CH 121 - GENERAL CHEMISTRY
Summer 2020 Syllabus, Section 400, CRN 71448
Credit hours: 5

Instructor Information
Jeffrey Gautschi

Session
6\22 to 7\17

Course Description
A general chemistry sequence for students who have had no previous training in chemistry and for those whose college aptitude test scores indicate the need for a more elementary introduction to chemistry. Entering students are expected to have a working knowledge of high school algebra, logarithms, and scientific notation. Lec/lab/rec. (CH 122, CH 123 are Bacc Core Courses)

Course Credits
This course combines approximately 150 hours of instruction, online activities, and assignments for 5 credits.

Course Learning Outcomes
Students will be able to competently discuss concepts and solve problems relating to: matter and biomeasurement, the language of chemistry, atomic structure and electron configuration, bonding and molecular structure (including Lewis structures), solutions and concentration, and stoichiometry.

Communication
Please post all course-related questions in the Q&A Discussion Forum so that the whole class may benefit from our conversation. Please contact me privately for matters of a personal nature. I will reply to course-related questions within 24-48 hours. I will strive to return your assignments and grades for course activities to you within about five days of the due date.

Evaluation of Student Performance

Quizzes (16.51%)

Introductory Quiz
This quiz covers material in the Syllabus as well as in the Start Here, Course Information, and Proctoring Information modules.

CH 121 Pre-Assessment
This quiz consists of questions taken from material throughout CH 121, as well as questions designed to gauge your thoughts with regard to studying chemistry.

You are not expected to study for the pre-assessment, but you are expected to put forth your best effort.

Chapter 1 Quiz
This quiz is based on material in Chapter 1: Essential Ideas

Chapter 2 Quiz
This quiz is based on material in Chapter 2: Atoms, Molecules, & Ions

Chapter 3 Quiz
This quiz is based on material in Chapter 3: Electronic Structure and Periodic Properties of Elements

Chapter 4 - Part 1 Quiz
This quiz is based on material in Part 1 of Chapter 4: Chemical Bonding and Molecular Geometry, sections 4.1-4.5

Chapter 4 Part 2 and Chapter 5 Quiz
This quiz covers material in Part 2 of Chapter 4 - section 4.6, and in Chapter 5: Advanced Theories of Bonding - sections 5.1-5.3

Chapter 6 Quiz
This quiz is based on material in Chapter 6: Composition of Substances and Solutions. Sections covered are 6.1-6.3

Chapter 7 Quiz
This quiz is based on material in Chapter 7: Stoichiometry of Chemical Reactions. Sections covered are 7.1, 7.3, & 7.4

Homework Totals (18.35%)

Chapter 1 - Part 1
This assignment consists of the following homework segments:

• Matter, Mass, and Weight (1 pt)
• Atoms and Molecules (1 pt)
• Elements, Compounds, & Mixtures (1 pt)

These can all be accessed directly from the Chapter 1 module.

Chapter 1 - Part 2
This assignment consists of the following homework segments:

• Physical and Chemical Properties (1 pt)
• Extensive and Intensive Properties (1 pt)
• Measurements (1 pt)
• Calculations Using Measurement (2 pts)
• Measurement Uncertainty (1 pt)
• Significant Figures (1 pt)
• Dimensional Analysis (2 pts)

These can all be accessed directly from the Chapter 1 module.

Chapter 2
This assignment consists of the following homework segments:

• Classical Atomic Theory
• Modern Atomic Theory
• Atomic Structure
• Isotopes
• Chemical Symbols
• Chemical Formulas

These can all be accessed from the Chapter 2 Module.

Chapter 3 - Part 1
This assignment consists of the following homework segments:

• Classic Electromagnetic Theory...
• Bohr’s Atomic Theory
• Bohr's Model: Energy Calculations
• Quantum Theory: Introduction
• Quantum Numbers
• Electron Configurations
• Orbital Diagrams
• Extensions of Electron Configurations

All of these segments can be accessed from the Chapter 3 Module.

Chapter 3 - Part 2
This assignment consists of the following homework segments:
• Variations in Element Properties: Covalent and Ionic Radii
• Variations in Elemental Properties: Ionization Energies and Electron Affinities
• Paradoxes within the Classic Electromagnetic Theory
• The Periodic Table
• The Periodic Table: Interpretation and Identification
• Ionic Compounds
• Molecular Compounds

These segments can all be accessed in the Chapter 3 Module.

Chapter 4 - Part 1
This assignment consists of the following homework segments:
• Ionic Bonding: Cations and Anions (2.5 pts)
• Covalent Bonding: Understand the... (1 pt)
• Covalent Bonding: Electronegativity (1 pt)
• Chemical Nomenclature: Ionic... (2 pts)
• Chemical Nomenclature: Molecular... (1.5 pts)
• Lewis Structures (2.5 pts)
• Lewis Structures: Octet Rules (2.5 pts)
• Formal Charges and Resonance (2 pts)

These segments can all be accessed in the Chapter 4 - Part 1 Module.

Chapter 4 - Part 2
This assignment consists of the following homework segments:
• VSEPR Theory (2 pts)
• Molecular Geometry and Polarity (1 pt)

These segments can all be accessed in the Chapter 4 - Part 2 Module.

Chapter 5
This assignment consists of the following homework segments:
• Valence Bond Theory (1 pt)
• Hybridization (2 pts)
• Orbital Overlap in Multiple Bonds (1 pt)

These segments can all be accessed in the Chapter 5 Module.

Chapter 6 - Part 1
This assignment consists of the following homework segments:
• Formula Mass (2.5 pts)
• The Mole: Definition and Use (1 pt)
• The Mole: Conversions to Grams (2 pts)
• The Mole: Conversions to Grams (2 pts)
• Empirical Formula (4 pts)
• Molecular Formula (2.5 pts)

These segments can all be accessed in the Chapter 6 Module.

Chapter 6 - Part 2
This assignment consists of the following homework segments:
• Molarity: Definition and Calculations (2.5 pts)
• Molarity and Molar Calculations (3.5 pts)
• Dilutions: Determining Concentration (2 pts)
• Dilutions: Determining Volume (2 pts)

These segments can all be accessed in the Chapter 6 Module.

Chapter 7
This assignment consists of the following homework segments:
• Writing and Balancing Chemical Equations (2.5 pts)
• Reaction Stoichiometry: Moles (4 pts)
• Reaction Stoichiometry: Mass (2.5 pts)
• Limiting Reactant (3 pts)

These segments can all be accessed in the Chapter 7 Module.

Labs (10.09%)
Lab 1 - Lab Techniques
This lab is an introduction to the online lab site and will familiarize students with how instrumentation in the labs works and how experiments are designed.

Lab 2 - Linear Regression
This lab introduces students to the use of spreadsheets in analyzing data from scientific experiments.

Lab 3 - Standard Deviations
This lab introduces some basic statistics used in evaluating data

Lab 4 - Absorbance
This lab has students apply concepts learned in the first three labs, creating a graph of data with a trendline and using the information obtained to quantify the concentration of an unknown solution

Lab 5 - NMR
This lab uses NMR to investigate molecular structure. Students will use their knowledge of molecular geometry to evaluate the data.

Lab 6 - Combustion
In this lab, students will combust both a known and an unknown substance, and use the data obtained to determine the empirical formula of each.

Lab 7 - TLC and Synthesis
In this lab, students will learn about chromatographic separation of compounds, and use the process to investigate reaction stoichiometry
Exams (55.05%)

Final Exam (U20)
This exam covers material from the entire course, but is more heavily weighted toward material that wasn't covered on the midterm.

Midterm Exam (U20)
The midterm exam covers materials from Chapter 1 through Part 1 of Chapter 4.

Extra Credit (4.4%)

Course Introductions
This extra credit discussion board post will help us get to know each other and build a course community.

Week 1 Extra Credit
This assignment will have students reflect on study strategies that will be useful for this course.

Week 2 Extra Credit
This assignment will have students reflect on the first quiz, and learn strategies for getting the most out of reviewing past assessments.

Week 3 Extra Credit
This assignment is to check in with students on their confidence in the course, and also make sure students are using calculators correctly as we move into calculations that use scientific notation.

Week 4 Extra Credit
This assignment will have students reflect on how they are preparing for the upcoming midterm exam in the course.

Week 5 Extra Credit
This assignment will have students reflect on strategies to manage exam anxiety, both before and during exams.

Week 6 - Extra Credit - Midterm Exam Wrapper
This assignment is designed to give students a chance to reflect on your exam performance and, more importantly, on the effectiveness of their exam preparation.

Week 7 Extra Credit
This assignment will have students reflect on situations when they have persevered and overcome obstacles.

Week 8 Extra Credit
This assignment will have students reflect on retrieval practice as a study strategy, and about how chemistry will be relevant to their chosen field of study.

Week 9 Extra Credit
This assignment asks students to reflect on how their study strategies have changed since the midterm exam.

Week 10 Extra Credit
For our final extra credit assignment, we're going to create a discussion board where people can discuss preparations for the final exam, and offer encouragement to each other.

Schedule of Topics and Assignments

<table>
<thead>
<tr>
<th>Week of</th>
<th>Reading(s):</th>
<th>Agenda/Topic:</th>
<th>Due: (Pacific Time)</th>
</tr>
</thead>
</table>
| 6/22    | Ch. 1 (Pt.1): Sections 1.1-1.2  
          Ch. 1 (Pt. 2): Sections 1.3-1.4  
          Begin Ch. 2: Sections 2.1-2.4 | Essential Ideas  
Atoms, Molecules, & Ions  
*Register for Knewton Alta homework (through Canvas)  
*Register for online labs sites (through Canvas)  
*Find an exam proctor & sign up through Ecampus Testing | Due 6/23 at 11:59pm:  
Introductory Quiz (p. 1)  
CH 121 Pre-Assessment (p. 1)  
Course Introductions (p. 3)  
Due 6/24 at 11:59pm:  
Chapter 1 - Part 1 (p. 1)  
Due 6/26 at 11:59pm:  
Chapter 1 Quiz (p. 1)  
Chapter 1 - Part 2 (p. 1)  
Lab 1 - Lab Techniques (p. 2)  
Lab 2 - Linear Regression (p. 2)  
Due 6/27 at 11:59pm:  
Week 1 Extra Credit (p. 3) |
### 6/29
- **Finish Ch. 2: Sections 2.1-2.4**
- **Ch. 3 (Pt. 1): Sections 3.1-3.4**
- **Ch. 3 (Pt. 2): Sections 3.5-3.7**
- **Ch. 4 (Pt. 1): Sections 4.1-4.5**

<table>
<thead>
<tr>
<th>Atoms, Molecules, &amp; Ions</th>
<th>Electronic Structure &amp; Periodic Properties of Elements</th>
<th>Chemical Bonding &amp; Molecular Geometry</th>
</tr>
</thead>
<tbody>
<tr>
<td>Due 6/30 at 11:59pm:</td>
<td>Week 2 Extra Credit (p. 3)</td>
<td>Chapter 2 Quiz (p. 1)</td>
</tr>
<tr>
<td></td>
<td>Week 3 Extra Credit (p. 3)</td>
<td>Chapter 3 Quiz (p. 1)</td>
</tr>
<tr>
<td></td>
<td>Due 7/3 at 11:59pm:</td>
<td>Chapter 4 - Part 1 Quiz (p. 1)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Chapter 2 (p. 1)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Chapter 3 - Part 1 (p. 1)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Chapter 3 - Part 2 (p. 2)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Chapter 4 - Part 1 (p. 2)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Lab 3 - Standard Deviations (p. 2)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Lab 4 - Absorbance (p. 2)</td>
</tr>
<tr>
<td></td>
<td>Due 7/4 at 11:59pm:</td>
<td>Week 4 Extra Credit (p. 3)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Week 5 Extra Credit (p. 3)</td>
</tr>
</tbody>
</table>

### 7/6
- **Ch. 4 (Pt. 2): Section 4.6**
- **Ch. 5: Sections 5.1-5.3**

<table>
<thead>
<tr>
<th>Chemical Bonding &amp; Molecular Geometry</th>
<th>Advanced Theories of Bonding</th>
<th>MIDTERM EXAM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Due 7/6 at 10pm:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Due 7/9 at 11:59pm:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Week 6 - Extra Credit - Midterm Exam</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wrapper (p. 3)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Due 7/10 at 11:59pm:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chapter 4 Part 2 and Chapter 5 Quiz</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(p. 1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chapter 4 - Part 2 (p. 2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chapter 5 (p. 2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lab 5 - NMR (p. 2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lab 6 - Combustion (p. 2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Due 7/11 at 11:59pm:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Week 7 Extra Credit (p. 3)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Week 8 Extra Credit (p. 3)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### 7/13
- **Ch. 6 (Pt. 1): Sections 6.1-6.2**
- **Ch. 6 (Pt. 2): Section 6.3**
- **Ch. 7: Sections 7.1, 7.3, 7.4**

<table>
<thead>
<tr>
<th>Composition of Substances &amp; Solutions</th>
<th>Stoichiometry of Chemical Equations</th>
<th>FINAL EXAM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Due 7/13 at 11:59pm:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Week 9 Extra Credit (p. 3)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Due 7/14 at 11:59pm:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Week 10 Extra Credit (p. 3)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Due 7/16 at 11:59pm:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chapter 6 Quiz (p. 1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chapter 7 Quiz (p. 1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chapter 6 - Part 1 (p. 2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chapter 6 - Part 2 (p. 2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chapter 7 (p. 2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lab 7 - TLC and Synthesis (p. 2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Due 7/17 at 10pm:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Final Exam (U20) (p. 3)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Grading Scale

<table>
<thead>
<tr>
<th>Grade</th>
<th>Percent Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>92-100</td>
</tr>
<tr>
<td>A-</td>
<td>89-91</td>
</tr>
<tr>
<td>B+</td>
<td>86-88</td>
</tr>
<tr>
<td>B</td>
<td>82-85</td>
</tr>
<tr>
<td>B-</td>
<td>79-81</td>
</tr>
<tr>
<td>C+</td>
<td>76-78</td>
</tr>
<tr>
<td>C</td>
<td>72-75</td>
</tr>
<tr>
<td>C-</td>
<td>69-71</td>
</tr>
<tr>
<td>D+</td>
<td>66-68</td>
</tr>
<tr>
<td>Grade</td>
<td>Score Range</td>
</tr>
<tr>
<td>-------</td>
<td>-------------</td>
</tr>
<tr>
<td>D</td>
<td>62-65</td>
</tr>
<tr>
<td>D-</td>
<td>60-61</td>
</tr>
<tr>
<td>F</td>
<td>&lt;60</td>
</tr>
</tbody>
</table>

**Please Note**

This syllabus is subject to change with notice from the instructor. For students registered in this section, there is additional content in the syllabus, which can be accessed through Canvas (http://oregonstate.instructure.com) at the start of term.