

# CH147, Comprehensive General Chemistry – Spring 2019 – Lecture Syllabus

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**Office Hours:** open, or by appt.

**Lectures meet:** M-W-F, 9:00 - 9:50 AM, Arey 5

**Required Materials:**

- “Chemistry, The Central Science” Brown, et. al, 13ed.
- “MasteringChemistry” access code (bundled with text or stand-alone)
- Specified calculator

**Course webpage:** <https://wiki.colby.edu/display/CH145/CH147+Home>

## Course description:

CH147 is an alternative to CH141/CH142 intended for likely science majors who have had substantial chemistry coursework before Colby. It is expected that students enter CH147 with a general understanding of the basic concepts and problem solving skills in chemistry, such as: *basic properties of matter, atoms and subatomic particles, unit conversions, stoichiometry and chemical equations, gas laws, and solutions*. The content of this course will include orbital theory, chemical bonding, thermodynamics and spontaneity, chemical kinetics and equilibria, and electrochemistry.

## Course objectives and learning goals:

- 1. For students to gain a broad understanding of chemistry that leaves them exceptionally prepared for organic chemistry and beyond**
  - a. To learn to communicate using the nomenclature used by chemists**
  - b. To learn the basic principles of mass balance and chemical equilibria**
  - c. To understand the nature of the chemical bond**
  - d. To understand the fundamental kinetics and thermodynamics that govern chemical reactions.**
- 2. For students to sharpen their quantitative skills in a scientific context**
- 3. For students to improve problem solving skills that involve the integration and synthesis of new knowledge and master the interface between narrative and mathematical problem solving**
- 4. For students to improve their oral communication skills through dynamic classroom discussion**

## Grading:

- **Exam 1 (13%)**—Monday, March 4<sup>th</sup>, from 5-7 PM (Arey 5).
- **Exam 2 (13%)**—Thursday, April 4<sup>th</sup> from 5-7 PM (Arey 5).
- **Exam 3 (13%)**—Tuesday, April 30<sup>th</sup> from 5-7 PM (Arey 5).
- **Final Exam (16%)**—(date, time, and room to be assigned by the Registrar).
- **Laboratory (25%)**—Attendance is mandatory. You must pass lab to pass CH147.
- **Homework (10%)**—See below for more information.
- **Student Engagement (10%)**—Includes in-class quizzes; assigned at the Instructor’s discretion.

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### Reading assignments:

Reading assignments from the required text will be posted to the course webpage weekly.

### Lecture:

Lectures for this course are extremely important and it is expected that students will attend all of them and be up to date on all reading assignments. While there will be a lot of content to get through, active and dynamic class discussions are critical for the development of the chemist's lexicon and establishment of the foundations of critical thinking and problem solving in the discipline. There will be frequent in-class quizzes given at the start of lecture. No accommodations will be made for missed classes or late arrival. Part of your grade in CH147 will be based on the instructor's interpretation of your engagement in the class, which will include the quizzes and active participation in lecture.

### Anticipated course topics and approximate schedule:

Week	Chapter	General topic
1: February 6	6	Electrons & Atoms
2: February 11	6-7	Quantum & Orbital Theory
3: February 18	8-9	Chemical Bonding
4: February 25	10-11	Gas Laws & Intermolecular Forces
5: March 4	14	Reaction Rates & Mechanisms
6: March 11	15	Chemical Equilibria
7: March 18	4,16	Acid/Base Chemistry
8: March 25		<b>Spring Break!!</b>
9: April 1	17	Buffers & Titrations
10: April 8	5,19	Enthalpy & Entropy
11: April 15	19	Free Energy & Spontaneity
12: April 22	4,20	Redox Chemistry
13: April 29	20	Electrochemistry
14: May 6	21,23	d-Block Chemistry & Nuclear Chemistry

### Homework assignments:

The homework portion of your grade will be derived from an online homework system, "MasteringChemistry." If you purchase a new textbook, the required access code will be bundled with your book, otherwise, you will need to purchase an stand-alone access code from the Bookstore or on their website ([www.masteringchemistry.com](http://www.masteringchemistry.com)) and set up an account according to the instructions that can be found on the CH147 website. There will be 8-10 graded online homework assignments over the course of the semester. These assignments and their due dates will be announced in lecture and posted on the website. For each assignment, be sure to view the grading details.

In addition, several practice problems will be assigned from the textbook. Work through as many of these problems as necessary to make sure you have a good grasp of the material. *The key to success in this course is to work through problems without depending heavily on the textbook, your notes, or an answer key.* Completing several problems in all areas may be necessary to perform well on examinations. Please speak with your instructor if you have any questions about homework assignments in CH147.

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### Exams:

There will be three one-hour midterm examinations that will take place outside of class time (see dates and times above) and a *cumulative* final exam during the exam period. Exam questions may come from lecture, laboratory, the textbook, and/or homework and will be a mix of multiple choice, mathematical, and short answer problems. *These exams will be challenging, to even the most well prepared student.* As such, numerical grades on exam may not necessarily correlate with assigned letter grades. On each graded exam students will receive a numerical percentage and a letter grade reflecting the approximate scaling. Exam grades will only be scaled up, never down.

There will be no make-up exams. If a student anticipates being away for a College activity on the evening of an exam, the Instructor will try to make alternative arrangements, such as having the exam to be administered by an athletic coach. It is the responsibility of the student to let the Instructor know, well in advance, of any potential conflicts such that necessary arrangements can be made. Accommodations will also be made for students with serious illnesses or family emergencies. Accommodations for other, non-college related activities or circumstances will not be considered. Should you miss an exam without *verified* medical cause or other prior approval, you shall receive a zero for that exam. The grade for an exam missed due to an excused absence will be calculated based on your next exam's grade relative to the class. By departmental policy, a student cannot miss more than one exam for any reason and still be able to complete the course. Please review the departmental exam policy found on the website:

<http://www.colby.edu/chem/about/chemistry-attendance-and-exam-policy/>

Some students may have approval from the Dean of Studies Office for time extensions on exams. All students, however, will have two hours to complete the exams, which are designed to be completed in one hour. Please speak with the Instructor if you have any questions about this policy. It is the student's responsibility to communicate any *other* arrangements made with the Dean of Studies Office to the Instructor *at the start of the semester* such that the necessary accommodations can be made.

To encourage improvement, all three midterm exam scores can be adjusted upward based on future test scores. Exam grades will be replaced by a grade based upon the average of that exam grade and the subsequent exam grade. The final exam will be used to adjust the third exam grade. Note that this adjustment is automatic, and will only be applied if it improves your grade.

### Other course policies, including academic dishonesty:

The Chemistry Department policies regarding exams, attendance, and academic honesty will apply to this course. This information is available on the department website at: <http://www.colby.edu/chem/about/chemistry-attendance-and-exam-policy/>. You are encouraged to study and discuss course material with other students. However, anything you submit for a grade (including online homework and laboratory assignments) must be solely your own work. If you are unsure about what constitutes academic dishonesty in this course, it is safest to check with your lecture professor or laboratory instructor first.

### Extra help:

You are strongly encouraged to seek extra help if you are having difficulty with material or assignments in this course. Your instructor should be your primary resource in getting help – don't hesitate to speak with Prof. Rice at any time. Help is also available at the Chemistry Help Center, staffed by experienced and knowledgeable chemistry majors, which is open four evenings per week in Keyes 104 (M-Th, 7:30-9:30). These students will be happy to answer questions and help with problems.