

# CHM2046 – GENERAL CHEMISTRY II – SUMMER 2021

## INSTRUCTORS:

<b>May 10 through June 18</b>	<b>June 28 through August 6</b>
<b>Dr. Steven Harris</b> E-mail (for administrative purposes): <a href="mailto:steven.harris@chem.ufl.edu">steven.harris@chem.ufl.edu</a>	<b>Dr. Martina Sumner</b> E-mail (for administrative purposes): <a href="mailto:m.sumner@chem.ufl.edu">m.sumner@chem.ufl.edu</a>
<b>Office Hours</b>	<b>Office Hours</b>
MTRF: 9:30 to 10:35 am, ufl.zoom.us, Meeting ID: 958 1512 8920 Links also found in Canvas	MTRF: 9:30 to 10:35 am, ufl.zoom.us, meeting ID: 959-363-8673

## COURSE SCHEDULE (the lecture schedule is tentative, but exam dates will not change):

Class date	Topic	Before class	After class (for credit and optional)	Silberberg 8 <sup>th</sup> Chapters*
May 10	Kinetics; rate law, integrated rate law, rate constant, mechanisms, theories of chem kinetics	Read syllabus, check out canvas, PLA Ch. 16.6/7	HW ch 16 2045, HW ch 16 review, HW ch 16.4	Ch. 16
May 11	Chemical Equilibrium; K and Q	PLA Ch. 17.1/2	HW ch 17.1/2	Ch. 17.1-2
May 13	Chem eq; relation between Kc and Kp, comparing Q and K	PLA Ch. 17.3/4	HW ch 17.3/5, HW ch 17.4	Ch. 17.3-4
May 14	How to solve eq problems	PLA Ch. 17.5	HW Ch. 17(1)	Ch. 17.5
May 17	More solving eq problems, LeChatelier's principle	PLA Ch. 17.5/6	HW ch 17.5/6 HW Ch. 17(2)	Ch. 17.5-6
May 18	LeChatelier's principle	PLA Ch. 17.6	HW ch 17.6, HW ch 17.6 (1)	Ch. 17.6
May 20	Acid-Base Eq.; autoionization of water, pH scale	PLA Ch. 18.1/2	HW Ch 18	Ch. 18.1-2
May 21	Bronsted-Lowry acid/base definitions	PLA Ch. 18.3	HW Ch 18(1)	Ch. 18.3
May 24	Solving problems involving weak acid eq.	PLA Ch. 18.4	HW Ch 18.(2)	Ch. 18.4

May 25	Molecular properties and acid strength; weak bases	PLA Ch. 18.5/6		Ch. 18.5-6
<b>May 26</b>	<b>Exam 1 (May 26 7 to 9 pm)</b>			Ch. 16-18.3
May 27	Acid Base Properties of Salt Solutions	PLA Ch. 18.7		Ch. 18.7
May 28	Lewis Acid-Base definitions, electron-pair donation	PLA Ch.18.8/9	HW Ch. 18	Ch. 18.8-9
June 1	Buffers	PLA Ch. 19.1		Ch. 19.1
June 3	Buffer capacity and preparation; Strong acid/strong base titration curve	PLA Ch. 19.2(1)	HW Ch. 19.1	Ch. 19.1-2
June 4	Weak acid/strong base; weak acid/weak base, polyprotic acids	PLA Ch. 19.2(2)	HW Ch. 19.2	Ch. 19.2
June 7	Equilibria of slightly soluble ionic compounds, $K_{sp}$	PLA Ch. 19.3(1)		Ch. 19.3
June 8	Predicting ppt formation, selective ppt	PLA Ch. 19.3(2)	HW Ch. 19.3	Ch. 19.3
June 10	Equilibria involving complex ions	PLA Ch. 19.4	HW Ch. 19.4	Ch. 19.4
June 11	Transition elements; properties of transition elements and inner elements	PLA Ch. 23.1/2/3	HW Ch. 23.1/2/3	Ch. 23.1-3
June 14	Coordination compounds, formulas and names	PLA Ch. 23.3	HW Ch. 23.3	Ch. 23.3
June 15	Crystal field theory	PLA Ch. 23.4	HW Ch. 23.4	Ch. 23.4
<b>June 17</b>	<b>Exam 2 (June 17)</b>			
June 18	Last day of summer A, no class or review?			
<b>June 21- June 25</b>	<b>Summer break</b>			
June 28	Thermodynamics; 2 <sup>nd</sup> law, entropy	PLA ch 20.1		Ch 20.1
June 29	Calculating the change in entropy	PLA ch 20.2	HW ch 20.1/2	Ch 20.2
July 1	Entropy, free energy, and work	PLA ch 20.3	HW ch 20.3	Ch 20.3
July 2	Free energy, equilibrium and reaction directions	PLA ch 20.4	HW ch 20.4, HW Ch 20 all	Ch 20.4
July 6	Electrochemistry; balancing redox reactions	PLA ch 21.1	HW Ch 21(1)	Ch 21.1
July 8	Voltaic cells, cell construction and operation, notation	PLA ch 21.2	HW Ch 21(2)	Ch 21.2
July 9	Voltaic cell potential, $E^\circ$	PLA ch 21.3		Ch 21.3

July 12	Free energy and electrical work	PLA ch 21.4	HW Ch 21.4, HW Ch 21.4(2)	Ch 21.4
July 13	Batteries, primary, secondary, fuel cells, corrosion	PLA ch 21.5/6		Ch 21.5-6
July 15	Electrolytic cells, energy to drive nonspontaneous rxn	PLA ch 21.7	HW Ch 21.7, HW Ch 21.7(2)	Ch 21.7
July 16	Nuclear reactions; radioactive decay and nuclear stability	PLA 24.1	HW ch 24.1/2	Ch 24.1
<b>July 19</b>	<b>Exam 3 (July 19)</b>			Ch 20- 21
July 20	The Kinetics of radioactive decay	PLA 24.2	HW ch 24.2	Ch. 24.2
July 22	Ionization, application of radioisotopes,	PLA 24.3/4/5		Ch 24.3-5
July 23	The Interconversion of mass and energy; Application of fission and fusion	PLA 24.6/7	HW ch 24 all	Ch. 24.6/7
July 26	Organic chemistry, structure and classes of hydrocarbons, optical isomers	PLA 15.1/2	HW ch 15(1), HW Ch 15.2	Ch 15.1-2
July 27	Some important classes of organic reactions, functional groups	PLA 15.3	HW Ch 15.2(1)	Ch 15.3
July 29	Functional groups	PLA 15.4		Ch 15.4
July 30	Functional groups	PLA 15.4(2)	HW Ch 15.4	Ch 15.4
Aug. 2	<b>Exam 4 (August 2)</b>			
Aug. 3	Office hours only			
Aug. 5	<b>Final comprehensive Exam</b>			
Aug. 6	No class			

\*The topics that will be covered from each chapter will be selective and announced in class.

**Holidays (no classes):** Monday, May 31; June 21 – June 25 (summer break); Monday, July 5

**ASYNCHRONOUS LECTURE:** MTRF Period 2 (9:30 to 10:35 pm)

### Materials:

Silberberg 8<sup>th</sup> edition recommended (copies of the 8<sup>th</sup> ed and solution manual are available in the Marston Science library, solution manual for EOCs available under course reserves), the ebook will be available for \$48 for 5 years.

**DESCRIPTION:** CHM 2046 and CHM 2046L constitute the second semester of the two term sequence of General Chemistry, CHM 2045/2045L - 2046/2046L. Prerequisite information and credit suitability can be found in the Undergraduate Catalog. Requirements for class attendance and make-up exams, assignments, and other work in this course are consistent with university policies that can be found at:

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

**COURSE OBJECTIVES:** As both a general education requirement and major's course, CHM2046 serves to teach: the scientific method, skills for problem solving, general chemistry knowledge, and a connection to the principles that govern the natural world.

**GRADES:** Grades for the term will be determined as follows:

4 Progress Exams	60%
Final Cumulative Exam	25%
PLA/LA/HW	7.5%
worksheets	7.5%
TOTAL	100%

The following grade cutoffs will be used (these are non-negotiable):

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-	

Information on current UF grading policies for assigning grade points can be found at:

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

**POSTED GRADES:** Should a student wish to dispute any grade received in this class, the dispute must be in writing (via e-mail to [m.sumner@chem.ufl.edu](mailto:m.sumner@chem.ufl.edu) or [steven.harris@chem.ufl.edu](mailto:steven.harris@chem.ufl.edu)) and submitted to the instructor within one week of the grade being posted to canvas. The deadline for grade dispute for Dr. Harris's half is June 19. After one week has passed from when the grade was posted and the student made aware of the posting of the grade(s) via an announcement on canvas, the instructor considers those grades final.

**WORKLOAD:** As a Carnegie I, research-intensive university, UF is required by federal law to assign at least 2 hours of work per week outside of class for every contact hour. Work done in these hours may include reading/viewing assigned material and doing explicitly assigned individual or group work, as well as reviewing notes from class, synthesizing information in advance of exams or papers, and other self-determined study tasks.

**ASSIGNMENT DUE DATES:** All due dates for assignments are clearly posted in the course assignments of the Canvas page and reflect the most up-to-date information. All assignments must be completed by the stated due date and time for credit. A Dean of Students note verifying documentation of illness or personal mater must be provided for at least five of the seven days of the week of the assignments';s deadline for accommodations to be considered.

Extensions will NOT be given because of technical or personal issues that occur within 24 hours of the assignment deadline. No assignment extensions are given. If you want to have access to a particular assignment you need to open and submit it once.

**PRE-LECTURE ASSIGNMENTS (PLA):** You will be expected to complete pre-lecture assignments in preparation for each class day. These assignments will be posted on Canvas under the quizzes tab and will be due prior to class. You will have multiple attempts to successfully answer the pre-lecture assignments.

**LECTURE ASSIGNMENTS (LA):** A lecture assignment is due with each lecture via canvas. Watch the lecture and do the assignment as you watch the lecture.

**HOMEWORK (HW):** Two to four homework assignments will be due per chapter to help you understand the material. The homework will be posted on Canvas under the quizzes tab. You will have multiple attempts to successfully answer the questions. Five percent of the course grade is based on your performance on the PLA/HW. 6 assignments will be dropped at the end of the semester. Additional HW assignments for each chapter can be found under Quizzes, then scroll down to Practice Quizzes. These are not worth any points.

You should also work numerous EOCs.

**DISCUSSION CLASSES/ WORKSHEETS:** Seven point five percent of the course grade is based upon your attendance at your discussion class and the correct completion of the worksheet. The Discussion Classes meet every Wednesday and your attendance is mandatory. 5 points will be awarded when you attend your TAs zoom session. The worksheet is worth 5 points. A total of 10 points can be earned each week by attending your discussion zoom class and correctly answering the worksheet questions on the canvas quiz (the questions on the canvas quiz are the same but the numbers will be different). The paper worksheets will be posted on Canvas in advance and you may start working on it before you come to discussion. A canvas quiz will open on Thursday and due by 11:59 pm. Any grade discrepancy needs to be addressed within a week of posting grades to canvas to your graduate TA

**HONORLOCK:** Honorlock will proctor your exams this semester. Honorlock is an online proctoring service that allows you to take your exam from the comfort of your home. You DO NOT need to create an account, download software or schedule an appointment in advance. Honorlock is available 24/7 and all that is needed is a computer, a working webcam, and a stable Internet connection.

To get started, you will need Google Chrome and to download the Honorlock Chrome Extension. You can download the extension at [www.honorlock.com/extension/install](http://www.honorlock.com/extension/install)

When you are ready to test, log into Canvas, go to your course, and click on your exam. Clicking "Launch Proctoring" will begin the Honorlock authentication process, where you will take a picture of yourself, show your ID, and complete a scan of your room. You will need a small

handheld mirror so you can show your computer screen to the camera and also show underneath your table or desk. Honorlock will be recording your exam session by webcam as well as recording your screen. Honorlock also has an integrity algorithm that can detect search-engine use, so please do not attempt to search for answers, even if it's on a secondary device.

Good luck! Honorlock support is available 24/7/365. If you encounter any issues, you may contact them by live chat, phone (855-828-4004), and/or email ([support@honorlock.com](mailto:support@honorlock.com)).

**EXAMS:** Exams will be administered at night from 7:00pm to 9:00pm (Eastern time) via Honorlock. Exam questions will consist of questions similar to the HW/PLA/worksheet you have completed on canvas. So expect numeric entry, multiple dropdowns, multiple answer, true/false, multiple choice, matching, and multiple fill in the blanks. You must use a non-graphing non-programmable scientific calculator on exams (with log, ln, root, and exponent (scientific notation) functions).

Any and all exam grade disputes must be performed within one week of the scheduled exam date. 5 points will be deducted from your score if you neglect to sign the Honor Pledge question at the end of every exam.

**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. (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) contact 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) contact the current instructor of the course 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 regarding this policy can be found in the [General Chemistry Exam Absence Policy](#) found on Canvas.)

**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 three Progress Exams will be replaced by the average score of all three of the Progress Exam scores: Example (unapproved absence): Exam 1, 60%; Exam 2, 0%; Exam 3, 90%; Exam 4, 90%; The Progress Exam 2 score (0%) will be replaced by  $\{(60+0+90+90) / 4\} = 60\%$ . Example (poor exam performance): Exam 1, 80%; Exam 2, 40%;



Exam 3, 90%; Exam 4, 90%; The Progress Exam 2 score (40%) will be replaced by  $\{(80+40+90+90) / 4\} = 70\%$

**CONTACTING THE INSTRUCTOR / OFFICE HOURS:** Emails are for administrative purposes only, and not for distance-instruction. All academic inquiries must be made during office hours. If this is not possible, visit the graduate TAs zoom office hours (schedule posted on canvas). Please be prepared before coming to office hours, bring specific questions and your previous work.

**CHEMISTRY LEARNING CENTER (CLC):** There is free help to be had from graduate student teaching assistants via zoom. Your discussion TA will have office hours on zoom. You will also receive zoom links for the other chm2046 graduate TAs so you may attend any TAs zoom office hours. Additionally, there is the teaching center <http://www.teachingcenter.ufl.edu> which offers some resources for being successful in your chm2046 class.

**HONOR CODE:** UF students are bound by The Honor Pledge which states, "We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code. On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: "On my honor, I have neither given nor received unauthorized aid in doing this assignment." The Honor Code (<https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx>) specifies a number of behaviors that are in violation of this code and the possible sanctions. Furthermore, you are obligated to report any condition that facilitates academic misconduct to appropriate personnel. If you have any questions or concerns, please consult with the instructor or TAs in this class.

**5 points will be deducted from your score if you neglect to sign the Honor Pledge question at the end of every exam. You will receive a 0 for the exam AND the average/replace policy will no longer apply if cheating has been detected.**

**CANVAS (<http://elearning.ufl.edu>):** Here you will find the syllabus, gradebook, files, class announcements, and other pertinent info for the course. It is your responsibility to check Canvas often to make sure that you do not miss important announcements and to ensure that your gradebook is accurate. For computer assistance, visit <http://helpdesk.ufl.edu/>.

**DISABILITIES:** Students with disabilities requesting accommodations should first register with the Disability Resource Center (352-392-8565, <http://www.dso.ufl.edu/drc/>) by providing appropriate documentation. Once registered, students will receive an accommodation letter which must be presented to the instructor when requesting accommodation. Students with disabilities should follow this procedure as early as possible.

**UF MULTICULTURAL & DIVERSITY AFFAIRS:** Department within the Division of Student Affairs. Multicultural and Diversity Affairs (MCDA) celebrates and empowers diverse communities and advocates for an inclusive campus for all students across identities. MCDA is located on the second level in the student union. <https://multicultural.ufl.edu/>

**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. 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.

**COUNSELING AND WELLNESS CENTER:** Visit [counseling.ufl.edu/](http://counseling.ufl.edu/) or call 352-392-1575 for information on crisis services as well as non-crisis services.

**UF TEACHING CENTER (CLAS):** Broward Hall, 352-392-2010 or to make an appointment 352-392-6420. General study skills and tutoring. [teachingcenter.ufl.edu/](http://teachingcenter.ufl.edu/)

**INCLUSIVE LEARNING ENVIRONMENT:** We embrace the University of Florida's Non-Discrimination Policy, which reads, "The University shall actively promote equal opportunity policies and practices conforming to laws against discrimination. The University is committed to non-discrimination with respect to race, creed, color, religion, age, disability, sex, sexual orientation, gender identity and expression, marital status, national origin, political opinion or affiliations, genetic information and veteran status as protected under the Vietnam Era Veterans' Readjustment Assistance Act." We are committed to fostering an open and inclusive classroom and laboratory environment in our College, where every student, guest instructor and contributor feels valued. If you have questions or concerns about your rights and responsibilities for inclusive learning environment, please see your instructor or refer to the Office on Multicultural & Diversity Affairs Website: <http://www.multicultural.ufl.edu/>

**EVALUATIONS:** Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals. Guidance on how to give feedback in a professional and respectful manner is available at <https://gatorevals.aa.ufl.edu/students/>. Students will be notified when the evaluation period opens, and can complete evaluations through the email they receive from GatorEvals, in their Canvas course menu under GatorEvals, or via <https://ufl.bluera.com/ufl/>. Summaries of course evaluation results are available to students at <https://gatorevals.aa.ufl.edu/public-results/>."



**GENERAL EDUCATION REQUIREMENTS:** This course satisfies the general education program requirements for the physical sciences at the University of Florida. More information regarding the program objectives, student learning outcomes, and specific goals for CHM2045/CHM2046 can be found in the *General Education Program Requirements* document found on Canvas.

**CRITICAL THINKING:** Critical thinking skills are essential in the general chemistry course. There are six criteria by which we promote critical thinking: 1. Information acquisition: Identifying and differentiating questions, problems, and arguments. 2. Application: Assessing the suitability of various methods of reasoning and confirmation when approaching a problem. Students are taught to develop hypotheses and to find support and limitations associated with their hypotheses. 3. Analysis: Identifying and analyzing stated and unstated assumption and using logical reasoning to evaluate different viewpoints. 4. Synthesis: Students are encouraged to formulate questions and problems, construct arguments to address such questions and be able to effectively communicate conclusions. 5. Communication: In discussion of alternative points of view, students will be encouraged to criticize or defend their arguments with the use of logical reasoning and evidence. 6. Evaluation: Assessing the quality of evidence and reasoning to draw reasonable conclusions.

**MATHEMATICS:** It is crucial in the general chemistry course to be competent in mathematics. Listed are the criteria by which we promote understanding and application of math: 1. Information acquisition: Students learn to select data that is pertinent to solving a problem. 2. Application: Use of algebraic, geometric, and statistical reasoning to solve problems. 3. Analysis: Interpret and draw conclusions from formulas, graphs, and tables. 4. Synthesis: To associate patterns and observations to more abstract principles and to consider specific applications of such principles. 5. Communication: Communicating information symbolically, graphically, numerically, and verbally. 6. Evaluation: Estimate and verify solutions to mathematical problems to determine reasonableness, compare alternatives and select optimal results and understand the limitations of mathematical and statistical methods.

**COLLEGE CHEMISTRY STUDY TIPS:** Success in college-level chemistry primarily requires two things: A strong conceptual understanding of the material, and a competent mastery of quantitative problem-solving strategies that are required to successfully answer word problems that are typical on exams. This means that you must read your textbook and PowerPoint slides and understand them. Then you **MUST PRACTICE** problems in your textbook and on Canvas so that you can diagnose your own strengths and weaknesses with the material. The more practice with problems that you do, the more likely you will recognize and know how to approach different kinds of problems, even if you have never seen identical questions before. Use the following suggestions as a guide:

1. Attempt each of the end-of-chapter problems one at a time, then check their solutions.

2. If you succeeded in getting the correct answer the first time without looking at the solution, check off that problem in the book, and if you did not succeed in getting the correct answer the first time without looking at the solution, circle the problem number.
3. Re- attempt the circled problems the next day or a few days later to see if you get the correct answer without looking at the solution.
4. Repeat steps 2 and 3 if necessary. Never assume that you have understood or succeeded at a problem until you have obtained the CORRECT answer all on your own and NEVER merely look at the solutions and say "oh yeah, I see what I did wrong", and move on.

Merely "doing all the problems at the end of the chapters" does not equal "doing all the problems at the end of the chapters correctly". The aim is not only to work hard, but to also work productively.

Giving yourself a "grade" after each session will keep you mentally on track regarding how you are performing at that time.

**ADDITIONAL STUDY HABITS:** Any Chemistry course demands a regular sustained effort throughout the semester. This course requires on average 6 – 8 hours per week of work outside of lecture. You are expected to read the appropriate pages from the textbook (or similar chapters in other textbooks) prior to coming to class. The instructor will build on this material and you are expected to be able to follow in-class discussion. Mastering this course is primarily your responsibility and I am here to help you at all times in your endeavor to be successful. One of the most important things that you should learn while in college is that you must learn to identify your own weaknesses and strengths with the material in your courses and work on those weaknesses by displaying a sense of responsibility for your own learning.

Most importantly, do not allow yourself to fall behind because the material builds up. If you find that you are not grasping essential material by reading the textbook and following in-class discussion, seek help early! Visit your instructor's office hours, talk to other students in your class, compare notes, form a study group, practice as many problems as you can, consult other textbooks, go to the CLC (grad TAs zoom office hours), *etc.*

Cramming overnight will not guarantee a favorable result.

**Disclaimer:** This syllabus represents our current plans and objectives. If those need to change as the semester progresses, then the changes will be communicated to the class clearly via announcements on Canvas.