

CHM2046 – GENERAL CHEMISTRY II – SUMMER 2024

10547, 10548, 10549, 10550, 10551, 10552, 10553, 10554, 10555

COURSE DELIVERY: This course will be delivered in a **synchronous HyFlex format**. The lectures will be held in CLB130 from 9:30 to 10:35 AM on Mondays, Tuesdays, Wednesdays, and Fridays. Students can attend in person or via Zoom. The Zoom link is posted on the Canvas course homepage at the top. Discussion sections will be held in-person. Your discussion section will meet on Thursdays as per your schedule in ONE.UF. Exams are in-person.

INSTRUCTORS INFORMATION

Instructors	Email/Office/Phone	Student Hours
Dr. Martina Sumner Associate Instructional Professor I value your input regarding making this course more accessible and inclusive. Please reach out with suggestions.	Email in Canvas preferred m.sumner@chem.ufl.edu 352-392-0517 Keene Flint 250	MTWF 10:45 to 11:30 am All office hours will meet in 258 Keene-Flint I welcome you to contact me outside of class and student hours. You may email me via canvas and/or see me before or after class.
Dr. Steven Harris Assistant Instructional Professor I value your input regarding making this course more accessible and inclusive. Please reach out with suggestions.	Email in Canvas only steven.harris@chem.ufl.edu Scott Family Hall, 302A 352-273-3717	MTWF 10:45 to 11:30 am All office hours will meet in 258 Keene-Flint I welcome you to contact me outside of class and student hours. You may email me via canvas and/or see me before or after class.

TEACHING ASSISTANTS

Grad TAs/Email addresses:

Student hours: TBA

[Academic Resources](#) offers free tutoring assistance. See their website for details.

COURSE DELIVERY/MEETING TIMES

- face-to-face in CLB130 MTWF (zoom option available, link at the top of the homepage in canvas)
- discussion section (Thursday class) in-person
- Exams in-person only (DTE – evening assembly exams), 7-9 PM

MATERIALS: The text Chemistry: The Molecular Nature of Matter and Change, 9th 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 is determined from electronic adaptive 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.

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.

Iclicker for answering clicker questions during lecture (free).

Calculator: You will require a calculator capable of logarithmic functions. For exams, the calculator must be non-graphing and non-programmable. The calculator you had for chm2045 should be fine. A TI-36 does do quadratic functions and will be useful.

CALCULATOR (REQUIRED, MUST PURCHASE)

- TI-36 good calculator, has quadratic functions and is most like TI-83, need logarithmic function

COURSE COMMUNICATIONS

GENERAL QUESTIONS

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

PRIVATE OR GRADE-RELATED QUESTIONS

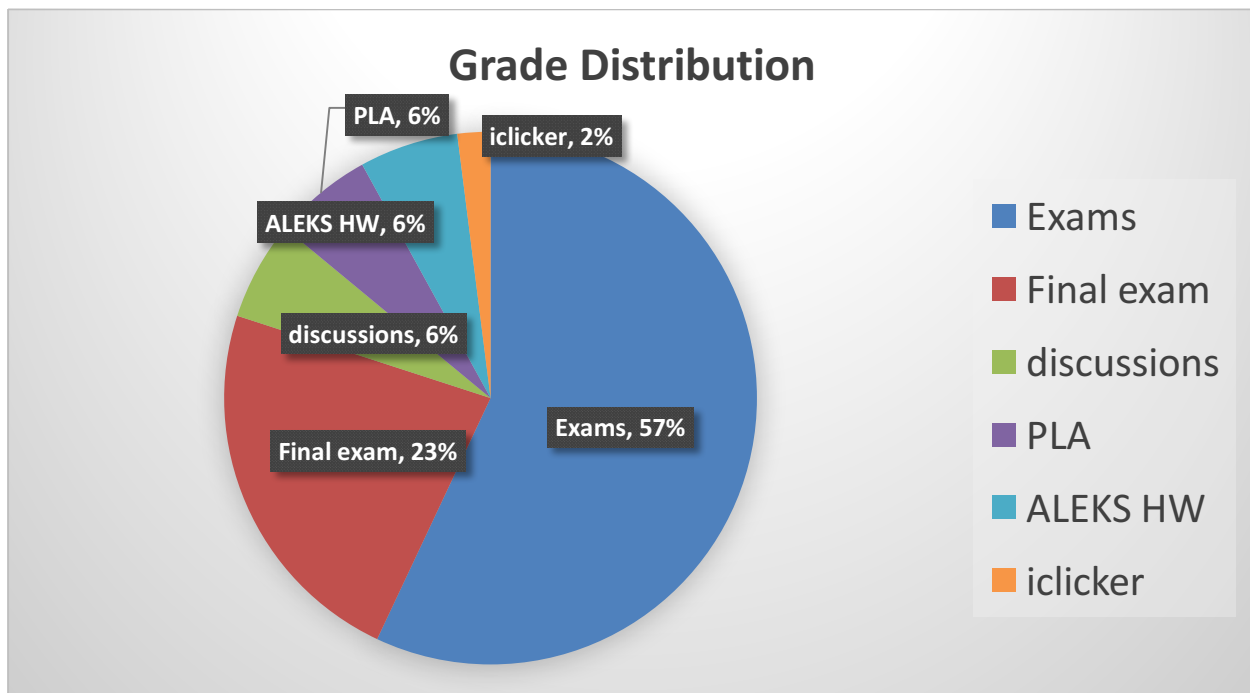
Direct these to your instructor via the mail function in Canvas. Do not email outside of Canvas to your instructor’s external email address – we aren’t permitted to discuss grade related questions outside of Canvas. You will be asked to resend the query through Canvas. Instructor response time to email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

GRADING

GRADE POLICY

- Grades are not rounded at the end of the semester.
- No extra credit available
- Current UF grading policies for assigning grade points can be found in [the catalog](#).
- Assignments weights are as follows:

Assignment Group	Weight %
Progress Exams	57%
Final Cumulative Exam	23%
Discussion/Worksheets	6%
PLA	6%
HW ALEKS	6%
iClicker	2%
TOTAL	100%



Grade scale (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

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. Unfortunately, life happens and you may need extra time to complete an assignment. Let me know so we can come up with a solution. All ALEKS assignments are due when the ALEKS website states. To get the most out of these assignments they need to be completed on time to keep your learning material on track

EXAMS

- Exams are at night (7-9 PM)
- Exam dates in the schedule (at the end of the syllabus)
- Scantrons, formula sheet, and blank scratch paper are provided.
- Bring pencils and eraser.
- Use an allowable non-graphing, non-programmable scientific calculator.
- Turn your cell phones and other electronic devices off and keep in your bag.

PROGRESS EXAM "AVERAGE/REPLACE" POLICY

- Applies to all students.
- No dropped progress exam.
- Average/replace policy (lowest of the 3 progress exams replaced by the average of the 3 exams) see below for an example

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.

- 30 points deducted if you bubble in the incorrect or no form code
- 5 points deducted if you are in the incorrect room or your name is on the no-match list from the scanning center

PRE-LECTURE ASSIGNMENTS (PLA)

- PLAs prepare you for that day's class (read the assigned sections in the book, work the sample problem in the book, then attempt PLA)
- 3 attempts, highest one will count
- Due before class so you are ready for class.

- 3 of the PLA assignments will be dropped before calculating your overall grade

CANVAS HOMEWORK AND ALEKS OPT HW (OPTIONAL/FOR PRACTICE)

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).

DISCUSSION SESSIONS & WORKSHEETS

- Thursday discussion class (in-person)
- Paper version available under Modules, suggestion: do before attending your discussion section
- Attendance and participation will earn you 5 points.
- Friday wksheet quiz on canvas will earn you 5 points (3 attempts)
- Grade discrepancies: address to your grad TA within one week
- One assignment will be dropped from this category.

Worksheets problems are similar to exam problems and prepare you for the actual exam.

ALEKS HOMEWORK (HW)

- HW in ALEKS for each class day
- Time to completion: 0.5 to 2 hours
- Multiple attempts
- Three assignments dropped in this category.

IClicker

- Keeps you engaged and active in the classroom.
- 3 days (about 9 points) are dropped before calculating your final iclicker grade.

POSTED GRADE DISPUTES

- In writing via email to instructor
- Within one week of posting grade

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

- UF is a Carnegie I research-intensive university.
- Federal law requires UF to assign at least 2 hours of work per week outside of class for every contact hour

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.

Some of the specific skills I hope you will obtain in this course are listed below:

The course objectives align with the UF General Education student learning outcomes and physical science area learning outcomes:

General Education SLO	Physical Science SLO	Course Objective Alignment	Assessment
Content	Identify, describe, and explain the basic concepts, theories and terminology of natural science and the scientific method; the major scientific discoveries and the impacts on	Objectives 1-6	All assessments and student practice assignments offer opportunities for students to demonstrate content knowledge.

	society and the environment; and the relevant processes that govern biological and physical systems.		
Critical Thinking	Formulate empirically-testable hypotheses derived from the study of physical processes or living things; apply logical reasoning skills effectively through scientific criticism and argument; and apply techniques of discovery and critical thinking effectively to solve scientific problems and to evaluate outcomes.	Objectives 1-6	Pre-lecture assignments (PLA), After-lecture assignments (ALQ), discussion class (worksheet), worksheet quiz on canvas, weekly quiz, exam
Communication	Communicate scientific knowledge, thoughts, and reasoning clearly and effectively.	Objective 3-6	Weekly discussion class, worksheet quiz on canvas

COURSE LEARNING OUTCOMES

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

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. 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

- ❖ Class is recorded and is available for viewing via mediasite (link is on the bottom of the home page)

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

Please visit the campus resources link in Canvas for a more comprehensive list.

1. **U MATTER, WE CARE:** If you or someone you know is in distress, please contact 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.
2. **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.

3. 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](#).
4. UNIVERSITY POLICE DEPARTMENT: Visit [UF Police Department website](#) or call 352-392-1111 (or 9-1-1 for emergencies).
5. 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](#).
6. 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

1. E-LEARNING TECHNICAL SUPPORT: Contact the [UF Computing Help Desk](#) at 352-392-4357 or via e-mail at helpdesk@ufl.edu.
2. CAREER CONNECTIONS CENTER: Reitz Union Suite 1300, 352-392-1601. Career assistance and counseling services.
3. LIBRARY SUPPORT: Various ways to receive assistance with respect to using the libraries or finding resources.
4. ACADEMIC RESOURCES CENTER: Broward Hall, 352-392-2010 or to make an appointment 352- 392-6420. General study skills and tutoring.
5. WRITING STUDIO: 2215 Turlington Hall, 352-846-1138. Help brainstorming, formatting, and writing papers.
6. STUDENT COMPLAINTS ON-CAMPUS: Visit the [Student Honor Code and Student Conduct Code webpage](#) for more information.
7. 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/>

COURSE FEES

Additional Course Fees: none

ABBREVIATIONS: HW: Homework (optional on canvas), PLA: Pre-lecture assignment (required), LA: Lecture assignment (optional), ALEKS: Assessment and Learning in Knowledge Spaces

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.

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

Class date	Topic	Before class	After class (optional)	Silberberg 9 th Chapters*
May 13	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 14	Chemical Equilibrium; K and Q	PLA Ch. 17.1/2	HW ch 17.1/2	Ch. 17.1-2
May 15	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 17	How to solve eq problems	PLA Ch. 17.5	HW Ch. 17(1)	Ch. 17.5
May 20	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 21	LeChatelier's principle	PLA Ch. 17.6	HW ch 17.6, HW ch 17.6 (1)	Ch. 17.6
May 22	Acid-Base Eq.; autoionization of water, pH scale	PLA Ch. 18.1/2	HW Ch 18	Ch. 18.1-2
May 24	Bronsted-Lowry acid/base definitions	PLA Ch. 18.3	HW Ch 18(1)	Ch. 18.3
May 27	HOLIDAY			
May 28	Solving problems involving weak acid eq.	PLA Ch. 18.4	HW Ch 18.(2)	Ch. 18.4
May 29	Molecular properties and acid strength; weak bases	PLA Ch. 18.5/6		Ch. 18.5-6
May 31	Acid-Base Properties of Salt solutions	PLA Ch. 18.7		Ch. 18.7
June 3	Lewis Acid-Base definitions, electron-pair donation	PLA Ch.18.8/9	HW Ch. 18	Ch. 18.8-9
June 3	Exam 1 (ch 16-18)			
June 4	Buffers	PLA Ch. 19.1		Ch. 19.1
June 5	Buffer capacity and preparation; Strong acid/strong base titration curve	PLA Ch. 19.2(1)	HW Ch. 19.1	Ch. 19.1-2
June 7	Weak acid/strong base; weak acid/weak base, polyprotic acids	PLA Ch. 19.2(2)	HW Ch. 19.2	Ch. 19.2
June 10	Equilibria of slightly soluble ionic compounds, K _{sp}	PLA Ch. 19.3(1)		Ch. 19.3
June 11	Predicting ppt formation, selective ppt	PLA Ch. 19.3(2)	HW Ch. 19.3	Ch. 19.3
June 12	Equilibria involving complex ions	PLA Ch. 19.4		Ch. 19.4
June 14	Thermodynamics; 2 nd law, entropy	PLA ch 20.1		Ch 20.1
June 17	Calculating the change in entropy	PLA ch 20.2	HW ch 20.1/2	Ch 20.2
June 18	Entropy, free energy, and work	PLA ch 20.3	HW ch 20.3	Ch 20.3
June 19	HOLIDAY			
June 21	Free energy, equilibrium, and reaction directions	PLA ch 20.4	HW ch 20.4, HW Ch 20 all	Ch 20.4
June 20	Exam 2 (ch 19-20)			

June 21	Office hours only			
June 24-28	Summer Break			
July 1	Periodic Patterns; Group 1A-4A			Ch 14.1-6
July 2	Periodic Patterns; Group 5A-8A			Ch 14.7-10
July 3	Main Group Demonstrations			
July 8	Elements in nature			Ch 22.1-3
July 9	Elements in industry			Ch 22.4-5
July 10	Electrochemistry; balancing redox reactions	PLA ch 21.1	HW Ch 21(1)	Ch 21.1
July 12	Voltaic cells, cell construction and operation, notation	PLA ch 21.2	HW Ch 21(2)	Ch 21.2
July 15	Voltaic cell potential, E°	PLA ch 21.3		Ch 21.3
July 16	Free energy and electrical work	PLA ch 21.4	HW Ch 21.4, HW Ch 21.4(2)	Ch 21.4
July 17	Electrolytic cells, energy to drive nonspontaneous rxn	PLA ch 21.7	HW Ch 21.7, HW Ch 21.7(2)	Ch 21.7
July 19	Batteries, primary, secondary, fuel cells, corrosion	PLA ch 21.5/6		Ch 21.5-6
July 22	Review			
July 22	Exam 3 ch 14, 22, and 21			
July 23	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
July 24	Coordination compounds, formulas, and names	PLA Ch. 23.3	HW Ch. 23.3	Ch. 23.3
July 26	Crystal field theory	PLA Ch. 23.4	HW Ch. 23.4	Ch. 23.4
July 29	Nuclear reactions; radioactive decay and nuclear stability	PLA 24.1	HW ch 24.1/2	Ch 24.1
July 30	The Kinetics of radioactive decay	PLA 24.2	HW ch 24.2	Ch. 24.2
July 31	Ionization, application of radioisotopes,	PLA 24.3/4/5	HW ch 24.3	Ch 24.3-5
Aug 2	The Interconversion of mass and energy; Application of fission and fusion	PLA 24.6	HW ch 24.6	Ch. 24.6-7
Aug 5	Organic chemistry, structure and classes of hydrocarbons, optical isomers	PLA 15.1/2	HW ch 15.1	Ch 15.1-2

Aug 6	Some important classes of organic reactions, functional groups	PLA 15.3	HW ch 15.3	Ch 15.3-4
Aug 7	Review			
Aug 8	Final Comprehensive Exam			

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

Holidays (no classes): Monday, May 27 (Memorial Day); June 19 (Juneteenth), June 24 – 28 Summer Break; Thursday, July 4 (Independence Day)

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 assumptions 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 lectures. 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.