

# CHEM 112

## Introductory Chemistry II

Trinity College

Spring 2019

### Class Meetings

MWF 9-9:50 am  
Clement 105

### Instructor

Prof. Michelle Kovarik  
860-297-5275  
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### Office Hours

Clement 129  
Mondays 1-2 pm  
Thursdays 9-10 am  
and by appointment

### Teaching Assistant

Rachel Fox  
[rachel.fox@trincoll.edu](mailto:rachel.fox@trincoll.edu)

### Supplemental Instruction

Bilal Hamzeh  
[bilal.hamzeh@trincoll.edu](mailto:bilal.hamzeh@trincoll.edu)

### Inside this syllabus

Tips for Success .....	2
Resources.....	2
Important Dates .....	3
Required Materials.....	3
Grading .....	3
Course Policies.....	3-4
FAQs.....	5

### Course Objectives

This course is a continuation of Chemistry 111 with emphasis on chemical equilibria, electrochemistry, kinetics, and a presentation of the properties and reactions of selected elements.

After completing this course, students should be able to

- Apply knowledge of intermolecular forces and chemical solutions to practical problems (Ch. 11, 13)
- Interpret mathematical data about chemical kinetics to draw conclusions about reactions and associated energy changes (Ch. 14)
- Distinguish between reaction rate and spontaneity, and explain spontaneity by applying thermodynamic calculations (Ch. 18)
- Make qualitative and quantitative predictions about chemical equilibria, particularly acid-base equilibria (Ch. 15-17)
- Identify and balance redox reactions (Ch. 19)
- Apply Lewis acid-base chemistry and crystal field theory to descriptions of coordination compounds (Ch. 22)

### Course Format

*During class* we will alternate between short lectures, small group work, and whole class discussion. Much of our discussion will draw on data that you generate in lab, so that the lecture and laboratory portions of the course are complementary.

You should do the pre-class reading in order to participate and make the most of your time in class. Sometimes I may call on you randomly to answer a question instead of asking for volunteers. I want to make sure everyone is contributing their ideas to the class, but I know that “cold calls” can be stressful. Our goal is to create a classroom environment where it’s OK to get something wrong or not know an answer. (If we all knew all the answers already, then we would just go home.) If you are anxious about this part of class, please let me know so we can discuss strategies for your participation.

We will have regular quizzes to help you test your conceptual understanding. These quizzes will be mostly multiple choice and short answer and will not require a calculator.

## Tips for Success

**Before class** read the textbook pages that introduce the next topic and preview the homework problems.

**During class** participate often and ask questions. Discuss difficult concepts with your group members, and make a note of sections you need to review in more detail.

**After class** review your notes and attempt the homework problems. Attend SI sessions regularly. As soon as you get stuck or feel uncertain, reach out to me or the TA. You will get the best results if you review the notes and start the homework as soon as possible after class. For any topics that you find challenging, work the extra practice problems in the textbook and check your answers using the appendix. For even more practice, do the optional adaptive follow-up assignments in Mastering Chemistry.

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When you get stuck on homework problems...

- Identify the goal of the problem.
  - Break large problems into smaller parts.
  - Identify the units your answer will be in and compare to the units of the information you have been given. Form a strategy based on converting from the units of what you know to the units of what you want.
- Do not try to track large quantities of information in your head.
  - Write things down (nearly) as you go.
  - Show your work and keep track of units.
  - Use diagrams and equations to summarize information.
- Check your work. Ask yourself if you have...
  - Copied the problem correctly (no numbers transposed, no mistakes in units, etc.).
  - Entered calculations into your calculator correctly.
  - Obtained a reasonable result for intermediate steps of the calculation, based on your common sense, your chemical knowledge, and information from the problem.
  - Written all chemical formulas correctly and balanced all equations.
- Seek new ideas.
  - Consider whether you need to look up information in the textbook or your notes to solve the problem.
  - Brainstorm. Draw new diagrams to represent what is happening.
  - Ask a friend for input. Come to office hours, supplemental instruction, or a TA help session.

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**Before exams** focus your studying the learning objectives in the course schedule. When reviewing worksheets and homework, re-work questions from scratch instead of reviewing worked solutions. For difficult concepts, practice explaining them out loud, as though you are the teacher. Keep in mind that the exam will not include questions you have seen previously, so you will need to apply your knowledge to new problems. It will not be sufficient to know the "right answer" – you need to understand why the correct answer is correct.

You should plan to spend 6-12 h per week outside of class time in order to be successful.

## Resources

### Accessibility Requests

Please let me know if there are circumstances that might affect your full participation in class or your health and safety in the lab. If you are requesting academic accommodations, you should notify me at least 10 days in advance and contact Lori Clapis in the Student Accessibility Resource Center at 860-297-4025 or [Lori.Clapis@trincoll.edu](mailto:Lori.Clapis@trincoll.edu).

### Supplemental Instruction and TA Help Sessions

Our teaching assistant, **Rachel Fox**, will hold weekly help sessions. Note that help with specific homework problems will be available through these TA sessions, not SI.

Supplemental instruction will be provided by **Bilal Hamzeh**. All students are strongly encouraged to attend.

Locations and times for TA and SI sessions TBA.

### Excel for Chemists

A copy of this book is available electronically through the library, and a hard copy is available for use in my office during office hours.

<http://site.ebrary.com/lib/trinity/Doc?id=10510405>

### The Writing Center

For hours or to schedule an appointment, call 297-2468 or visit <http://trincoll.mywconline.com/>

## Course Materials

### Required

- **Textbook and online homework**  
*Chemistry: Structure and Properties*, 2<sup>nd</sup> ed. by Nivaldo J. Tro, Pearson, 2015. with Mastering Chemistry access
- **Laboratory manual**  
Available in the Chemistry Office (CT208), ~\$7
- **Laboratory safety glasses**  
Available in the Chemistry Office (CT 208), \$5
- **Laboratory notebook**  
Spiral bound, carbonless copy, available in bookstore, ~\$15.
- **Scientific calculator** (bring to class!)

### Suggested

- *ACS Style Guide*
- *Excel for Chemists*
- Binder and 3-hole punch for organizing handouts and assignments

## How do you earn your grade?

Exams	55%
Quizzes	10%
Homework	10%
Laboratory	25%

We will have 3 equally-weighted exams, including 2 in-class exams and a final. The final exam will be cumulative.

Your lab grade will be kept by your lab instructor until the end of the semester, so you should contact your lab instructor with any questions about lab grades.

## Course Policies

### *Due Dates, Late Work, and Make-up Assignments*

We will use Mastering Chemistry for most homework. A weekly homework assignment on Mastering Chemistry will be due by 11:59 pm on Sunday nights. Before each exam we will do a case study homework assignment that will be due at the start of class. Late homework assignments will be penalized at a rate of -10% per day.

Sometimes unexpected (and often unwelcome) events intrude on our plans – mental and physical illness, family needs, etc. may affect your class performance this semester. To the extent that you are comfortable sharing this information with me, I would like to know as soon as possible. If you miss an exam or quiz due to illness, injury, or a family emergency, you should provide some confirmation of the event directly to me or to the Dean of Students office. If you will miss an exam or quiz for a scheduled, College-sanctioned event (e.g., religious observance, athletics), you should discuss your absence with me in advance (preferably at least 3 days prior). In most cases, your other exams or quizzes will be weighted to replace the one missed. Make-ups will be given only in special circumstances at the instructor's discretion.

**By department policy, in order to pass this course, you must complete all laboratory experiments. If you miss a lab period, it is critical that you contact your lab instructor as soon as possible to arrange a make-up lab.**

## Important Dates

Drop/Add Deadline.....	1/29
Withdraw Deadline .....	2/15
Exam 1 .....	2/27
Exam 2 .....	4/12
Final Exam .....	5/6

Weekly syllabi will be handed out regularly in class.

A complete schedule is available on Moodle.

Check for updates often.

## ***Moodle & Email***

Moodle and e-mail will be used extensively. All students are required to have an active e-mail account. Please inform me during the first week of class if you prefer to use a non-trincoll address. Students are expected to consult the course Moodle site frequently for assignments, announcements, schedule changes, lecture materials, supplementary course materials and external links.

## ***Classroom Citizenship***

This course is intended for advanced students, and I expect you to conduct yourselves as such and to be familiar with the College's policies on attendance, absences, academic honesty, and classroom behavior as outlined in the Student Handbook.

## ***Academic Integrity***

Each student should be familiar with the Trinity College Student Integrity Contract and the section on Intellectual Honesty in the Student Handbook.

**References:** Any ideas in your written assignments that (i) did not spring from your own mind and (ii) are not common knowledge to high school science students should be cited at the end of each assignment. Direct quotes are usually unacceptable: rewrite all ideas in your own words *and* cite them. If you have a question about whether or not your rewording is acceptable, ask before turning in the assignment. Use the *ACS Style Guide* to format your references. Plagiarism and academic dishonesty – copying from another student, copying from another source including the internet, failing to cite a reference, etc. – will be addressed through the College's jury system.

**Homework:** I encourage you to discuss homework with your classmates. Your peers should be a primary resource if you are uncertain about how to proceed on a problem (although the TAs and I are happy to help, too). **On written homework assignments, you should acknowledge which classmates worked with you on an assignment by listing their names on the first page.** Additionally, I expect each of you to do your own work. Discussing homework problems with your classmates is acceptable; copying your classmate's answers or work is not. If I find evidence of copying or allowing work to be copied, we will go through the College's academic honesty proceedings. If you have any questions about whether or not your collaboration with a classmate complies with my expectations, please talk to me about it *before* turning in an assignment.

On the first day of class, I will be asking you to sign the Student Integrity Statement as a way of affirming your commitment to academic integrity. You may choose not to sign, however, whether you sign or not, you are expected to behave in accordance with the statement. For your records, the statement is as follows:

"In accordance with Article II of the Trinity College Student Integrity Contract, I hereby pledge that the papers, exams, and other academic exercises I submit for this course will represent my own work; that I will properly acknowledge and attribute any and all information and ideas that I have used from other sources; and that no collaboration unauthorized by the instructor of the course will occur in the course of its completion."

## Frequently Asked Questions (FAQs)

*What should I do if I have to miss class?*

Class attendance is critical to your success in the course, so please be on time and do not miss class if at all possible. If you will be absent, please do the following:

- (1) Notify me as soon as possible, preferably before class and by email.
- (2) Email me any assignments that are due, drop them in CT208, or send them to class with a friend.
- (3) Contact a classmate to get the notes and schedule an appointment with me to address any questions you have about missed material.

**By department policy, in order to pass this course, you must complete all laboratory experiments. If you miss a lab period, it is critical that you contact your lab instructor as soon as possible to arrange a make-up lab.**

*Can I have an extension? What is the penalty for late work?*

Late assignments will be penalized at a rate of -10% per day. In general, extensions will not be granted except in extenuating circumstances of prolonged illness, injury, or family emergency. In these cases, you should contact the Dean of Students' office.

*How can I tell what my current grade is?*

Your current overall grade and your grades for individual assignments will always be available in the grade book on Moodle. If you have questions or would like to discuss the class at any time, please come by office hours or make an appointment. Keep in mind that your final grade for the course will be calculating using your grade for the lecture (75%) and for the lab (25%). You should contact your lab instructor if you have questions about lab grades.

*Can I do extra credit?*

There will be no extra credit in this class. Please don't ask! My philosophy is that you should spend your valuable time succeeding at the primary objectives for the course. If you have not completed them, you should not be spending time on additional work. If you have completed them, your grade should not be in need of a boost.

*Why are we doing so much group work?*

A large body of educational research shows that students learn more and perform better on exams when they are actively engaged, rather than passively listening, in class. This is especially true when students work in groups because of the opportunity to learn from each other, rather than just from the instructor. Working with other people is also a key skill for almost every professional occupation, so a complete education should include practice at this skill. (For recommendations to graduate programs and references for job openings, I am almost always asked to comment on a student's ability to work on a team.) Finally, when you work in groups, it makes your thinking clear to me. If I talk and you listen, there aren't many opportunities for me to learn how things are going before the exam. When I hear you discussing ideas in class each day, it gives me important feedback about which topics we have mastered and which need to be revisited.