CH 231 - General Chemistry (4 credits)

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CH 231, 232, 233: A general chemistry sequence taught on Ecampus for students majoring in most sciences, pharmacy, and chemical, biological, and environmental engineering. CH 231 is an online lecture course; CH 261 is the on campus laboratory component. Enrollment in CH 261 is NOT required for enrollment in CH 231. CH 261 may be taken at a later time, or not at all, depending on your needs.

Beginning Fall 2012 term, CH 231/232/233 (lecture) and CH 261/262/263 (lab) classes will have enforced corequisites in the registration system, because on campus students are required to take both. Ecampus students, however, are not required to take the labs; check with your advisor to be sure. If you do not need the lab, you can request an override by contacting: chemistry.ecampus@oregonstate.edu, Chemistry Ecampus support. Please supply your OSU ID number in your request.

NOTE – CH 261 is only offered on-site at the main campus. It is offered in a condensed, 3-day format; for dates, please go to the Schedule of Classes.

Prerequisites: One year of high school chemistry and acceptable aptitude test scores. CH 121 is accepted in lieu of high school chemistry as a prerequisite for this sequence. CH 231, CH 232, CH 233 must be taken in order.

Time Requirements: It is expected that students will spend approximately 3 hours /week reading the materials posted on Blackboard (lecture notes, worked examples, video clips, etc.) and an additional 9-12 hours/week reading the textbook, studying the material covered in the lecture notes, and working on the Mastering Chemistry assignments.

Textbook and Related Items:

Please refer to the OSU Bookstore website for current textbook information.

Course Content:

Chapter 1: Matter, Measurement, and Problem Solving
Chapter 2: Atoms and Elements
Chapter 7: The Quantum Mechanical Model of the Atom
Chapter 8: Periodic Properties of the Elements
Chapter 9: Chemical Bonding I: Lewis Theory
Chapter 10: Chemical Bonding II: Molecular Shapes, Valence Bond Theory, and Molecular Orbital Theory
Chapter 3: Molecules, Compounds, and Chemical Equations
Chapter 4: Chemical Quantities and Aqueous Reactions

**Student Learning Outcomes:**

The successful student will:

1) Demonstrate mastery of basic chemical concepts and principles covered in this course as measured by performance on exams.
   a) Quantum mechanics
      - Be able to explain the significance of the historically important experiments such as Rutherford’s gold foil experiment and Millikan’s oil drop experiment
      - Be able to explain how and why phenomena such as the photoelectric effect and the “UV catastrophe” were important in the historical evolution of quantum mechanics
      - Be able to use the products of quantum mechanics, such as quantum numbers and quantized energy levels, to describe the structure of atoms and their behavior.
   b) The periodic table and electronic structure
      - Be able to explain the relationship between the structure of the periodic table and electron configurations
      - Be able to explain the relationship between electronic structure and properties such as atomic size, ionization energies, electron affinities, and electronegativity
      - Be able to explain the relationship between electronic structure of atoms and chemical reactivity
   c) Chemical bonding
      - Be able to compare and contrast the three bonding theories discussed in class
      - Be able to determine molecular shapes, and the presence or absence of molecular dipoles
   d) Stoichiometry and chemical reactions
      - Be able to identify reactions according to type: precipitation, acid/base, oxidation reduction
      - Given the reactants be able to predict the products of precipitation reactions and acid/base reactions
      - Be able to do stoichiometric calculations

2) Demonstrate the ability to think scientifically and critically as measured by performance on exam questions requiring written explanations

3) Demonstrate problem-solving skills applicable to a wide variety of problems drawn from the topics covered in this course, as measured by performance on exams.

4) Be able to explain how and why scientific theories have changed over the years, as measured by performance on short answer exam questions.

**Successful completion of both CH 231 and CH 261 are required to fulfill OSU’s Baccalaureate Core course requirement in the Perspectives category under Physical Science (Lab).**

This course is offered through Oregon State University Extended Campus. For more information, contact:
Web: ecampus.oregonstate.edu Email: ecampus@oregonstate.edu Tel: 800-667-1465
Physical Science Baccalaureate Core Rational: Science seeks to develop a fundamental description and understanding of the natural world, from elementary particles to the cosmos, including the realm of living systems. Students should have the opportunity to explore the insights of science, to view science as a human achievement, and to participate in scientific inquiry. This experience includes the challenge of drawing conclusions based on observation, analysis, and synthesis.

CH 231, 232, 233 has adopted the "atoms first" approach to teaching general chemistry. This means that early on we will discuss quantum mechanics and the seminal experiments that have lead to our current conception of atomic structure and function. One advantage to this approach is that it emphasizes the tentative nature of science. Science, and by extension chemistry, will be viewed as a process rather than a static set of facts. The process of 'doing science' will be further explored in the companion laboratory sequence CH 261, 262, 263.

Examinations:

Students will take a midterm exam (in week 5) and a comprehensive final exam (in week 11), both under the supervision of an approved proctor. Proctoring guidelines and registration for proctored exams are available online through the Ecampus Exams and Proctoring website: http://ecampus.oregonstate.edu/services/proctoring

It is important to submit your proctoring request as early as possible to avoid delays.

Grading:

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<tr>
<th>Exams/Assignments</th>
<th>Points</th>
<th>Week</th>
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<tbody>
<tr>
<td>Midterm Exam*</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>Final Exam *</td>
<td>200</td>
<td>5</td>
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<tr>
<td>Mastering Chemistry</td>
<td>50</td>
<td></td>
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<tr>
<td>Quizzes (best 6 of 7; 10 pts each)</td>
<td>60</td>
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*If the percentage on the final exam is higher than the percentage on the midterm exam the midterm score will be dropped and the final exam score will be used for the entire exam component of the course grade.

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<thead>
<tr>
<th>Course grade</th>
<th>% of total pts</th>
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<tbody>
<tr>
<td>A</td>
<td>92.0 - 100%</td>
</tr>
<tr>
<td>A-</td>
<td>90.0 - 91.9%</td>
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<tr>
<td>B+</td>
<td>88.0 - 89.9%</td>
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<tr>
<td>B</td>
<td>82.0 - 87.9%</td>
</tr>
<tr>
<td>B-</td>
<td>80.0 - 81.9%</td>
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<tr>
<td>C+</td>
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<tr>
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<tr>
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<tr>
<td>D-</td>
<td>60.0 - 61.9%</td>
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<tr>
<td>F</td>
<td>&lt;60.0%</td>
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Services for Students with Disabilities:

Accommodations are a collaborative effort between students, faculty, and the Disability Access Services (DAS) office. Students with accommodations approved through DAS are responsible for contacting the faculty member in charge of the course prior to, or during, the first week of the term to discuss accommodations. Students who believe they are eligible for accommodations, but who have not yet obtained approval through DAS, should contact DAS immediately at 541-737-4098.

Expectations for Student Conduct:

Student conduct is governed by the university's policies, as explained in the Office of Student Conduct: Information and Regulations. In an academic community, students and faculty, and staff each have responsibility for maintaining an appropriate learning environment, whether online or in the classroom. Students, faculty, and staff have the responsibility to treat each other with understanding, dignity, and respect. Further information may be found at: http://oregonstate.edu/admin/stucon/achon.htm

Academic Integrity - Students are expected to comply with all regulations pertaining to academic dishonesty, defined as: An intentional act of deception in which the student seeks to claim credit for the work or effort of another person or uses unauthorized materials or fabricated information in any academic work. For further information, visit Avoiding Academic Dishonest, or contact the office of Student Conduct and Mediation at 541-737-3656.

Conduct in this online classroom -- Students are expected to conduct themselves in the course (e.g. on discussion boards, email postings) in compliance with the university's regulations regarding civility. Students will be expected to treat all others with the same respect as they would want afforded to themselves. Disrespectful behavior (such as harassing behavior, personal insults, inappropriate language) or disruptive behaviors are unacceptable and can result in sanctions as defined by Oregon Administrative Rules Division 015 Student Conduct Regulations.

Student Evaluation of Teaching

We encourage you to engage in the course evaluation process each term – online, of course. The evaluation form will be available toward the end of each term, and you will be sent instructions through ONID. You will login to “Student Online Services” to respond to the online questionnaire. The results on the form are anonymous and are not tabulated until after grades are posted.