALTH COUNSELING:** Students requesting classroom and exam accommodations should contact the Dean of Students Disability Resources Center (DRC) at 392-8565 or <http://www.dso.ufl.edu/drc/> and obtain the proper forms that need to be turned in to me during the first week of class or as soon as possible after obtaining the paperwork from the DRC. It is the student's responsibility to schedule and arrange accommodations with the DRC. Students may seek mental health counseling at any time. See <http://www.counseling.ufl.edu/cwc/>.

**U MATTER, WE CARE:** Your well-being is important to the University of Florida. The U Matter, We Care initiative is committed to creating a culture of care on our campus by encouraging members of our community to look out for one another and to reach out for help if a member of our community is in need. If you or a friend is in distress, please contact [umatter@ufl.edu](mailto:umatter@ufl.edu) so that the U Matter, We Care Team can reach out to the student in distress. A nighttime and weekend crisis counselor is available by phone at [352-392-1575](tel:352-392-1575). The U Matter, We Care Team can help connect students to the many other helping resources available including, but not limited to, Victim Advocates, Housing staff, and the Counseling and Wellness Center. Please remember that asking for help is a sign of strength. In case of emergency, call 9-1-1.

**COURSE INFO:** CHM 2045 and CHM 2045L constitute the first semester of the two term sequence of General Chemistry, CHM 2045-2045L-2046-2046L. This sequence is suitable for all science and engineering majors.

**GENERAL EDUCATION CREDIT:** This course is available for general education credit. This course introduces students to fundamental concepts of chemistry including bonding, atomic and molecular structure, chemical reactions, states of matter, reaction rates, chemical thermodynamics and equilibria. The scientific method and the place of chemistry in the everyday world are emphasized.

**PROGRAM OBJECTIVES:** General Chemistry and Qualitative Analysis (aka General Chemistry II, or CHM2046) covers the basic concepts, theories and terms related to chemical equilibria, thermodynamics, elemental characteristics, and the chemical potentials associated with chemical species in systems covered in the course. The course will focus on major scientific developments and their impacts on society, science and the environment, and the relevant processes and potentials that govern and characterize the discussed chemical systems. Students will formulate empirically-testable hypotheses derived from the study of these systems, apply logical reasoning skills through scientific criticism and argument, and apply techniques of discovery and critical thinking to evaluate potential outcomes of chemical processes. In addition to the described educational objectives of the course, it is also expected that preparatory objectives will be met and surpassed, with regard to rendering students equipped for success in future courses in the physical sciences, by way of a sound competency with the CHM2046 material and how it relates to earlier studies (CHM2045 and earlier) and later studies in chemistry and other scientific disciplines.

These objectives will be accomplished through interactive participation in the course lectures and discussion sections, and individual work done on provided guided and structured homework resources. Successful achievement will be assessed through weekly discussion section quizzes and monthly Progress Exams, as well as a Final Exam.

**GENERAL EDUCATION STUDENT LEARNING OUTCOMES:** The following learning outcomes (see table below) will be assessed through monitored Discussion Section preparation and participation, as well as through online assessments and progress (mid-term) examinations and final examinations.

**GENERAL EDUCATION STUDENT LEARNING OUTCOMES, continued:**

Area	Institutional Definition	Institutional SLO
<b>CONTENT</b>	Content is knowledge of the concepts, principles, terminology and methodologies used within the discipline.	Students demonstrate competence in the terminology, concepts, methodologies and theories used within the discipline.
<b>COMMUNICATION</b>	Communication is the development and expression of ideas in written and oral forms.	Students communicate knowledge, ideas, and reasoning clearly and effectively in written or oral forms appropriate to the discipline.
<b>CRITICAL THINKING</b>	Critical thinking is characterized by the comprehensive analysis of issues, ideas, and evidence before accepting or formulating an opinion or conclusion.	Students analyze information carefully and logically from multiple perspectives, using discipline specific methods, and develop reasoned solutions to problems.