

# CHM2096 - CHEM FOR ENGINEERS II – SPRING 2024

## INSTRUCTOR INFORMATION

### INSTRUCTOR

Instructor: Dr. Maria Korolev, Instructional Professor

Email (for administrative purposes): email via Canvas preferred; korolev@ufl.edu

Office hours: Mondays, Wednesdays, and Fridays 1:45pm - 2:45pm held in FLI 252

### TEACHING ASSISTANTS

You will meet your teaching assistant at your first discussion section, and they will provide you with their contact information and office hours. Your teaching assistants will hold office hours during the week in the Chemistry Learning Center (CLC) in SFH 105. Their schedule will be posted on Canvas. Additionally, you can get help from any of the CHM2046 or CHM2096 teaching assistants in the CLC.

## GENERAL INFORMATION

### PREREQUISITES

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

### COURSE DESCRIPTION AND LEARNING OBJECTIVES

CHM2096 constitutes the second semester of the two-term sequence of Chemistry for Engineers I & II, CHM2095/2095L - CHM2096/2096L. Topics include chemical equilibria, acid-base and solubility equilibria, entropy, free energy, electrochemical devices, solution dynamics, and descriptive inorganic and organic chemistry. All topics are taught in an engineering case-study context. As both a general education requirement (P) and major's course, CHM2096 serves to teach: the scientific method, skills for problem solving, general chemistry knowledge, and a connection to the principles that govern the natural world.

Specifically, students will be able to:

1. Clearly communicate in writing information derived from course related readings/lectures about the major concepts and themes in the chemical sciences.
2. Apply knowledge of the fundamental principles of chemical, acid/base and aqueous equilibria to perform related calculations and make predictions of system behavior.
3. Describe and apply the fundamental principles of kinetics, thermodynamics, and electrochemistry.
4. Describe the properties of complex ions and coordination compounds.
5. Analyze chemical principles in engineering applications and identify the importance of elements in nature and industry.
6. Apply general chemistry knowledge to solve engineering problems

A complete and detailed list of student learning objectives organized by module/chapter is posted in Canvas.

### COURSE DELIVERY/MEETING TIMES

Lectures will be delivered in FLI 50 from 12:50pm to 1:40pm on Mondays, Wednesdays, and Fridays.

Discussion sections will be held in person on Thursdays at the time listed on your schedule. Exams will be held on campus during the evening assembly periods, E2-E3.

## TENTATIVE SCHEDULE

The following lecture schedule is tentative, but exam dates will not change. Any changes to the schedule will be communicated clearly.

Dates	Topics/Chapters	Quizzes/Exams
Jan 8 – Jan 12	Ch 16: Kinetics; Ch 17: Equilibrium	
Jan 15 – Jan 19	Holiday 1/15; Ch 17: Equilibrium	
Jan 22 – Jan 26	Ch 18: Acids/Bases	Ch 17 Quiz Jan 22
Jan 29 – Feb 2	Ch 18: Acids/Bases; Ch 19: Buffers	Ch 18 Quiz Feb 2
Feb 5 – Feb 9	Exam Review; Ch 19: Titrations	<b>Exam 1 Feb 6 8:20pm</b>
Feb 12 – Feb 16	Ch 19: Ionic Equilibria	
Feb 19 – Feb 23	Ch 20: Thermodynamics	Ch 19 Quiz Feb 19
Feb 26 – Mar 1	Ch 20: Thermodynamics; Ch 21: Electrochemistry	Ch 20 Quiz Mar 1
Mar 4 – Mar 8	Ch 21: Electrochemistry	<b>Exam 2 Mar 5 8:20pm</b>
Mar 11 – Mar 15	Spring Break	
Mar 18 – Mar 22	Ch 21: Electrochemistry; Ch 22: Elements in Industry	Ch 21 Quiz Mar 22
Mar 25 – Mar 29	Ch 23: Transition Metals and Coordination Compounds	
Apr 1 – Apr 5	Ch 23: Transition Metals; Ch 24: Nuclear Chemistry	Ch 23 Quiz Apr 5
Apr 8 – Apr 12	Exam Review; Ch 24: Nuclear Chemistry	<b>Exam 3 Apr 11 8:20pm</b>
Apr 15 – Apr 19	Ch 15: Organic Chemistry	Ch 24 Quiz Apr 15
Apr 22 – Apr 26	Review; Reading Days	Final Quiz Apr 24
Apr 29 – May 3	Final Exam Week	<b>Final Apr 29 5:30pm</b>

## COURSE MATERIALS & FEES

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

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.

#### CALCULATOR (REQUIRED, MUST PURCHASE)

You will require a non-graphing, non-programmable scientific calculator capable of logarithmic functions.

#### IClicker (REQUIRED, NO CHARGE)

You will use iClicker to answer in-class clicker questions. Access is provided free of charge to students. An access code will be sent in the first week of the semester to all students via email. You will use your own internet-enabled device (phone, tablet, or laptop) during class to answer clicker questions with iClicker.

#### COURSE FEES (NONE)

There are no additional course fees.

#### COURSE COMMUNICATIONS

##### GENERAL OR ACADEMIC QUESTIONS

General course questions and all academic inquiries should be posed to your instructor during office hours, or to TAs during their office hours or during discussion sessions. Please be prepared before coming to office hours. Emails are for administrative purposes only, and not for distance-instruction.

##### PRIVATE OR GRADE-RELATED QUESTIONS

Direct private or grade-related 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. Grades will not be discussed during office hours due to FERPA regulations; you can schedule a private meeting with the instructor to discuss grades, study skills, or other concerns.

##### NETIQUETTE

All members of the class are expected to follow rules of common courtesy in all email messages, discussions, and chats. Please be mindful of your comments and responses, and make sure that they are respectful and inclusive to all participants.

#### GRADING

##### 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 three of the seven days of the week of the assignments' deadline for accommodations to be considered.

## PRE-CLASS ASSIGNMENTS

You are expected to complete pre-class assignments in preparation for each class day. These assignments are based on the reading in the required textbook and/or watching provided videos. Each assignment has problems that match the content before class. These assignments will be posted on Canvas under the quizzes tab and are due just prior to class. You will have multiple attempts to successfully answer the questions on the pre-lecture assignments. Pre-class assignments are worth 2% of your course grade. Three of these assignment grades are dropped from your overall course grade. Pre-class assignments cannot be submitted late for any credit.

## ENGINEERING MINI-PROJECTS

7% of your course grade will be determined by engineering mini-projects introduced during your discussion sections. There will be three projects spread over the semester that will relate to material covered in lecture. Each project will be done over three weeks to be done both during discussions and outside the discussions. You will be graded on the scientific merit of your work in groups. More of the details of the activities will be discussed during the first class meeting. Your attendance is required in your registrar assigned section. If you have an unexcused absence during the discussion for a given week, then you will score a 0 on the assignment for that week.

## ENGINEERING ASSIGNMENT

2% percent of your course grade will be based on the final engineering assignment due on Monday, April 22<sup>nd</sup> at 11:59pm. This is a written assignment that asks you to highlight a general chemistry topic that is applied in the field of engineering that you are interested in. You will describe the chemical process in detail, including its application, and include sources of information. More details will be provided during the semester.

## HOMEWORK

Homework assignments are due three times per week, typically on lecture days and approximately 5 days after the material was taught in lecture. You can access homework and the e-book via ALEKS tab in Canvas. You have multiple attempts at each homework assignment, with the highest score counting for credit. Homework assignments that are submitted after the deadline incur a late penalty of 50%. Homework assignments contribute 4% of your course grade. Three homework assignment scores are dropped from your overall course grade. Additional optional homework assignments are available on Canvas to help you master the material.

## QUIZZES

Quizzes will occur following completion of each chapter to check that you have retained the material. These quizzes will be timed and the deadlines will be posted. Quizzes contribute 3% of your course grade and it is recommended that you take these quizzes seriously so that you get an accurate idea of your knowledge and preparation. Quizzes can be submitted late up until the upcoming exam date with a late penalty of 50%. These quizzes are not proctored but are subject to the Honor Code. One quiz will be dropped.

## IClicker

iClicker is a classroom response system used for in-class participation during lectures. You can access iClicker via your internet enabled device in-class, such as a laptop or phone. The in-class questions will be

presented during class in-pace with the lecture. You can earn points in class by correctly answering clicker questions through iClicker. iClicker will count toward 2% of your course grade. iClicker points will begin counting the day after add/drop is over. The lowest three clicker grades will be dropped at the end of the semester to account for technical issues or occasional absences. iClicker points will only be excused for extended excused absences of one week or longer.

## EXAMS

There will be 3 progress exams during the semester which account for 60% of your course grade. Exams occur in the evenings, periods E2-E3, in exam rooms TBA. Exam Dates are provided in the schedule in this syllabus document. You are permitted use of a non-graphing non-programmable scientific calculator. Notes, cell phones or other electronic devices are not permitted. Scantrons and blank paper are provided. You must bring a valid photo ID and attend your assigned exam room. The final exam is scheduled by the registrar during the final exam week. Date and time can be found at: <https://registrar.ufl.edu/courses/final-exam>

## 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%, then the 0% would be replaced with the average of 48%. That is a much better score than a 0.

A 30-point penalty is assessed for student failure to bubble in the correct form code on the scantron. A 5-point penalty is also applied for failing to bubble in the UFID number and/or name.

## 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 3-credit course at a Carnegie I, research-intensive university, you will be expected to work at least 6 hours a week outside of class to succeed in this course. Work done in these hours may include reading or viewing assigned material, 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.

## GRADE BREAKDOWN

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 grades can be found in [the catalog](#).

Assignments weights are as follows:

Assignment Group	Weight %
Progress Exams	60%
Final Cumulative Exam	20%
Quizzes	3%
Homework	4%
Pre-Class Assignments	2%
iClicker	2%
Engineering Assignment	2%
Engineering Mini-Projects	7%

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

## 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/>

## GENERAL EDUCATION OBJECTIVES

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.

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 society and the environment; and the relevant processes that govern biological and physical systems.	Objectives 2-6	All assessments and student practice assignments offer opportunities for students to demonstrate content knowledge.
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	Homework, quizzes, iClicker, exams.
Communication	Communicate scientific knowledge, thoughts, and reasoning clearly and effectively.	Objectives 1-7	Weekly discussions, engineering assignments

## SAMPLE GRADING RUBRICS

The following grading rubrics will be used to assess the engineering assignments.

Mini-Project Flow Diagram Grading Criteria	Pts
The flow diagram is consistent with the summary of the process.	2 pts
All physical and moving components (and their parameters, if applicable) are correctly identified and are correctly connected in the flow diagram.	2 pts
The flow diagram is of a professional quality and is appropriately scaled for the scope of the problem.	2 pts

<b>Mini-Project Problem Solving Grading Criteria</b>	<b>Pts</b>
The calculations include all the necessary steps and are presented in an organized manner	2 pts
The calculations are solved correctly based on the given data	2 pts
The key findings are identified for all parts.	2 pts
The assumptions are concisely described and justified.	2 pts

<b>Mini-project Final Report Grading Criteria</b>	<b>Pts</b>
The project is well introduced and contains all necessary background information, objectives, etc.	2 pts
The steps you took to address the project are clearly and concisely stated. The assumptions you made are described and justified. The key findings of your assessment are stated.	2 pts
The impacts and the implications are addressed sufficiently in any applicable contexts (and include sources).	2 pts
The comparisons fit the key findings and impacts of the results. The recommendations provide clear guidance for action, and are justified.	2 pts
The report is well written, organized, and is free of writing errors.	2 pts

<b>Engineering Written Assignment Grading Criteria</b>	<b>Pts</b>
Report introduces the topic, its importance, and its relevance to the content in general chemistry	2 pts
Report describes a specific reaction or process, including chemical equations	2 pts
Report highlights a specific engineering industrial application of the chemical process	2 pts
Report is >500 words, text and figures are legible, uses proper grammar	2 pts
Report includes at least 3 appropriate sources and reports them in a consistent format	2 pts

## 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 will be communicated clearly.