

### Course Syllabus

**Goals for Chem 167:** This introductory one semester college chemistry course for engineering students will show you how chemistry can explain many everyday observations, how chemistry is a major economic force, and how chemistry can help improve materials used in most engineering applications. You will acquire a basic chemical vocabulary, develop skills of using the language and formulae of chemistry to perform quantitative calculations, and will be able to use basic chemical concepts to estimate and predict properties of materials. A number of current research and application topics are explored to show how they are related to chemistry in the hope that you will continue to use these ideas in a continued process of learning and critical thinking in your college and professional career.

#### Learning Outcomes/Objectives for Chem 167:

- Students will learn to use the language of chemistry: symbolic representation, nomenclature, and terminology.
- Students will learn to think about chemical reactions and chemical and physical properties at the particulate level and will be able to visualize and depict the structure of matter and its reactions at the microscopic (atomic and molecular) level.
- Students will gain an understanding of the significance of the periodic table and will use it to predict chemical and physical properties of elements and as a resource for problem-solving.
- Students will gain a conceptual understanding of and will be able to perform qualitative and quantitative problem-solving skills in atomic structure, stoichiometry, gas laws, thermochemistry, thermodynamics, chemical equilibria, chemical kinetics, and electrochemistry.
- Students will gain an appreciation for and understanding of the importance of chemistry and a chemical perspective in the world around them and in specific engineering applications.
- Students will be able to use their knowledge to analyze and construct solutions for new and unfamiliar problems.

#### Lecture Information

Lecture Sections	Class Meetings Times & Days	Lecture Room	Instructor
A	10 – 10:50 am MWF	1001 Troxel Hall	Dr. Bonaccorsi
B	12:10 – 1 pm MWF	1001 Troxel Hall	Dr. Bonaccorsi
C	2:10 – 3 pm MWF	1001 Troxel Hall	Dr. Meyer
D	3:10 – 4 pm MWF	1001 Troxel Hall	Dr. Meyer

#### Instructor Information

Lecture Section	Name	Office	Email address	Office hours
A & B	Dr. Cristina Bonaccorsi	2754 Gilman	<a href="mailto:chem167Q@iastate.edu">chem167Q@iastate.edu</a> Put <b>Chem 167</b> in subject line	MW 11:00 am – 12 noon 1110 Troxel Hall* or by appointment
C & D	Dr. Gerd H. Meyer	3759 Gilman		MWF 1:30 – 1:50 pm and MWF 4:10 – 4:30 pm 1110 Troxel Hall* or by appointment

\*1110 Troxel is located in the northeast end of Troxel's lower level (to the right side of the screens/chalkboard in 1001 Troxel).

#### Assistant to the Instructors:

TBD

[chem167Q@iastate.edu](mailto:chem167Q@iastate.edu) – Put **Chem 167** in subject line

Office hours: TBD, in 1761 Gilman Hall – the Chemistry Help Center

**Course website:** <http://avogadro.chem.iastate.edu/CHEM167/>

**Blackboard Learn (BbL) website:** <https://bb.its.iastate.edu/>; Log-in using your Iowa State net-ID (recommended: perform a browser test/check before you logon for the first time. Click on the course link **Chem 167 All Sections (Fall 2015)** to access course-specific content. General course announcements, course materials (lecture notes, captured lectures, old exams, study aids, and current exam and quiz keys), and grades are available on Blackboard Learn (BbL): It is good practice to log into BbL every day.

**Drops and audits:** Students who drop or audit the Chem 167 lecture will be required to drop the lab Chem 167L. The Registrar's audit deadline is 5:00 p.m. on Friday, September 4. The audit does not count towards full-time student status. **To add or drop recitation or lab sections during the first week of class, use AccessPlus; after the first week, please come to the Undergraduate Chemistry office in 1608 Gilman (hours 8 – 11:50 am and 1:00 to 4:00 pm). The last day to drop a class without extenuating circumstances is Friday October 30<sup>th</sup>.**

**Required textbooks and supplies:**

- *Chemistry for Engineering Students, 3rd Edition* - by Brown and Holme, Cengage, 2015; students can choose between a hardbound edition (ISBN: 9781285199023), a loose-leaf 3-ring binder edition (9781305256675), or an ebook edition (9781285805504). Note: OWL (online homework system) is NOT being used for this class.
- Response Card (Clicker)-W/LCD. Turning Technologies; 9781934931400.  
(For Clicker Assistance: <http://www.celt.iastate.edu/technology/clickers/for-students/>)
- A scientific calculator is required (with scientific notation and  $\ln x$ ,  $\log x$ ,  $10^x$ ,  $e^x$ , and  $y^x$  functions). Please note that programmable and graphing calculators are permitted for CHEM 167 this semester.

**Lectures:** You are expected to attend classes and to read the text material before lecture. You will learn more in lecture by arriving prepared for class. Not everything in the text will/can be covered in lecture. Attending another lecture section will not hurt you, but you should not expect that the material covered by one instructor to match exactly the material covered by the other instructor. Lectures notes for each chapter are posted on Blackboard Learn; you are encouraged to read the text and the lecture notes prior to attending lecture. Bring your clickers to all lectures; failure to bring a clicker to class will result in 0 clicker points for that day.

**Absolutely no exceptions.**

*All lectures will be video-captured and posted on blackboard after each class.*

***Please refrain from any disruptive activities in the class, which might affect other students or distract the instructor. This includes reading newspapers, using cell phones or iPods, browsing the internet, playing games, watching videos, talking, etc.*** Research studies have shown a clear correlation between the use of laptops for entertainment in large lecture settings and LOWER student learning in the lecture environment; students around a laptop user also pay less attention to the content in the lecture. ***Your classmates are permitted and encouraged to ask you to discontinue distracting behavior. To help promote a good learning environment for all, please be respectful in your behavior towards your fellow students and your instructors.***

**Lecture or Clicker Quizzes:** Quizzes will be given during class using the Turning Point RF Clicker. **Clickers must be registered on Blackboard Learn by noon on Tuesday September 1<sup>st</sup>; clicker quizzes will count for credit starting on Wednesday September 2<sup>nd</sup>.** **Bring your clickers to all lectures; failure to bring a clicker to class will result in 0 clicker points for that day.** Each lecture/clicker quiz is worth 2 points and there will be a minimum of 35 clicker quizzes (70 points total); total lecture/clicker quiz scores will be capped at 50 points (thus there is a 20 point buffer built in to give flexibility to miss a few questions or lectures). It is important that you correctly register your clicker on BbL; failure to do so will result in a loss of points. Check scores on BbL to verify that you are earning clicker points. If you have problems with your clicker, visit: <http://www.celt.iastate.edu/technology/clickers/for-students/>.

**Homework:** You will be assigned problems from the textbook weekly; these are due in recitation. **Late homework will not be accepted.** For full credit on homework, all work must be shown, answers must be correct, the handwriting must be easily legible, and **the assignment must be turned in during recitation. Be kind to your teaching assistants: be organized and write neatly.** There will be 15 homework assignments each worth 4 points (60 points total); the total for the homework scores will be capped at 50 points (thus there is a buffer of 10 points giving flexibility to miss a homework deadline or not determining the correct answer on all problems).

**Recitations & recitation quizzes:** On Tuesdays you will meet in smaller groups with a teaching assistant (TA). Recitations will be used to discuss questions, end-of-chapter problems, and material from the lectures or text. Weekly paper-based homework assignments will be collected in recitation. Graded homework, quizzes, and exams will be returned to you in recitation. A short 10-point quiz or worksheet will be given during recitation sessions. Out of 15 recitation quiz/worksheet scores, the best 10 will be counted up to 100 points. This grading policy gives flexibility to miss several recitations in case of conflicts or illness. **There are no make-up quizzes.**

**Exams:** Three one-hour exams are scheduled for the following Wednesday evenings **6:45-7:45 PM: September 16, October 14, and November 18**. Add these dates and times to your planner to avoid schedule conflicts. You will be assigned an exam location depending on your recitation section as soon as this information is available. **There are no make-up exams**. If you have a valid, serious reason to miss an hour exam, you need to immediately contact one of the instructors (not your TA). You will be asked to drop the course if you miss more than one exam. Your graded hour exams will be returned in recitation the following week. Any request for re-grade should be clearly given in writing before leaving the recitation room – special instructions for regrade requests will be given after the first exam.

**Periodic tables:** Prior to the first exam, you will be issued a periodic table on card stock paper in recitation. This periodic table is yours to use throughout the semester and during exams and recitation quizzes? You may add notes to the periodic table with one rule - it must be written in non-erasable PEN. Both instructors and your TA will make spot checks of these periodic tables throughout the semester. If you lose your periodic table, you will not receive a replacement; however, each exam will contain a periodic table, so losing the card stock version will only mean you lose access to your notes. So, don't lose your periodic table. ***Producing a replacement periodic table to subvert this rule constitutes academic misconduct.***

**Final exam:** The date and time of the final exam is determined by the Registrar's Office and will be announced through BbL as soon as it is available. Do not schedule any travel until you have all your final exam dates confirmed. Alternative final exam times will only be scheduled for students with a conflicting final exam time or those with three or more finals scheduled for the same day. There will be no exceptions. **The last day to request an alternative time for the final exam is 5 pm on Thursday December 3<sup>rd</sup>**. The university final examinations policy will be followed absolutely: <http://www.registrar.iastate.edu/students/exams>.

**Grades:** The BbL grade book will be used. Please monitor your grades on BbL regularly. Any discrepancies between assigned and posted grades must be brought to the attention of your recitation TA (see below for important course policy).

Your final grade will be based on 650 possible total points: three hour-exams at 100 points each (300 total), lecture (clicker) quizzes 50 points, homework 50 points, recitation quizzes 100 points and the final exam 150 points.

The grading policies outlined for pre-lecture assignments (PLAs), recitation/clicker quizzes, recitation quizzes, and homework assignments give significant flexibility for you to miss a lecture, recitation quiz, or assignment without hurting your overall grade. These policies are designed to allow for absences or missed assignments due to illness, emergency, or other unavoidable conflict. Please do not notify your instructor if you miss a lecture; however you are encouraged to let your TA know if you can't make it to your recitation section. Because of this built-in point buffer, **no makeup clicker or recitation quizzes are given and homework deadlines are absolute: no extensions, no exceptions.**

The final exam will be cumulative. Plus-minus grading will be used for the final grade. There will be no optional assignments offered. Tentative letter grade assignments will be as follows: A > 93%, A- > 90%, B+ > 87%, B > 83%, B- > 80%, C+ > 77%, C > 73%, C- > 70%, D+ > 67%, D > 63%, and D- > 60%, F below 60%. The final grade distribution will be consistent with prior semesters; the instructors reserve the right to adjust the grading scale. Important: final grades are based solely on graded work and are NOT negotiable; no single student will be offered make-up or extra credit points.

**Important course policy regarding scores and BbL:** It is the student's responsibility to check grades on Blackboard Learn. Teaching assistants are responsible for entering scores for exams and quizzes; your teaching assistant will have scores recorded on Blackboard within one week of the exam or quiz. Any student who discovers an error in a grade on Blackboard **MUST** bring the graded work to their teaching assistant within 1 week of receiving the returned graded work to have the grade corrected.

**Resources and academic support:** The department of chemistry provides help to all general chemistry students in the **Martha E. Russell Chemistry Help Center** in room 1761 Gilman Hall. It is open MTWR from 9 am to 6 pm and Fridays from 9 am to 1 pm. The Help Center is staffed by general chemistry teaching assistants. Solutions manuals and general chemistry textbooks, study guides, and workbooks are available. Resources in the Help Center may not be removed from the room. Students are encouraged to form study groups and meet on a regular basis in the Help Center.

Supplemental Instruction (SI) is offered to help students in Chem 167. The SI schedule will be posted at: <http://www.dso.iastate.edu/asc/supplemental/homepage.html>. Students who attend SI regularly earn higher grades than students who don't. Students who are struggling to succeed in Chem 167 or any of their courses are encouraged to take advantage of support available to them: instructor office hours, Help Centers, Supplemental Instruction, and the Academic Success Center (<http://www.dso.iastate.edu/asc>). Students should work closely with their academic adviser to implement a plan for success.

**Illness or other emergencies:** If you have a health issue or other emergency that requires you to miss multiple classes, you are advised to contact the Dean of Students Office (<http://www.dso.iastate.edu/sa>) who can contact all of your instructors on your behalf. You also should contact your academic adviser to keep them informed of your situation.

**Academic misconduct:** Academic Misconduct in any form is in violation of ISU *Student Disciplinary Regulations*. This includes, but is not limited to: copying or sharing answers on tests or assignments, plagiarism, entering student response data (Clickers) for another student or having another student enter student response data for you, not following the guidelines regarding the cardstock periodic table, and having someone else do your academic work. Depending on the act, a student could receive an F grade on the test/assignment, F grade for the course, and could be suspended or expelled from the University. If misconduct involves clickers, the student could receive a score of 0 for all clicker questions over the entire semester. See Academic Regulations at <http://www.dso.iastate.edu/ja/academic/misconduct.html> for more details and a full explanation of the Academic Misconduct policies.

**Disability Accommodations:** Please address any special needs or special accommodations with the course instructor as early in the semester as possible. If you have a disability that qualifies under the Americans with Disabilities Act and Section 504 of the Rehabilitation Act, and you require accommodations, you should contact the Disability Resource (DR) office for information on appropriate policies and procedures. DR is located on the main floor of the Student Services Building, Room 1076, phone 515/294-7220, web site: <http://www.dso.iastate.edu/dr/>. There you can obtain a Student Academic Accommodation Request (SAAR) form, which you must present to the course instructor at the beginning of the semester or as soon as you become aware of your needs. **We require at least one week's advance notice to provide accommodation at an exam.**

**Dead Week:** This class follows the Iowa State University Dead Week policy as noted in the university catalogue: <http://catalog.iastate.edu/academiclife/gradingsystem/>.

**Harassment and Discrimination:** Iowa State University strives to maintain our campus as a place of work and study for faculty, staff, and students that is free of all forms of prohibited discrimination and harassment based upon race, ethnicity, sex (including sexual assault), pregnancy, color, religion, national origin, physical or mental disability, age, marital status, sexual orientation, gender identity, genetic information, or status as a U.S. veteran. Any student who has concerns about such behavior should contact his/her instructor, [Student Assistance](#) at 515-294-1020 or email [dso-sas@iastate.edu](mailto:dso-sas@iastate.edu), or the [Office of Equal Opportunity and Compliance](#) at 515-294-7612.

**Religious Accommodation:** If an academic or work requirement conflicts with your religious practices and/or observances, you may request reasonable accommodations. Your request must be in writing, and your instructor will review the request. You or your instructor may also seek assistance from the [Dean of Students Office](#) or the [Office of Equal Opportunity and Compliance](#).

**Contact Information:** If you are experiencing, or have experienced, a problem with disability accommodations, academic misconduct, dead week policies, harassment and discrimination, or religious accommodations, email [academicissues@iastate.edu](mailto:academicissues@iastate.edu).

**Suggested problems:** The following is a listing of some suggested problems to help you to prepare for exams and quizzes. Other problems may be suggested by the instructors in the course of the semester. It is in your best interest to do these problems and other related problems in order to master the material. Learning, achievement, and success comes with sustained and deliberate practice (as with success in most endeavors, see:

[http://money.cnn.com/magazines/fortune/fortune\\_archive/2006/10/30/8391794/index.htm](http://money.cnn.com/magazines/fortune/fortune_archive/2006/10/30/8391794/index.htm)).

Chapter 1: 1.11, 1.16, 1.44, 1.46, 1.46a, 1.74

Chapter 2: 2.13f, 2.16, 2.19, 2.20, 2.24ab, 2.25b, 2.30, 2.38, 2.42, 2.44, 2.53, 2.65, 2.77, 2.79/88

Chapter 3: 3.1, 3.17, 3.21, 3.26, 3.27, 3.29, 3.31, 3.35abd, 3.51a, 3.54, 3.55, 3.65a, 3.69, 3.90, 3.96, 3.98

Chapter 4: 4.13a, 4.15b, 4.43, 4.51, 4.54, 4.77, 4.76

Chapter 5: 5.1, 5.4, 5.31, 5.35, 5.42, 5.64, 5.69, 5.73, 5.78, 5.79

Chapter 6: 6.11, 6.16, 6.17a, 6.20, 6.22, 6.27, 6.28, 6.31, 6.38, 6.39, 6.42-45, 6.48, 6.52, 6.54, 6.55, 6.58, 6.65, 6.66, 6.72, 6.75, 6.76, 6.85a, 6.86a

Chapter 7: 7.8, 7.12, and see example problem 7.2 on page 206 of the text, 7.17, 7.23, 7.33, 7.34ab, 7.35d, 7.39, 7.50, 7.53, 7.59, 7.61ab, 7.68, 7.70, 7.74, 7.86

Chapter 8: 8.5, 8.9, 8.13, 8.15, 8.19, 8.23, 8.25, 8.26, 8.29, 8.31, 8.34, 8.35, 8.36, 8.37, 8.46, 8.58, 8.63, 8.65, 8.68, 8.73, 8.75, 8.77, 8.78, 8.87, 8.93

Chapter 9: 9.2, 9.3, 9.5, 9.7, 9.15b, 9.17, 9.19, 9.23, 9.24, 9.37, 9.43, 9.44, 9.45, 9.48, 9.54, 9.57, 9.58b

Chapter 10: 10.4, 10.7, 10.10, 10.13, 10.23, 10.18, 10.28, 10.35, 10.43, 10.47d, 10.53, 10.57, 10.60, 10.61, 10.67, 10.84, 10.85; Fun question (not required): 10.17

Chapter 11: 11.12, 11.13, 11.17, 11.22, 11.26, 11.34, 11.44, 11.53, 11.54, 11.57 (use only 2 points 298 and 308 K and solve algebraically), 11.60, 11.71, 11.78

Chapter 12: 12.12, 12.15, 12.19d, 12.20a, 12.25a, 12.30, 12.36, 12.39, 12.45, 12.49, 12.54, 12.57e, 12.62, 12.64a, 12.73ac, 12.75b, 12.76bc, 12.77, 12.78

Week	Dates	Chapter/Topics	Exams
1	Aug 24–28	1 - Introduction to Chemistry 2 - Atoms and Molecules	
2	Aug 31 – Sep 4	3 - Molecules, Moles, and Chemical Equations	
3	Sep 7–11	4 - Stoichiometry	
4	Sep 14–18	4 - Stoichiometry (cont.) and 5 - Gases	<b>Evening Exam I: Wed Sep 16, 6:45 pm</b>
5	Sep 21–25	5 - Gases (cont.)	
6	Sep 28 – Oct 2	6 - The Periodic Table and Atomic Structure	
7	Oct 5–9	7 - Chemical Bonding and Molecular Structure	
8	Oct 12–16	7 - Chemical Bonding and Molecular Structure (cont.) and 8 - Molecules and Materials	<b>Evening Exam II: Wed Oct 14, 6:45 pm</b>
9	Oct 19–23	8 - Molecules and Materials (cont.)	
10	Oct 26–30	9 - Energy and Chemistry	
	Fri Oct. 30	<b><i>Last day to drop the course without extenuating circumstances.</i></b>	
11	Nov 2–6	10 - Entropy and the Second Law of Thermodynamics	
12	Nov 9–13	11 - Chemical Kinetics	
13	Nov 16–20	11 - Chemical Kinetics (cont.) and 12 – Chemical Equilibrium	<b>Evening Exam III: Wed Nov 18, 6:45 pm</b>
	Nov 23–27	Thanksgiving break	
14	Nov 30 – Dec 4	12 - Chemical Equilibrium (cont.)	
	Thursday Dec 3 5 pm	<b><i>Last day to request a change in final exam schedule, see (<a href="http://www.registrar.iastate.edu/students/exams">http://www.registrar.iastate.edu/students/exams</a>) for details.</i></b>	
15	Dec 7–11	13 - Electrochemistry	
16	Dec 14–18	Finals Week	