

General Chemistry II, CHEM 111BF  
CRN 20725  
Spring 2025

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Office Hours Friday 8:50 am – 10:20 am  
11:35 am – 1:35 pm

### Course Description

General Chemistry II, CHEM 111BF, is a continuation of General Chemistry I, CHEM 111AF. The topics covered in this course include kinetics, equilibria, acid/base reactions, thermodynamics, electrochemistry, transition metals, coordination chemistry, and the nucleus. The concepts covered within lecture will be reinforced through experiments conducted in the laboratory.

### Prerequisites

This course requires prior completion of General Chemistry I, CHEM 111AF (with a grade of C or better); please check for a possible mismatch of material covered if you did not complete General Chemistry I at Fullerton College. Additionally, the safe performance laboratory experiments will require the ability to follow oral and written instructions.

### Meeting Time and Location

Laboratory: Monday and Wednesday, 8:00 am to 11:10 am, 441  
Lecture: Monday and Wednesday, 11:45 am to 1:10 pm, 414AB

Regular attendance and participation are required for this course. You may be dropped from the course for excessive (9 or more hours) lecture or laboratory absences.

### Required Textbook and Materials

Interactive General Chemistry 2.0 Reactions First, J. White (*and access to Achieve*)  
Laboratory Notebook (75 pages minimum – Refer to Laboratory Manual for additional guidelines)

*Students are required to purchase a new laboratory notebook, and will receive deductions if using a laboratory notebook from a prior class.*

Scientific Calculator  
Safety Goggles (Not Safety Glasses!)

### Optional Materials

Small Bottle of Detergent (Soap)  
Lab Apron (or Coat)

*The Laboratory Manual for Second Semester General Chemistry will be provided to you electronically through Canvas. You are responsible for downloading and/or printing out the experiment procedures.*

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*Your success will be determined by the amount of time and effort you place into this course!*

*If you want finish to this class successfully...*

*You will need to complete the assigned textbook readings and homework problems (as a minimum)!!!*

## Course Objectives

1. Demonstrate an understanding of transition element chemistry:
  - a. State the unique trends and properties of transition metals.
  - b. Use the nomenclature for transition metal complexes.
  - c. Determine whether a complex ion is optically active.
  - d. Explain the origin of color in aqueous solutions of complex ions.
  - e. Given several colors and formulas of complex ions, match the formula to the color of the complex ion.
2. Demonstrate knowledge of chemical kinetics:
  - a. State the factors that influence the rate of a chemical reaction and predict how changes in each factor affect the rate.
  - b. Differentiate and calculate average rate, instantaneous rate, and relative rate.
  - c. Determine and utilize differential and integrated rate laws, rate constants, half-lives, and activation energy and frequency factor, to solve for any missing variable.
  - d. Determine whether a mechanism is consistent with a rate law.
3. Demonstrate knowledge of chemical equilibrium:
  - a. Write an equilibrium expression for any type of equilibrium, including,  $K_c$ ,  $K_p$ ,  $K_a$ ,  $K_b$ ,  $K_{sp}$ ,  $K_f$ , and apply it to calculate the equilibrium concentrations of a reaction mixture using an ICE chart, linear algebra, the quadratic formula, and successive approximations.
  - b. Identify the factors that can affect equilibrium concentrations and use Le Chatelier's principle to predict the direction of shift in equilibrium.
4. Demonstrate knowledge of acid/base chemistry:
  - a. Write reactions for the dissociation of a strong or weak, acid or base, the hydrolysis of a salt, and the behavior of chemicals in a titration.
  - b. Apply the Henderson-Hasselbalch equation to buffers.
  - c. Calculate the pH, pOH,  $[H_3O^+]$ ,  $[OH^-]$ ,  $K_a$ ,  $K_b$ ,  $pK_a$ ,  $pK_b$ , of a solution.
  - d. Construct a titration curve for any monoprotic acid with monohydroxide base and identify the significance of various points and regions on the graph.
  - e. Compare and contrast acid-base theories of Arrhenius, Brønsted-Lowry, and Lewis.
5. Demonstrate an understanding of thermodynamics:
  - a. State and apply the laws of thermodynamics.
  - b. Define and calculate enthalpy, entropy, free energy and use these parameters to determine the spontaneity of a process.
6. Demonstrate an understanding of electrochemistry:
  - a. Balance oxidation-reduction reactions in acidic and basic solutions using two methods: half reaction and oxidation number method.
  - b. State and apply equations to calculate and relate standard free energy, cell potential, and the equilibrium constant.
  - c. Illustrate the construction and operation of voltaic and electrolytic cells with diagrams and shorthand notation.
  - d. Illustrate how corrosion occurs and propose methods to reduce corrosion.
7. Demonstrate knowledge of the nucleus:
  - a. Identify the different mechanisms for radioactive decay.
  - b. Determine the time required to decrease the amount of a nuclide by one-half.
8. Demonstrate advanced expertise in the care and safe use of analytical equipment, balances, pH meters, spectrophotometers, voltaic and electrolytic cells.
9. Use computer technology for numerical and graphical analysis and research.
10. Maintain a complete and accurate laboratory notebook, demonstrating an understanding of data, calculations, and results.

## Student Learning Outcomes

1. Use chemical principles to apply concepts, demonstrate comprehension of course topics, and develop problem-solving skills.
2. Demonstrate laboratory skills through the collection of data in a laboratory setting, analysis and interpretation of data, and communication of subsequent results by composing written lab reports.
3. Employ safe and proper handling of chemicals and equipment in the laboratory.

## Assignments and Grades

Homework	10%
Adaptive Quizzes	10%
Problem-Solving Handouts	5%
Laboratory	25%
Examinations	50%
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Total	100%

### Homework

Generally, it is not possible to succeed in a chemistry course without doing a significant number of problems. For this reason, regular homework assignments will be given via Canvas in relation to the lecture material. Each homework assignment must be submitted within one week to avoid a 50% deduction of the available points. Homework assignments not submitted within one week of the due date (and time) will not be accepted for points.

The homework problems will provide a record for you to study from, and will help when asking questions, such as during problem-solving sessions or the instructor's office hours. Additionally, having a permanent record of the problems that you have solved will make it easier to prepare for the examinations.

The total homework score is worth 10% of your overall grade in the class.

### Adaptive Quizzes (Achieve)

It is extremely critical that students stay current with the material that is covered in lecture, and would have reviewed concepts and practiced problems seen during the lecture meetings prior to the examination. To ensure that students stay current with the material, Adaptive Quizzes will be given online through Achieve throughout the semester. Students will be allowed to work on the chapter quizzes upon introduction of the chapter material and until 11:59 pm of the night before an examination. The lowest Adaptive Quiz score will be dropped at the end of the term.

The total adaptive quiz score is worth 10% of your overall grade in the class.

### Problem-Solving Handouts

The ability to correctly set-up and solve problems is an integral part of chemistry. Students will regularly meet during the laboratory meeting to develop their problem-solving skills. The problem-solving session represents an excellent opportunity to have questions answered about the homework and lecture material. Students may work in groups to solve worksheets that relate to the material being studied in lecture. The solutions to the problem-solving handouts will be made available, such that students can check their own work. The score earned for problem solving will be based on participation and completion of the worksheets.

The total problem-solving score is worth 5% of your overall grade in the class.

### Laboratory

The laboratory score will be determined from your ability to keep a record of your laboratory work (laboratory notebook), properly and competently conduct laboratory procedures from written and oral instructions and demonstrate an understanding of the theories and background associated with the studied experiments. Additionally, the laboratory score will also be determined by several laboratory examinations.

Laboratory Experiments:	50%
Pre-Laboratory Assignments (20%)	
Notebook Notes (50%)	
Discussion Questions (30%)	
Laboratory Practical	20%
Midterm (15%) and Final (15%) Examinations	30%
Total	100%

Laboratory work not submitted before the due date (and time) will be subject to a 50% deduction of the available points. Furthermore, if the pre-laboratory assignment is not submitted before the due date (and time), a 25% deduction will be applied to the score for both the notebook notes and discussion questions.

The laboratory is a critical aspect of this course. Attendance and participation are required; a missed experiment will result in the loss of all points for the experiment. The lowest experiment score (pre-laboratory assignment, notebook notes and discussion questions) will be dropped at the end of the term.

The total laboratory score is worth 25% of your overall grade in the class.

***A total laboratory score of at least 65% must be obtained to ensure a letter grade of C or better...***

### **Laboratory Notebook**

The laboratory notebook is an essential component of all experimental work. It represents an official record of the work that was completed in the laboratory. Experience will be gained in recording information into the laboratory notebook prior to, during, and after the completion of an experiment.

The laboratory notebook will be prepared, prior to coming to laboratory, according to the guidelines presented in class. The laboratory notebook must be presented to the instructor on the day in which laboratory work is to begin.

Failure to arrive at laboratory with a properly prepared laboratory notebook will result in a student's dismissal until the required information has been recorded into the laboratory notebook; this could prevent the student from completing the experiment.

Note: Printouts of the experiment procedure (laboratory manual) may not be present at your laboratory bench while performing an experiment, otherwise a 25% deduction to the notebook score will be given. The laboratory notebook must be prepared in such a way that you will be able to complete the experiment without any additional resources.

### **Laboratory Safety**

Safety within the laboratory will be constantly emphasized. In addition to viewing a video on laboratory safety, students will be required to read the laboratory safety rules (pg. iii - iv in the laboratory notebook) and sign a laboratory safety agreement. Failure to follow the laboratory safety rules will result in the loss of points and/or dismissal from laboratory. In particular:

1. The pre-laboratory assignment must be completed prior to the experiment.
2. You must always wear your safety goggles when experiments are being performed.
3. You will be required to wear closed-toed shoes (no sandals!) in the laboratory.
4. You will not be allowed to eat or drink within the laboratory.
5. You will not be allowed to "goof" around.

Failure to follow these rules will result in a 25% deduction to the experiment score per violation (per experiment); three violations in the same laboratory period will result in your expulsion from laboratory for the remainder of the day.

Students may not be allowed to perform the experiment if they have missed the pre-laboratory lecture. Specific laboratory and safety techniques are introduced in the pre-laboratory lecture. Missing this information might put you and others at risk of injury.

### Examinations

There will be three exams given during the semester in 414AB. The three exams, worth 100 points each, will be given on the assigned dates (see schedule) from 11:45 am to 1:10 pm. In addition to the full-period exams, a final exam (200 points) will be given on Wednesday, May 28th at 9:00 am in 441.

Exam Dates	
Exam I	March 5th
Exam II	April 16th
Exam III	May 21st

You are expected to take all three exams and the final exam. Regardless of performance, cheating on an exam will result in the loss of all points. Make-up exams, given only for excused (and documented) absences, must be taken within one week of the original exam.

The total examination score is worth 50% of your overall grade in the class.

***A total exam (three exams and final exam) score of at least 65% (325 pts out of 500 pts possible) must be obtained to ensure a letter grade of C or better...***

### Letter Grades

Without exception, the following ranges represent that which must be obtained to earn the corresponding letter grades.

If your final percentage (x) is ...	You will be given...
$x \geq 90\%$	A
$80 \leq x < 90\%$	B
$65 \leq x < 80\%$	C
$55 \leq x < 64\%$	D
$< 55\%$	F

### Important Notes

1. Make-up exams and quizzes will be provided for excusable absences and will only be given within one week of the original assessment date.
2. The total laboratory and average exam score must each be at least 65% to ensure a letter grade of C or better in the course. Furthermore, failure to check out of the locker will result in a D (or worse) letter grade in the course!
3. All electronic communication devices must be turned off during class time and exams, without exception, to avoid disruption of the class. Failure to follow this policy will result in a verbal warning (yellow card) for the first offense, and expulsion from the class for the duration of the day upon the second offense (red card).

### ADA Statement

Fullerton College is committed to providing educational accommodations for students with disabilities upon the timely request by the student to the instructor. Verification of the disability must also be provided. The Disability Support Services office, (714) 992 - 7099, functions as a resource for students and faculty in the determination and provision of educational accommodations.

## Grading Policies

The percentages for Homework, Adaptive Quizzes, Problem Solving, Laboratory, and Exams will be posted periodically throughout the term. It is your responsibility to ensure that the percentages which are presented truly reflect your performance in the course. You should notify me as soon as possible if at any time you feel as though I have made a mistake.

You may request that your work to be re-graded if at any time you feel as though a mistake was made or if have graded you have been graded unfairly. Requests that work be re-graded must be submitted within one week; a written description of the mistake/complaint may be required for some assignments. All items submitted may be examined in their entirety. It should be noted that this could potentially result in a lower grade than given originally.

## Academic Dishonesty

Cheating, plagiarism, and falsification/fabrication of laboratory data are unacceptable practices and are in violation of the Academic Honesty policy at Fullerton College. All students involved in an instance of academic dishonesty will be disciplined according to the actions outlined in the Fullerton College Catalog. In the least, all students involved in an incident will receive zero points for the assignment/exam. Additionally, a Student Discipline Incident Report may be written and submitted to the Dean of the Natural Sciences Division.

Academic dishonesty includes copying the answers of homework and laboratory assignments. Students who allow their assignments to be copied are also guilty of violating the Academic Honesty policy at Fullerton College. Regardless of the extent of participation, all instances of academic dishonesty will result in the penalties described above.

## Emergency Response Message

Please take note of the safety features in and close to your classroom, as well as study the posted evacuation route. The most direct route of egress may not be the safest because of the existence of roofing tiles or other potentially hazardous condition. Similarly, running out of the building can also be dangerous during severe earthquakes. During strong quakes the recommended response is to duck—cover—and hold until the shaking stops. Follow the guidance of your instructor. You are asked to go to the designated assembly area. Your cooperation during emergencies can minimize the possibility of injury to yourself and others.

## Important Dates

Last day to drop without a "W" grade  
Last day to withdraw with a "W" grade

Monday, February 17th  
Sunday, May 4th

## Course Expectations

This course might require more time and effort than previous courses in chemistry.

A five-unit course should require at least 10 additional hours of coursework outside of the classroom. The chemistry department at CSU Fullerton tells students that the average performance (letter grade of C) for the average student requires between 10 and 15 hours of effort outside of the classroom.

Each week, this course will consist of 3 hours of lecture, 6 hours of laboratory, and (very likely) at least 10 hours of additional coursework. This class could easily require at least 19 hours from your schedule each week... for the average grade of C. Of course, based on a student's level of preparation and expected performance, this value could be more or less.

