

# CHM2046 GENERAL CHEMISTRY II

FALL 2023

## INSTRUCTOR INFORMATION

Instructors	Email/Office/Phone	Office Hours
<b>Dr. Steven Harris</b> <b>Assistant Instructional Professor</b>	<a href="mailto:Steven.harris@chem.ufl.edu">Steven.harris@chem.ufl.edu</a> 352-273-3717 SFH 302A	TBA
<b>Dr. Anna Toth</b> <b>Associate Professor</b>	<a href="mailto:atoth@chem.ufl.edu">atoth@chem.ufl.edu</a> 352-392-7972	

## TEACHING ASSISTANTS

Grad TAs: TBA

Email: TBA

Office hours: TBA

Undergraduate TAs: TBA

## COURSE DELIVERY/MEETING TIMES

The course is delivered in a face to face format. Instructors *may* decide to offer Zoom/HyFlex options for lecture times only but are not required to do so. Discussion sections are held only in-person in assigned classrooms at assigned class meeting times. Exams are evening assembly exams, on campus, rooms TBA, periods E2-E3.

## COURSE FEES

Additional Course Fees: none

## GENERAL INFORMATION

### PREREQUISITES

Please refer to the [Undergraduate Catalog](#) for placement and prerequisite information.

### COURSE DESCRIPTION AND GOALS

The second semester of the CHM 2045/CHM 2045L and CHM 2046/CHM 2046L sequence. Kinetics review, acids and bases, additional aspects of chemical equilibria, thermodynamics, electrochemistry, complex ions and descriptive chemistry. (P).

As both a general education requirement and major's course CHM 2046 serves to teach the scientific method, skills for problem solving, general chemistry knowledge, and a connection to the principles that govern the natural world.

## FIRST DAYS

Log into Canvas and access the course. You should check daily for new Announcements and/or emails containing important information. Your instructor has provided information in Canvas on recommended study habits/skills to help you succeed in the course.

## GENERAL EDUCATION OBJECTIVES AND LEARNING OUTCOMES

Primary General Education Designation: Physical Sciences (P) ([area objectives available here](#))

A minimum grade of C is required for general education credit. Courses intended to satisfy the general education requirement cannot be taken S/U.

Physical science courses provide instruction in the basic concepts, theories and terms of the scientific method in the context of the physical sciences. Courses focus on major scientific developments and their impacts on society, science and the environment, and the relevant processes that govern physical systems. Students will formulate empirically-testable hypotheses derived from the study of physical processes, apply logical reasoning skills through scientific criticism and argument, and apply techniques of discovery and critical thinking to evaluate outcomes of experiments.

In General Chemistry II, these objectives will be met as detailed below.

At the end of this course, students will be expected to have achieved the following learning outcomes in content, communication, and critical thinking:

**Content:** *Students demonstrate competence in the terminology, concepts, theories and methodologies used within the discipline.* Students will acquire a basic knowledge of a variety of chemistry concepts including those related to equilibrium, chemical thermodynamics, and complex ions. Achievement of this learning outcome will be assessed largely through assigned homework problems, and quizzes and exams.

**Communication:** *Students communicate knowledge, ideas, and reasoning clearly and effectively in written and oral forms appropriate to the discipline.* Students participate in class discussions throughout the semester to reflect on pertinent topics. Achievement of this learning outcome is realized through discussion sessions and/or office hours during which students formulate questions, construct arguments, and use logical reasoning to draw reasonable conclusions.

**Critical Thinking:** *Students analyze information carefully and logically from multiple perspectives, using discipline-specific methods, and develop reasoned solutions to problems.* Students apply mathematical knowledge and reasoning to solve chemical problems. This may entail use of algebra, basic geometry, and graphical analysis. Achievement of this learning outcome is largely assessed via worksheets, assigned homework problems, and quizzes and exams.

## COURSE LEARNING OUTCOMES

A complete list of student learning outcomes is posted in Canvas, organized by module/chapter.

## REQUIRED & RECOMMENDED COURSE MATERIALS

### TEXTBOOK (ONLINE EBOOK WITH HW; REQUIRED IN FULL)

The text Chemistry: The Molecular Nature of Matter and Change, 9<sup>th</sup> ed., Silberberg & Amateis (McGraw Hill) is required. Access to the textbook is via the ALEKS platform, accessed through a link in your Canvas course. A portion of your grade may stem from electronic homework (ALEKS) via the same link. You must purchase ALEKS360 (both the text and electronic homework) for the course.

There are two options for purchasing access to homework/ebook: **Option 1**: consent to have the purchase price charged to your student account following the directions posted on the course homepage in Canvas; this is a time-limited option after which only Option 2 is available. **Option 2**: purchase an access code for the materials at the UF Bookstore (at a slightly higher price).

To opt in, navigate to: <https://bsd.ufl.edu/allaccess>. Click the "Opt In" tab or view the "View Eligible UF All Access Classes" button. You will be prompted to log in using Gatorlink credentials. Follow the prompt to authorize charges to your student account. The access code will then be provided. Copy the access code to your clipboard. In the Canvas course, click on the ALEKS module, and provide the access code when prompted to do so. If you have any questions about the authorization process or refunds contact [Included@bsd.ufl.edu](mailto:Included@bsd.ufl.edu).

A paperback version of the text is completely optional. The bookstore may stock paper versions of the text, or you can order one directly through the McGraw Hill website. A paper version is on reserve at the Marston Science Library for reference purposes.

All other assigned material will be available through Canvas.

### CALCULATOR (REQUIRED, MUST PURCHASE)

You will require a calculator capable of logarithmic functions. For exams, the calculator must be non-graphing and non-programmable.

## COURSE COMMUNICATIONS

### GENERAL QUESTIONS

General course questions should be posed to your instructor during office hours, or to TAs during their office hours or during discussion sessions.

### PRIVATE OR GRADE-RELATED QUESTIONS

Direct these to your instructor via the mail function in Canvas. Do not email outside of Canvas to your instructor's external email address – we aren't permitted to discuss grade related questions outside of Canvas. You will be asked to resend the query through Canvas. Instructor response time to email queries is <48 h during the workweek, or the first business day for emails received Friday or over the weekend.

## COURSE POLICIES

### 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 matter must be provided for at least five of the seven days of the week of the assignments' deadline for accommodations to be considered.

### PRE-LECTURE ASSIGNMENTS (PLAS)

You are expected to complete pre-lecture assignments in preparation for each class day. These assignments are based on the reading in the required textbook and on the sample problems therein. These assignments will be posted on Canvas under the quizzes tab and are due prior to class. You will have multiple attempts to successfully answer the pre-lecture assignments. Up to three of these assignment grades are dropped from your overall course grade.

### DISCUSSION SESSIONS & WORKSHEETS

Discussion classes meet per your scheduled day/time, and attendance is mandatory. A total of 10 points can be earned each week by attending your discussion class (5 points) and correctly answering the worksheet questions in Canvas (5 points). Open/close times of the Canvas quiz varies by day of discussion. The paper worksheets will be posted on Canvas in advance, and you may start working on it before you come to discussion. Grade discrepancies should be addressed with your graduate TA within a week of grades posting to Canvas. One assignment will be dropped from this category before calculating your final grade.

### ALEKS HOMEWORK

ALEKS HW are due frequently. You have multiple attempts to answer questions correctly.

### ALEKS QUIZZES

ALEKS quizzes are graded and are designed to act as a readiness check for exams.

### IClicker

iClicker is a classroom response system used for in-class participation during lectures. Several points are dropped before calculating the final iClicker score for each student. Detailed will be announced at a later date in Canvas.

### AFTER LECTURE QUIZZES AND CANVAS HOMEWORK (OPTIONAL/FOR PRACTICE)

After-lecture quizzes after each day's lecture. These quizzes are posted on Canvas (and under Modules for each chapter) and are due at the end of the lecture day by 11:59 pm. You will have 3 attempts to successfully answer the quizzes.

Several optional homework assignments are available for each chapter to help you understand the material. The homework is posted in Canvas. You have multiple attempts to successfully answer the questions. These are not worth any points.

You should also work on numerous End-of-Chapter questions (EOCs).

## EXAMS

Exams occur in the evenings, periods E2-E3, in exam rooms TBA. Exam Dates are TBA. You are permitted use of a non-graphing non-programmable scientific calculator. Notes, cell phones or other electronic devices are not permitted. Scantrons, formula sheet, and blank paper are provided.

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### PROGRESS EXAM “AVERAGE/REPLACE” POLICY

This applies to all students. No progress exam score will be dropped for any reason. To alleviate the stress of potential issues that do not fall under officially sanctioned absences, we have incorporated an “average/replace” policy: the lowest of the three progress exams will be replaced by the average of the three progress exams. This policy helps to minimize the impact of a single poor performance (it will not disappear, but will be minimized). For example, if a student scores the following on their three progress exams: 0%, 65%, 80%, the 0% would be replaced with the average of 0, 65 and 80, which is 48%. That is a much better score than a 0.

A significant penalty is assessed for student failure to bubble in the correct form code on the scantron.

### POSTED GRADE DISPUTES

Should a student wish to dispute any grade received in this class, the dispute must be in writing (via Canvas e-mail to *your* instructor) and submitted within one week of the grade being posted to Canvas. After one week has passed from when the grade was posted and the student made aware of the posting of the grade(s) to Canvas, the instructor considers those grades final.

### ATTENDANCE, EXTENSION REQUESTS

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/UGRD/academic-regulations/attendance-policies/>

Exam absences will be handled in accordance with official UF academic regulations. For more information, see <https://catalog.ufl.edu/UGRD/academic-regulations/> . See below for further clarification for two different types of situations.

(1) Conflicts with other events: acceptable reasons may include religious holidays, military obligations, special curricular requirements (e.g., attending professional conferences), or participation in official UF-sanctioned activities such as athletic competitions, etc. For more information on such absences see the official UF Policy at <https://catalog.ufl.edu/UGRD/academic-regulations/attendance-policies/#absencestext> ). If you must be absent for an exam due to a documented and approved conflict known in advance, you must e-mail your instructor (within Canvas) the documentation at least one week prior to the scheduled exam and an early conflict exam will be scheduled for you.

(2) Missing an exam due to an emergency or sudden illness: If you are absent for an exam due to an unpredicted documented medical reason or family emergency, you must contact the instructor as soon as possible, and you may be asked to have your excuse verified by the Dean of Students Office (DSO). Your instructor will follow UF academic regulations in evaluating the notification and/or documentation received from you or from the DSO on your behalf. Once your instructor is satisfied with the validity of your exam absence a make-up exam will be scheduled after a reasonable amount of time, i.e., before the end of the semester. If your documentation is deemed insufficient to excuse your absence you will receive a zero on the missed exam.

## 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.

## GRADING

### GRADE POLICY

There is no extra credit available for this course. Grades are not rounded at the end of term. Exam grades or course grades are not curved. Current UF grading policies for assigning grade points can be found in [the catalog](#).

Assignments weights will resemble the following:

Assignment Group	Weight %
Progress Exams	60%
Final Cumulative Exam	23%
Homework	4%
Quizzes	3%
iClicker	1%
Pre-Lecture Assignments/Lectures	4%
Discussion/Worksheets	5%
<b>TOTAL</b>	<b>100%</b>

Grade scale will resemble the following (note: there is no rounding to your score in Canvas):

Letter	A	A-	B+	B	B-	C+	C	D+	D	D-	E
Cutoff	90.0	86.0	83.0	80.0	77.0	73.0	69.0	66.0	63.0	60.0	< 60.0

## UNIVERSITY POLICIES

### STUDENTS REQUIRING ACCOMMODATIONS

Students with disabilities who experience learning barriers and would like to request academic accommodations should connect with the Disability Resource Center by visiting [disability.ufl.edu/students/get-started](http://disability.ufl.edu/students/get-started). It is important for students to share their accommodation letter with their instructor and discuss their access needs, as early as possible in the semester.

Accommodations are not retroactive, therefore, students should contact the office as soon as possible in the term for which they are seeking accommodations.

## UNIVERSITY POLICY ON ACADEMIC MISCONDUCT

As a student at the University of Florida, you have committed yourself to uphold the Honor Code, which includes the following pledge: “We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honesty and integrity.” You are expected to exhibit behavior consistent with this commitment to the UF academic community, and on all work submitted for credit 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.” It is assumed that you will complete all work independently in each course unless the instructor provides explicit permission for you to collaborate on course tasks (e.g. assignments, papers, quizzes, exams). Furthermore, as part of your obligation to uphold the Honor Code, you should report any condition that facilitates academic misconduct to appropriate personnel. It is your individual responsibility to know and comply with all university policies and procedures regarding academic integrity and the Student Honor Code. Violations of the Honor Code at the University of Florida will not be tolerated. Violations will be reported to the Dean of Students Office for consideration of disciplinary action. For more information regarding the Student Honor Code, please see: <http://www.dso.ufl.edu/SCCR/honorcodes/honorcode.php>.”

## IN-CLASS RECORDING

Students are allowed to record video or audio of class lectures. However, the purposes for which these recordings may be used are strictly controlled. The only allowable purposes are (1) for personal educational use, (2) in connection with a complaint to the university, or (3) as evidence in, or in preparation for, a criminal or civil proceeding. All other purposes are prohibited. Specifically, students may not publish recorded lectures without the written consent of the instructor. A “class lecture” is an educational presentation intended to inform or teach enrolled students about a particular subject, including any instructor-led discussions that form part of the presentation, and delivered by any instructor hired or appointed by the University, or by a guest instructor, as part of a University of Florida course. A class lecture does not include lab sessions, student presentations, clinical presentations such as patient history, academic exercises involving solely student participation, assessments (quizzes, tests, exams), field trips, private conversations between students in the class or between a student and the faculty or lecturer during a class session. Publication without permission of the instructor is prohibited. To “publish” means to share, transmit, circulate, distribute, or provide access to a recording, regardless of format or medium, to another person (or persons), including but not limited to another student within the same class section. Additionally, a recording, or transcript of a recording, is considered published if it is posted on or uploaded to, in whole or in part, any media platform, including but not limited to social media, book, magazine, newspaper, leaflet, or third party note/tutoring services. A student who publishes a recording without written consent may be subject to a civil cause of action instituted by a person injured by the publication and/or discipline under UF Regulation 4.040 Student Honor Code and Student Conduct Code.

## CAMPUS RESOURCES

U Matter, We Care: If you or someone you know is in distress, please contact [umatter@ufl.edu](mailto:umatter@ufl.edu), 352-392-1575, or visit [U Matter, We Care website](#) to refer or report a concern and a team member will reach out to the student in distress.

Counseling and Wellness Center: Visit the [Counseling and Wellness Center website](#) or call 352-392-1575 for information on crisis services as well as non-crisis services.

Student Health Care Center: Call 352-392-1161 for 24/7 information to help you find the care you need, or visit the [Student Health Care Center website](#).

University Police Department: Visit [UF Police Department website](#) or call 352-392-1111 (or 9-1-1 for emergencies).

UF Health Shands Emergency Room / Trauma Center: For immediate medical care call 352-733-0111 or go to the emergency room at 1515 SW Archer Road, Gainesville, FL 32608; Visit the [UF Health Emergency Room and Trauma Center website](#).

GatorWell Health Promotion Services: For prevention services focused on optimal wellbeing, including Wellness Coaching for Academic Success, visit the [GatorWell website](#) or call 352-273-4450.

## ACADEMIC RESOURCES

E-learning technical support: Contact the [UF Computing Help Desk](#) at 352-392-4357 or via e-mail at [helpdesk@ufl.edu](mailto:helpdesk@ufl.edu).

[Career Connections Center](#): Reitz Union Suite 1300, 352-392-1601. Career assistance and counseling services.

[Library Support](#): Various ways to receive assistance with respect to using the libraries or finding resources.

[Teaching Center](#): Broward Hall, 352-392-2010 or to make an appointment 352- 392-6420. General study skills and tutoring.

[Writing Studio](#): 2215 Turlington Hall, 352-846-1138. Help brainstorming, formatting, and writing papers.

Student Complaints On-Campus: Visit the [Student Honor Code and Student Conduct Code webpage](#) for more information.

On-Line Students Complaints: View the [Distance Learning Student Complaint Process](#).

## FEEDBACK

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/>.

## GETTING HELP



For issues with or technical difficulties with Canvas, contact the UF Help Desk:  
<https://lss.at.ufl.edu/help.shtml>; (352)-392-HELP.

## 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/>

## DISCLAIMER

This syllabus represents my current plans and objectives. As we go through the semester, those plans may need to change to enhance the class learning opportunity. Such changes, communicated clearly, are not unusual and should be expected.

## TENTATIVE SCHEDULE

The following lecture schedule is tentative, but exam dates will not change.

Date	Topic	Before class	Silberberg 8 <sup>th</sup> Chapters*
Aug. 23	Kinetics; rate law, integrated rate law, rate constant, mechanisms, theories of chem kinetics	Read syllabus, check out canvas,	Ch. 16.1-4
Aug. 25	Kinetics; mechanisms, theories of chem kinetics	PLA Ch. 16.6/7	Ch. 16.5-7
Aug. 28	Chemical Equilibrium; K and Q	PLA Ch. 17.1/2	Ch. 17.1-2
Aug. 30	Chem eq; relation between K <sub>c</sub> and K <sub>p</sub> , comparing Q and K	PLA Ch. 17.3/4	Ch. 17.3-4
Sept. 1	How to solve eq problems	PLA Ch. 17.5	Ch. 17.5
<b>Sept. 4</b>	<b>Labor Day</b>		
Sept. 6	More solving eq problems, LeChatelier's principle	PLA Ch. 17.5/6	Ch. 17.5-6
Sept. 8	LeChatelier's principle	PLA Ch. 17.6	Ch. 17.6

Sept. 11	Acid-Base Eq.; autoionization of water, pH scale	PLA Ch. 18.1/2	Ch. 18.1-2
Sept. 13	Bronsted-Lowry acid/base definitions	PLA Ch. 18.3	Ch. 18.3
Sept. 15	Solving problems involving weak acid eq.	PLA Ch. 18.4	Ch. 18.4
Sept. 18	Molecular properties and acid strength; weak bases	PLA Ch. 18.5/6	Ch. 18.5-6
Sept. 20	Acid-Base Properties of Salt solutions	PLA Ch. 18.7	Ch. 18.7
Sept. 22	Lewis Acid-Base definitions, electron-pair donation	PLA Ch.18.8/9	Ch. 18.8-9
Sept. 25	Buffers	PLA Ch. 19.1	Ch. 19.1
<b>Sept. 25</b>	<b>Exam 1</b>		<b>Chapters 16-18</b>
Sept. 27	Buffer capacity and preparation; Strong acid/strong base titration curve	PLA Ch. 19.2(1)	Ch. 19.1-2
Sept. 29	Weak acid/strong base; weak acid/weak base, polyprotic acids	PLA Ch. 19.2(2)	Ch. 19.2
Oct. 2	Equilibria of slightly soluble ionic compounds, $K_{sp}$	PLA Ch. 19.3(1)	Ch. 19.3
Oct.4	Predicting ppt formation, selective ppt	PLA Ch. 19.3(2)	Ch. 19.3
Oct.6	Equilibria involving complex ions	PLA Ch. 19.4	Ch. 19.4
Oct. 9	Thermodynamics; 2 <sup>nd</sup> law, entropy	PLA ch 20.1	Ch 20.1
Oct.11	Calculating the change in entropy	PLA ch 20.2	Ch 20.2
Oct.13	Entropy, free energy, and work	PLA ch 20.3	Ch 20.3
Oct. 16	Free energy, equilibrium and reaction directions	PLA ch 20.4	Ch 20.4
Oct. 18	Electrochemistry; balancing redox reactions	PLA ch 21.1	Ch 21.1
Oct. 20	Voltaic cells, cell construction and operation, notation	PLA ch 21.2	Ch 21.2
Oct. 23	Voltaic cell potential, $E^\circ$	PLA ch 21.3	Ch 21.3
<b>Oct. 25</b>	<b>Exam 2</b>		<b>Chapters 19, 20</b>

Oct. 27	Free Energy and Electrical Work, Corrosion	PLA ch 21.4	Ch 21.4/6
Oct. 30	Electrolytic cells	PLA ch 21.7	Ch 21.6/7
Nov. 1	Transition elements; properties of transition elements and inner elements	PLA Ch. 23.1/2/3	Ch. 23.1-3
Nov. 3	Coordination compounds, formulas and names	PLA Ch. 23.3	Ch. 23.3
Nov. 6	Crystal field theory	PLA Ch. 23.4	Ch. 23.4
Nov. 8	Nuclear reactions; radioactive decay and nuclear stability	PLA 24.1	Ch 24.1
<b>Nov. 10</b>	<b>Veteran's Day</b>		
Nov. 13	The Kinetics of radioactive decay	PLA 24.2	Ch. 24.2
Nov. 15	Ionization, application of radioisotopes,	PLA 24.3/4/5	Ch 24.3-5
Nov. 17	The Interconversion of mass and energy	PLA 24.6	Ch. 24.6
Nov. 20	Application of fission and fusion	PLA 24.7	Ch. 24.7 and review
<b>Nov. 22</b>	<b>Thanksgiving Break</b>		
<b>Nov. 24</b>	<b>Thanksgiving Break</b>		
<b>Nov. 27</b>	<b>Exam 3</b>		<b>Chapters 21, 23, &amp; 24</b>
Nov. 29	Organic chemistry, structure and classes of hydrocarbons, optical isomers	PLA 15.1/2	Ch 15.1-2
Dec. 1	Some important classes of organic reactions, functional groups	PLA 15.3	Ch 15.3
Dec. 4	Functional groups	PLA 15.4	Ch 15.4
Dec. 6	Review for final exam		
<b>Dec. 8</b>	<b>Reading Day 2</b>		
Dec. 10	<b>Final Comprehensive Exam</b>		Cumulative