Instructor: Dr. David Clevette  (david.clevette@doane.edu)
Office: Doane College, Crete Campus, Lied 201
Work Phone: (402) 826-8244

Catalog Description: Through lecture and lab experience, students will be exposed to and will demonstrate an understanding of basic concepts in chemistry such as nomenclature, stoichiometry, thermochemistry, the periodic table, electronic structure and bonding.

Prerequisite: Two years of high school algebra or any college mathematics course.

4 credits.

READINGS:


Note: This is a standalone book and does not contain an access code. The access code then will be purchased separately online using a credit card or PayPal on the Pearson website (accessed through this Blackboard course.) Another option is to purchase the eText at this time for more money, in which case you can choose whether or not to have the physical textbook.

Alternatively, one may buy the textbook with the access code:

COURSE GOALS & OBJECTIVES:

This course meets the Doane College Foundational Areas of Knowledge (FAK) outcomes for Scientific Perspectives:

Students will gain a greater understanding of scientific thinking and applications using core ideas in a course that includes a laboratory or field experience. Students will consider the complexities of scientific methodologies in one or more disciplines of the natural sciences, the scientific context of issues they will confront as informed citizens, and the scientific impact on the global community. Students will work to:

1. Employ methods of science for inquiry in a scientific discipline
2. Develop their scientific literacy and ability to critically evaluate scientific information

Other Global Learning Outcomes include:
• Read and interpret graphs and data.
• Demonstrate the quantitative skills needed to succeed in General Chemistry.

Primarily, these outcomes will be assessed through graded online tutorials, homework, quizzes, tests, and online laboratory modules. Additionally, these outcomes will be assessed less formally through online conversations with individual students as they progress throughout the course.

1
COURSE MATERIAL:
Within each chapter listed below, the Learning Modules from Blackboard (see below) are also listed along with the specific chapter sections. The letters A, B, and C to describe each Learning Module are used for the Mastering Chemistry Assignments (see below).

Chapter 0 – Getting Started
• Getting Started

Chapter 1 – Matter, Measurement, and Problem Solving
• 1A - Classification of Matter (1.1 – 1.4)
• 1B - Measurement (1.5 – 1.7)
• 1C - Problem Solving (1.8)

Chapter 2 – Atoms and Elements
• 2A - Modern Atomic Theory (2.1 – 2.5)
• 2B - Atomic Structure and the Periodic Law (2.6 – 2.7)
• 2C - Atomic Mass and Moles (2.8 – 2.9)

Chapter 3 – Molecules, Compounds, and Chemical Equations
• 3A - Nomenclature and Chemical Formulas (3.1 – 3.7)
• 3B - Molar Mass, Mass Percent, and Empirical Formulas (3.8 – 3.10)
• 3C - Balancing Reactions and Organic Compounds (3.11 – 3.12)

Chapter 4 – Chemical Quantities and Aqueous Reactions
• 4A - Stoichiometry (4.1 – 4.3)
• 4B - Solution Concentration and Solubility (4.4 – 4.5)
• 4C - Chemical Reactions (4.6 – 4.9)

Chapter 5 – Gases
• 5A - The Ideal Gas Law (5.1 – 5.5)
• 5B - Mixtures of Gases, Stoichiometry with Gases (5.6 – 5.7)
• 5C - Kinetic Molecular Theory of Gases (5.8 – 5.10)

Chapter 6 – Thermochemistry
• 6A - Thermochemistry and Calorimetry (6.1 – 6.7)
• 6B - Hess’s Law, Standard Heats of Formation (6.8 – 6.10)

Chapter 7 – The Quantum Mechanical Model of the Atom
• 7A - Light and the Bohr Model of the Hydrogen Atom (7.1 – 7.3)
• 7B - Quantum Mechanics and Atomic Orbitals (7.4 – 7.6)

Chapter 8 – Periodic Properties of the Elements
• 8A - The Periodic Table and Atomic Configurations (8.1 – 8.5)
• 8B - Periodic Trends (8.6 – 8.9)

Chapter 9 – Chemical Bonding I: Lewis Theory
• 9A - Ionic Bonding, Octet Rule, Lattice Energy (9.1 – 9.4)
• 9B - Lewis Structures (9.5 – 9.9)
• 9C - Bond Lengths and Bond Energies (9.10)

Chapter 10 – Chemical Bonding II: Molecular Shapes, Valence Bond Theory, and Molecular Orbital Theory
• 10A - VSEPR Theory, Predicting Molecular Geometries (10.1 – 10.5)
• 10B - Valence Bond Theory and Molecular Orbital Theory (10.6 – 10.8)
ON-LINE LEARNING STRATEGIES & ASSESSMENTS:

1. **BlackBoard:**
   By enrolling in this course you are automatically enrolled in this *Blackboard* course (bb2.doane.edu), 15SUM: General Chemistry I Sec 1. You will find a menu on the left side of the screen with some links.

   The more important links are:

   **Chapters** – Folders with several **Learning Modules** within each Chapter. Within each Learning Module you will find:
   
   • Textbook sections (in parenthesis after the name of the Learning Module)
   • Learning Objectives – specific goals
   • Lectures – what I have prepared for this course
   • YouTube Videos – what others have prepared for learning material within this Learning Module
   • Other Resources – links to alternative readings, practice quizzes, FAQs, etc.
   • Mastering Assignments – what you are graded on

   **Mastering Chemistry** – links to the MyLab & Mastering for Blackboard.
   **Online ChemLabs** – access the laboratory

Some other links that are not required but you will probably find useful are as follows. Whenever appropriate I put specific links within Other Resources in the Learning Modules.

   **ChemWiki** – a hyperlinked textbook created by the folks at UC-Davis.
   **Principles of General Chemistry** – an alternative, traditional textbook that is open-sourced.
   **General Chemistry Online** – by Fred Senese at Frostburg State University - lots of help and resources, including hyperlinked notes and guides, tutorials, FAQs, skills checklist, and self-grading practice quizzes and examinations.
   **Chemistry Tutorials and Drills** – A subsection of “meta-synthesis”, all about chemical reactions. The Drills you will find useful are on nomenclature and VSEPR shapes.
   **ChemTutor: The Math You Need for Chemistry** – by David Wilner.
   **Chem1 Virtual Textbook** – by Stephen Lower, a reference text.

Along with my **Lectures**, there are many excellent **YouTube videos** listed that I recommend you watch before beginning the graded portion of each Learning Module. I have searched through many videos and have selected the ones appropriate to the specific course material and the level of instruction.
2. Pearson MyLab & Mastering for Blackboard (Mastering Chemistry):

The first time you click a MyLab & Mastering link from within the Blackboard course, you are guided through the Pearson registration process. The Blackboard course is directly linked to the Pearson website so that all subsequent clicks on Mastering links will be a direct access without having to enter extra password information.

For the payment, the Pearson registration process requires that you do one of the following: 1) Use the access code purchased with the textbook or a separate kit, 2) purchase access online using a credit card or PayPal, or 3) request temporary access (if you're waiting for financial aid and/or can't pay immediately, you can access the full set of features without payment for 14 days.)

All of the online coursework assessment is done through the Mastering Assignments of which there are three types:

1. **Tutorials** – These usually have some introduction along with the questions and offer hints to help you answer the questions. These allow multiple attempts at answering with some feedback when incorrect. These are designed to be completed after reading the assigned textbook sections, watching the lecture(s), and using the other resources.

2. **Homework (HW)** – These are selected questions from the end-of-chapter problems. These questions do not offer hints, but allow multiple attempts at answering with some feedback when incorrect. These are designed to be completed after the Tutorials.

3. **Quizzes** – These are mostly multiple choice questions that are graded either right or wrong. These are designed to be completed after the Homework and reviewing the material. These quizzes are TIMED. Allow yourself time to finish the quiz once it has begun, with no interruptions. Notes and the textbook will be allowed to use during the quiz, but since it is timed, you will not be able to spend a lot of time searching. Be ready before you begin.

Each Learning Module has 100 possible points through the Mastering Assignments, divided between the types listed above. An average level of difficulty and an estimated time for completion are also given for each assignment. These are from feedback provided by students. Difficulty scale: 1 = easiest; 5 = hardest. Most of my assignments have a level of difficulty of 1, 2, or 3. **There will be due dates for the completion of each Learning Module.**

On the Pearson MyLab & Mastering website you will also find access to the Pearson eText (depending on what you purchase) as well as the Study Area which includes optional extra lessons, practice quizzes, and video.
3. Lab:
Virtual lab experiments will be conducted through OnlineChemLabs. Go to "onlinechemlabs.com" and enter DOACHMSU15 in the green registration box. This opens a student registration page, and then you will be guided through the verification and payment process. The price for the labs is $35 total, payable through PayPal. The labs are autoscored. The labs for this course are as follows:

1. Laboratory Techniques
2. Error Analysis
3. Density
4. Combustion
5. Synthesis and TLC
6. Spreadsheets and Linear Regression
7. Metal + HCl
8. Calorimetry
9. Absorbance
10. NMR

There will be due dates for the completion of each lab.

4. On-Line Follow-up Sessions:
There will be three follow-up sessions to be completed immediately after completion of the first three chapters. These sessions are intended to review strengths and weaknesses and to have an opportunity to discuss future learning strategies.

I will conduct these video sessions with Google Hangouts. You will need to add Google+ (Google Plus) to your Google account if you haven’t done so already. I plan for these sessions to be about 30-60 minutes long and they will be graded. I will ask you to answer some questions from the chapters you have completed, but you may use your book and notes during the sessions.

If you’d like, I can also arrange for more follow-up sessions for assistance with future material. These extra sessions would not be graded.

5. MIDTERM and FINAL EXAMS:

A Midterm and Final Exam will be administered through the Blackboard Course (not through the MasteringChemistry site.) I will write my own questions for a TIMED midterm and final exam. The Midterm Exam will be over Chapters 1-5, while the Final Exam will be over Chapters 6-10. There will be various types of questions for these exams; some will require written answers.
GRADING:
Your grade will be determined from a total accumulation of points:

<table>
<thead>
<tr>
<th>Item</th>
<th>Number</th>
<th>Points per</th>
<th>Total</th>
<th>% of Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Midterm Exam</td>
<td>1</td>
<td>500</td>
<td>500</td>
<td>10%</td>
</tr>
<tr>
<td>Final Exam</td>
<td>1</td>
<td>500</td>
<td>500</td>
<td>10%</td>
</tr>
<tr>
<td>MasteringChemistry Assignments</td>
<td>27 Modules</td>
<td>100</td>
<td>2700</td>
<td>54%</td>
</tr>
<tr>
<td>OnLine ChemLabs</td>
<td>10</td>
<td>100</td>
<td>1000</td>
<td>20%</td>
</tr>
<tr>
<td>Follow-up Sessions</td>
<td>3</td>
<td>100</td>
<td>300</td>
<td>6%</td>
</tr>
</tbody>
</table>

Total Possible: 5000

Your course grade will be based on the following cutoffs:

<table>
<thead>
<tr>
<th>Grade</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>90%</td>
</tr>
<tr>
<td>B</td>
<td>80%</td>
</tr>
<tr>
<td>C</td>
<td>70%</td>
</tr>
<tr>
<td>D</td>
<td>60%</td>
</tr>
</tbody>
</table>

4500 points 4000 points 3500 points 3000 points

+ and – grades will be established around the above cutoffs.

More Specific Information on Grading:
- Mastering Chemistry Assignments are autoscored.
- OnLine ChemLabs are autoscored.
- The Follow-Up Sessions will be graded on how well you can answer selected questions and communicate verbally using proper chemical terminology.

A final caveat: You must score at least a 30% on the midterm exam and at least a 30% on the final exam and score at least a 50% total score on the laboratory (OnLine ChemLabs) in order to pass the course.

ACADEMIC INTEGRITY:
In accordance with Doane's Academic Dishonesty Policy any act of dishonesty in pursuing course work will be penalized. If it is a first act (no reported incidents in any course) the penalty is an assignment of zero points for the particular piece of work involved. Second and subsequent acts of dishonesty will be handled by the Vice President for Academic Affairs. Each act of dishonesty will be reported to the Academic Affairs office. For this particular course, acts of dishonesty include representing someone else's work as your own on exams and all assignments.

NOTE: The procedures in this course are subject to change in the event of extenuating circumstances.