GE Freshman Learning Community (Cluster) Proposal
Fall, 2011 – Spring, 2014

1. What is the theme you propose for your group of courses? In what ways do you think this theme speaks to issues important to our freshman population? To the University's mission?

Molecules, Energy and Living Things – Chemistry sequence for science majors. This is an application for renewal of an existing cluster for freshman science majors. The three courses in the cluster constitute a year-long sequence of General Chemistry, as opposed to courses from three different disciplines. Because of the large number of units required for science majors and because General Chemistry is pre-requisite for many of the required courses, it is important for students in majors such as chemistry, biochemistry, geology, physics and pre-physical therapy to complete this chemistry sequence in their freshman year. The alternative is to extend the minimal time required to complete a degree to five years.

The theme provided by the General Chemistry series gives a strong introduction to the world of molecules and the relationship between molecules, chemical reactions and the production and utilization of energy in our environment. It speaks to the university mission by providing a deep and rich educational experience that will train students to pursue meaningful lifework and acquire knowledge that will prepare them to be socially responsible contributors to their communities. As these students move into the post-freshman years and take more general education courses, they will broaden their multicultural learning experiences and hopefully develop into well educated citizens who will function effectively and compassionately in modern society.

2. List the three courses (prefix, number, title, units)

CHEM 1101 General Chemistry (5)
CHEM 1102 General Chemistry (5)
CHEM 1103 General Chemistry (5)

3. Explain how the theme will be used to integrate course content in each course.
(Describe the contribution of each discipline’s perspective on the theme that will help create a coherent learning experience for the students).

An understanding of the building blocks of materials (atoms and molecules) will lead to an appreciation for chemical principles and the driving forces for chemical reactions. All reactions, including those that take place in living organisms, are controlled by the same basic factors. The fundamental attractive forces between atoms and molecules are surveyed, including ionic and covalent bonding, and weaker attractive forces such as hydrogen bonding. Concepts of energy, entropy, catalysis, equilibrium and kinetic control of reactions lead to an understanding of why reactions occur and how chemical processes produce or require energy.
Once the fundamental principles that control reactions are understood, the student is positioned to understand key concepts of the chemistry of living systems. An understanding of the chemical nature of living things in relation to the chemical composition of the earth provides perspective on the possible origin of life as we know it.

4. Explain how each course in the proposed learning community will support student learning of each of the lower division general education area learning outcomes and General Education requirements (passed by Academic Senate February 17, 2004). Please use GE course application forms to address this question. (If the course has already been approved for GE credit, and the current application form was used, please attach a copy. If the course has not yet been approved for GE credit, the use of the application form will permit review for GE credit, even if the cluster application is not selected. [http://www.csuhayward.edu/ge/subcommite/ge/learningoutcomes.htm].)

Please see attached Application for General Education Credit for Lower Division Physical Science (Area B1).

5. Please note: for mixed area learning communities, courses must meet learning outcomes in each area covered by the learning community. For example, a learning community with a course in humanities, one in social science, and one in science must demonstrate that the learning outcomes in humanities, social science, and science are met by the relevant courses.

6. Attach course outlines for the three courses. Each course outline should indicate how the theme would be used in the course and any student activities that cross all three courses. (For example, will there be common reading(s) in the three courses? Will there be common assignments, or assignments on which students work the entire year? Will students keep a cluster portfolio? Etc.)

There will be laboratory activities scheduled in each of the three cluster courses. The same General Chemistry textbook and Laboratory Manual will be used in all three quarters of the cluster experience. The themes of the cluster will be presented in a consistent, well developed learning package. The course outlines are attached.
Application for General Education Credit
for Lower Division Physical Science (Area B1)

Course title: General Chemistry sequence          Course Numbers: Chemistry 1101, 1102, 1103

Courses approved for general education credit must provide students with explicit instruction in the approved student learning outcomes. Please be as specific as possible, pointing to topics, readings, assignments, activities and assessments that illustrate how the course meets the requirements. Attach the course syllabus and any assignments or assessments needed to support your explanations.

Please use this template as a guide to address ALL of the following learning outcomes

Purpose of Science GE: The goal of lower division general education in the natural sciences is to gain basic knowledge and learn key principles in the life and physical sciences as essential for an informed citizenry. In addition, students should recognize the experimental and empirical methodologies characteristic of science and understand the modern methods and tools used in scientific inquiry.

1. Students will demonstrate broad science content knowledge in the physical sciences such as the nature and structure of matter, Earth's place in the Universe, or the conservation of energy and matter.

   In CHEM 1101 students gain an understanding of the nature of matter in terms of the atoms and molecules of which it is composed. They learn what situations induce changes in matter through chemical reactions and how energy is consumed or released in the process. They develop an understanding of how chemicals dissolve in water or other liquids and learn what types of chemicals make up acids and bases.

   In CHEM 1102 students learn about atomic structure and the principles that govern chemical bonding and ion formation. They study the properties of crystals, and learn the laws that dictate the behavior of gases and liquids.

   In CHEM 1103 students are exposed to the factors that control reaction rates, and the concept of equilibrium as it applies to chemical reactions. They study oxidation reduction reactions in the context of electrochemistry and learn about the properties of the different types of elements in detail. Finally, they discuss the impact of chemistry on the environment.

   The concepts covered throughout the General Chemistry series are addressed and reinforced through lecture explanations, demonstrations, problem solving and laboratory experimentation.

2. Students will demonstrate the application of quantitative skills (such as statistics, mathematics and the interpretation of numerical graphical data) to physical science problems.

   Chemistry requires calculations of various types, e.g. in chemical equations, solubility problems and graphical representations. The field is particularly rich in quantitative applications. Students demonstrate their acquired skills both in laboratory experiments and in several hundred problems assigned in the CHEM 1101, 1102 and 1103 lectures.
3. Students will demonstrate a general understanding of the nature of science, the methods applied in scientific investigations, and the value of those methods in developing a rigorous understanding of the physical world. Students should be able to identify the difference between science and other fields of knowledge. Students should be able to distinguish science from pseudoscience.

General Chemistry introduces students to the scientific method. The sequence provides many examples of how chemical science has progressed through the process of developing hypotheses to explain chemical phenomena, then testing them rigorously before either advancing them to the level of viable theories or rejecting them as untrue. In the laboratory the students are frequently introduced to a hypothesis, given a suggested method for testing it and asked to draw their own conclusions in lab reports. They become familiar with the concept of a “controlled experiment” where all the variables are held constant except the one to be tested. The idea of rigorous and controlled testing learned in chemistry can be applied later in life when judging the likely truth of scientific claims of various types.

LEARNING OUTCOME FOR SCIENCE LABORATORY: Students should be able to demonstrate hands-on skills applying the specialized methods and tools of scientific inquiry (such as collecting, analyzing, and interpreting the data, presenting the findings, and using the information to answer questions).

Chemistry 1101, 1102 and 1103 each have a laboratory component. The laboratory experience allows the opportunity to make observations, collect data, then analyze and interpret the results. Laboratory reports include the opportunity to present results, draw conclusions and answer questions related to experimental findings.
Approved by Department Chairs:

[Signature]

Department

Date

[Signature]

Department

Date

[Signature]

Department

Date

Approved by College Dean/Associate Dean from each participating college

[Signature]

Date

[Signature]

Date

[Signature]

Date

Signatures of three faculty members: Ideally, the person who will teach the courses will participate in the cluster planning. However, recognizing the staffing difficulties departments face, the faculty member who plans the cluster must agree to provide a thorough orientation to the expectations and methods developed for the learning community to the actual instructor. We each agree, if selected, to meet on for six hours during the following three days for an end-of-Spring workshop on interdisciplinary curriculum, pedagogy and course integration

[Signature]

Date

[Signature]

Date

[Signature]

Date

Proposals should be submitted as soon as possible and no later than Friday, April 1, 2011. Please submit proposals to sally.murphy@csueastbay.edu and linda.beebe@csueastbay.edu.

9 While Colleges do not approve courses for GE, College approval assures support for departmental participation.
REQUIRED COURSE INFORMATION

Instructor: Dr. Danika LeDuc
Office: Science S 432
E-mail: danika.leduc@csueastbay.edu
Phone: (510) 885-3463
Lecture Hours: MWF 12:00 – 12:50 p.m. in VBT124
Office Hours: MW 1:15 – 2:15 p.m., F 10:30 – 11:30 a.m., and by appointment

Course Materials: 
Your choice of bound notebook
Your choice of safety goggles with side shields

Lecture text options -
1) The bookstore will be offering custom editions of Chemistry, A Molecular Approach by Tro Revised 2nd edition split into 3 versions for each of the 3 quarters (1101, 1102, 1103) that comes with the online homework system (www.masteringchemistry.com, Course ID MCLEDUC13579, zip code = 94542).
2) You could buy a complete version of the book. If it does not come with the online homework system, you must buy access to the homework system. This homework system will be good for two years from time of purchase.
3) You could get an e-book version of the entire book that includes the homework system.
4) You could just get the homework system and use the books on reserve at the library.

Lab text options:
1) The bookstore offers Chemical Principles in the Laboratory, by Slowinski and Wolsey 9th Ed. used all 3 quarters (1101, 1102, 1103).
2) You can buy the experiments individually off ichapters.com and print them out using this link: http://www.ichapters.com/market/isbn.html?isbn=0495112887&cid=D2S
3) Lab manuals will also be available in the library.

Grade Determination:

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<thead>
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<th>Component</th>
<th>Points</th>
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</thead>
<tbody>
<tr>
<td>Homework</td>
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<td>ASAs</td>
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<td>Lab Reports</td>
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<td>Lab Notebook/Safety</td>
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<td>Quizzes</td>
<td>120</td>
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<td>Midterms</td>
<td>200</td>
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<td>Final Examination</td>
<td>200</td>
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<td>835</td>
</tr>
</tbody>
</table>
Final grades are assigned based on total points accumulated. Students earning similar point totals will receive similar letter grades.

Steps for Success:

1) Read relevant sections in the text before the lecture on the material. That way, the lecture will have context, and you can ask questions as they arise.

2) After reading the section, do the example and practice problems at the end. The more problems you do, the better prepared you will be.

3) Seek help when you need it – on-line homework, office hours, tutoring, and study groups are all great resources!

4) Chem 1111 is being offered this quarter. This is a facilitated group problem solving session with worksheets that follow the lecture prepared by me and with a successful former student helping you when needed it. If you are interested, register now!

5) When you have finished reading the chapter, go through the “Chapter in Review” section. Make sure you know all the meanings of the “Key Terms” — you may want to draw a concept map to give yourself a visual picture of how the terms are related.

Suggested Additional Practice Problems (not to be turned in):
Chapter 1: 33, 35, 37, 39, 41, 43, 45, 47, 49, 57, 65, 67, 71, 73, 77, 79, 83, 97, 99, 105, 121, 125
Chapter 2: 33, 35, 37, 39, 41, 43, 45, 49, 63, 65, 67, 71, 73, 75, 77, 81, 85, 99, 103, 109, 113, 115
Chapter 3: 25, 27, 29, 31, 37, 39, 41, 45, 47, 49, 53, 59, 67, 73, 75, 79, 85, 95, 97, 99, 115, 125
Chapter 5: 33, 35, 37, 39, 45, 49, 53, 55, 57, 59, 61, 63, 71, 73, 77, 79, 85, 93, 105, 109, 121, 145

Course Policy:

Homework: Homework must be submitted on-line using the MasteringChemistry website. Points will be deducted from late homework assignments (10%/day). Students whose documented disability prevents them from using this program should make separate arrangements with me.

Lab: Lab attendance is mandatory. Completion of the laboratory portion of the course is mandatory in order for a student to receive credit for the course. Advance Study Assignments (ASA’s) are due in lab the day of the experiment. Experiments should be completed on time, and lab reports should be submitted to the instructor either at the end of the lab session (strongly encouraged!) or at the beginning of the next lab period. Points will be deducted from late laboratory reports (10%/day). No grade is assigned in lab. The total number of points is carried over to the lecture, and the lecture instructor assigns grades. The lecture instructor reserves the right to adjust student laboratory points to a common average in order to compensate for variation in lab instructor point assignment.

Students who miss an experiment should consult with their lab instructor immediately upon their return to class, if not earlier. If a valid excuse is discussed with the instructor, the student may be granted credit for the experiment if calculations can be completed on substitute data. The Advance Study Assignment should be done and handed in late. If the absence is not excused, zero points will be assigned for the experiment. Quizzes missed for an excused absence will be
assigned the average of the student’s other quiz scores. If the absence is not excused, zero points will be assigned for the quiz. *A maximum of one absence can be excused for the quarter.*

A Laboratory Notebook is required for Chem 1101 and should be brought and used to every experimental session in Chem 1101. This same notebook can be used for Chem 1102 and 1103.

**General Notebook Requirements:**

1. You may use any bound notebook comprised of lined pages.
2. All entries in the notebook should be made in black or blue pen.
3. Any mistakes or errors should be crossed out with a single line.
4. Reserve the first few pages for a Table of Contents.
5. If your notebook doesn’t have numbered pages, number them in a consistent corner.

**Before the experiment write:**

1. Name and date of the experiment.
2. Title and purpose of the experiment. (1–2 sentences)
3. Flow chart of experimental procedure. (*A brief* plan of what you will do in lab)

**During the experiment write:**

1. Observations, data, calculations, and any deviations from your experimental plan.

**After the experiment write:**

1. Conclusions drawn from the results of the experiment. (1–2 sentences)

Notebooks will be collected during the last week of classes (11/29) and returned at the final lab session. Please discuss your notebook with your lab instructor during the quarter if you have any questions about grading.

Safety goggles with side shields are required whenever experimental work is being conducted. You are responsible for purchasing your own goggles. You may wish to store them in your laboratory locker so you won’t forget them. You are expected to follow the laboratory safety rules discussed during lab check-in at all times throughout the quarter.

**Exams:** Examinations must be taken as scheduled. If for some reason beyond your control you cannot take an exam on time, please contact me and present an excused absence upon return to class. An unexcused missed exam will receive a failing grade.

**Disability:** If you have a documented disability and wish to discuss your approved academic accommodations, or if you would need assistance in the event of an emergency, please make an appointment to meet with me to discuss this as soon as possible.

**Academic Dishonesty:** Please review the policy concerning academic dishonesty in the university catalog. Students found guilty of cheating on an exam or quiz or submitting work other than his/her own will receive an F for that work, and an “Academic Dishonesty Incident Report” will be filed with the Academic Affairs Office. The student will receive a copy of the report.
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<thead>
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<th>September</th>
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<th>October</th>
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<tbody>
<tr>
<td>Monday</td>
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<td>22</td>
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<tr>
<td>Lab:</td>
<td>Lecture:</td>
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<td>Check-in, Safety</td>
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<tr>
<td>Lecture:</td>
<td>Chemical Changes, Energy</td>
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</tr>
<tr>
<td>Course Introduction</td>
<td>Reading: 1.1 – 1.5</td>
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</tbody>
</table>

| 27              | 29       |                  |
| Lab: 1 – Densities| Lab: 3 - Fractional|                  |
| Lecture:        | Crystallization|                  |
| Measurements and| Lecture: Atomic Theory|                  |
| Problem Solving| Reading: 2.2 – 2.4|                  |
| Reading: 1.6 – 1.8|                  |                  |

**Homework 1**

| 1              | 4        |                  |
| Lecture:       | Lab: Quiz 1 – Chapter 1|                  |
| Atomic Structure and Subatomic Particles| Lecture: Periodic Table; Molar Mass|                  |
| Reading: 2.5 – 2.6| Reading: 2.7 – 2.9|                  |

**Homework 2**

| 8              | 13       |                  |
| Lab: 3 - Fractional Crystalization, continued| Lab: 4 – Determination of a Chemical Formula|                  |
| Lecture:      | Lecture: Chemical Formulas and Equations|                  |
| Chemical Bonds; Chemical Formulas| Reading: 3.9 – 3.10|                  |
| Reading: 3.2– 3.4|                  |                  |

**Homework 3**

| 18             | 20       |                  |
| Lab: Quiz 2 – Chapter 2| Lab: 5 – Identifying Compound by Mass Rel.|                  |
| Lecture:       | Lecture: Exam Review|                  |
| Formula Mass; Chemical Composition| Reading: Chs. 1 – 3|                  |
| Reading: 3.7 – 3.8|                  |                  |

**Homework 5**

| 22             | 29       |                  |
| Lecture:       | Lab: Quiz 3 – Chapter 3|                  |
| Limiting Reactant, Theoretical and Percent Yield| Lecture: EXAM 1|                  |
| Reading: 4.3| Reading: Chs. 1 – 3|                  |
| Lab: 6 – Properties of Hydrates| Lab: 7 – Analysis of an Unknown Chloride (Handout)|                  |
| Lecture: Solutions and Solubility| Lecture: Precipitation Reactions|                  |
| Reading: 4.4 – 4.5| Reading: 4.6|                  |

**Homework 7**
<table>
<thead>
<tr>
<th>November</th>
<th>December</th>
</tr>
</thead>
</table>
| 1 Lab: 18 - Non-metals and their Compounds  
Lecture: Acid-Base and Gas-Evolution Reactions  
Reading: 4.8 | 1 Lab: Quiz 6 - Chapter 6  
Lecture: Standard Heats of Formation  
Reading: 6.8 |
| 3 Lab: 12 - Alkaline Earths and Halogens (Handout /No ASA)  
Lecture: Oxidation-Reduction Reactions  
Reading: 4.9 | 3 Lecture: Final Exam Review  
Reading: Chapters 1 - 6  
Homework 12 |
| 8 Lab: Quiz 4 - Chapter 4  
Lecture: Ideal Gas Law  
Reading: 5.4 - 5.5 | 6 Finals Week  
No class |
| 10 Lab: 24a - Standardization of a Basic Solution (Handout)  
Lecture: Exam Review  
Reading: Ch. 4 | 8 FINAL EXAM  
12:00 p.m. - 1:50 p.m. |
| 15 Lab: 30 - Determination of Iron - A Redox Titration*  
Lecture: Partial Pressures; Stoichiometry  
Reading: 5.6 - 5.7 | 12 Lecture: EXAM 2  
Reading: Ch. 4 |
| 17 Lab: 35 - Spot Tests for Some Common Anions  
Lecture: Kinetic Molecular Theory  
Reading: 5.8 - 5.9  
Homework 9 | 19 Lecture: Real Gases  
Reading: 5.10  
Homework 10 |
| 22 Lab: Quiz 5 - Chapter 5  
Lecture: Energy Transformations; First Law of Thermodynamics  
Reading: 6.2 | 24 Lab: 14 - Heat Effects and Calorimetry  
Lecture: Heat and Work; ΔE for Chemical Reactions  
Reading: 6.3 - 6.4 |
| 29 Lab: Checkout  
Notebooks Due!  
Lecture: Enthalpy in Chemical Reactions  
Reading: 6.5 - 6.7  
Homework 11 | 26 Thanksgiving Recess  
No Classes |

*Answer to ASA Q1 = 8 \( \text{H}^+(aq) + \text{MnO}_4^-(aq) + 5 \text{Fe}^{2+}(aq) \rightarrow \text{Mn}^{2+}(aq) + 5 \text{Fe}^{3+}(aq) + 4 \text{H}_2\text{O}(l) \)
REQUIRED COURSE INFORMATION

Instructor: Dr. Danika LeDuc
Office: Science S 432
E-mail: danika.leduc@csueastbay.edu
Phone: (510) 885-3463
Lecture Hours: MWF 12:00 p.m. – 12:50 p.m. in VBT 124
Office Hours: M 1:15 p.m. – 2 p.m., W 1:15 p.m. – 2:30 p.m., F 10:30 a.m. – 11:30 a.m., and by appointment

Course Materials: Your choice of bound notebook
Your choice of safety goggles with side shields

Lecture text options -
1) The bookstore offers custom editions of Chemistry, A Molecular Approach by Tro 2nd edition split into 3 versions for each of the 3 quarters (1101, 1102, 1103) with the online homework system (www.masteringchemistry.com, Course ID MCLEDUC41763). 2) You could buy a complete version of the book. If you buy a used book, you would need to buy access to the homework system. This homework system will be good for two years from time of purchase. 3) You could get an e-book version of the entire book that includes the homework system. 4) You could just get the homework system and use the books on reserve at the library.

Lab text options:
1) The bookstore offers Chemical Principles in the Laboratory, by Slowinski and Wolsey 9th Ed. used all 3 quarters (1101, 1102, 1103).
2) You can buy the experiments individually off ichapters.com and print them out using this link:
3) Lab manuals will also be available in the library.

Grade Determination:

<table>
<thead>
<tr>
<th>Grade Determination</th>
<th>Percentage</th>
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</thead>
<tbody>
<tr>
<td>Homework (12)</td>
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<tr>
<td>ASAs (11)</td>
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<td>Lab Reports (11)</td>
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<td>Lab Notebook</td>
<td>20</td>
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<tr>
<td>Quizzes (6)</td>
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<tr>
<td>Midterms (2)</td>
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<td>Final Examination</td>
<td>200</td>
</tr>
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<td>Total</td>
<td>820</td>
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</table>

Final grades are assigned based on total points accumulated. Students earning similar point totals will receive similar letter grades.
Note: Earning a grade of C- or better in CHEM 1101 is required for enrollment in CHEM 1102. All students who did not take CHEM 1101 at CSUEB during the Fall 2010 quarter should bring proof that they have passed CHEM 1101 or its equivalent (unofficial transcripts are fine) to me by the 2nd class meeting (January 5, 2011).

Steps for Success:
1) Read relevant sections in the text before the lecture on the material. That way, the lecture will have context, and you can ask questions as they arise.
2) After reading the section, do the example and practice problems at the end. The more problems you do, the better prepared you will be.
3) If you are having trouble with these problems, do the corresponding tutorials in Mastering General Chemistry.
4) Seek help when you need it – hints for on-line homework, office hours, tutoring, and study groups are all great resources! We encourage you to enroll in the concurrent Supplemental Instruction course (Chem 1112).
5) When you have finished reading the chapter, go through the “Chapter in Review” section. Make sure you know all the meanings of the “Key Terms” – you may want to draw a concept map to give yourself a visual picture of how the terms are related.

Suggested Additional Practice Problems (not for credit):
Chapter 7: 39, 41, 47, 49, 51, 53, 55, 59, 61, 63, 67, 69, 75, 77, 79, 81, 83, 85, 87, 89, 91, 93, 105
Chapter 8: 43, 45, 51, 57, 65, 69, 79, 81, 85, 87, 89, 91, 93, 95, 99, 101, 103, 105, 109, 131, 133
Chapter 9: 37, 39, 43, 45, 49, 57, 67, 71, 73, 75, 77, 79, 81, 85, 87, 91, 93, 95, 97, 99, 101, 121
Chapter 10: 33, 35, 37, 39, 41, 43, 45, 47, 53, 55, 57, 59, 67, 71, 75, 77, 81, 83, 85, 87, 89, 91, 97
Chapter 11: 51, 55, 57, 59, 61, 63, 67, 69, 75, 79, 81, 97, 105, 107, 109, 111, 113, 119, 123, 131
Chapter 12: 31, 33, 35, 45, 63, 69, 85, 87, 93, 95, 97, 99, 101, 103, 105, 107, 109, 111, 113, 131

Course Policy:
Homework: Homework must be submitted on-line using the Mastering Chemistry website by midnight on the due date. Points will be deducted from late homework assignments (10%/day). Students whose documented disability prevents them from using this program should make separate arrangements with me.

Lab: Lab attendance is mandatory. Completion of the laboratory portion of the course is mandatory in order for a student to receive credit for the course. Advance Study Assignments (ASA’s) are due in lab the day of the experiment. Experiments should be completed on time, and lab reports should be submitted to the instructor either at the end of the lab session (strongly encouraged!) or at the beginning of the next lab period. Points will be deducted from late laboratory reports (10%/day). No grade is assigned in lab. The total number of points is carried over to the lecture, and the lecture instructor assigns grades. The lecture instructor reserves the right to adjust student laboratory points to a common average in order to compensate for variation in lab instructor point assignment.

Students who miss an experiment should consult with their lab instructor immediately upon their return to class, if not earlier. If a valid excuse is discussed with the instructor, the student may be granted credit for the experiment if calculations can be completed on substitute data. The
Advance Study Assignment should be done and handed in late. If the absence is not excused, zero points will be assigned for the experiment. Quizzes missed for an excused absence will be assigned the average of the student's other quiz scores. If the absence is not excused, zero points will be assigned for the quiz. A maximum of one absence can be excused for the quarter.

A Laboratory Notebook is required for Chem 1102 and should be brought and used to every experimental session in Chem 1102. This same notebook can be used for Chem 1103.

**General Notebook Requirements:**

1. You may use any bound (not spiral) notebook comprised of lined pages.
2. All entries in the notebook should be made in black or blue pen.
3. Any mistakes or errors should be crossed out with a single line.
4. Reserve the first few pages for a Table of Contents.
5. If your notebook doesn't have numbered pages, number them in a consistent corner.

**Before the experiment write:**

1. Name and date of the experiment.
2. Title and purpose of the experiment. (1-2 sentences)
3. Experimental procedure or flow scheme. (A brief plan of what you will do in lab - a few sentences or flow chart)
4. Special safety precautions and waste disposal.

**During the experiment write:**

1. Observations, data, and any deviations from your experimental plan. (Use your worksheet as a guide of what to record.)

**After the experiment write**

1. Conclusions drawn from the results of the experiment. (1 - 2 sentences)

Safety goggles with side shields are required whenever experimental work is being conducted. You are responsible for purchasing your own goggles. You may wish to store them in your laboratory locker so you won't forget them. You are expected to follow the laboratory safety rules discussed during lab check-in at all times throughout the quarter.

**Exams:** Examinations must be taken as scheduled. If for some reason beyond your control you cannot take an exam on time, please contact me and present an excused absence upon return to class. An unexcused missed exam will receive a failing grade.

**Disability:** If you have a documented disability and wish to discuss your approved academic accommodations, or if you would need assistance in the event of an emergency, please make an appointment to meet with me to discuss this as soon as possible.

**Academic Dishonesty:** Please review the policy concerning academic dishonesty in the university catalog. Students found guilty of cheating on an exam or quiz or submitting work other than his/her own will receive an F for that work, and an "Academic Dishonesty Incident Report" will be filed with the Academic Affairs Office. The student will receive a copy of the report.
<table>
<thead>
<tr>
<th><strong>January</strong></th>
<th><strong>Monday</strong></th>
<th><strong>Wednesday</strong></th>
<th><strong>Friday</strong></th>
</tr>
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<tbody>
<tr>
<td>3</td>
<td>Lab: Check-in, Safety</td>
<td>Lab: 33 - Preparation of CuCl</td>
<td>7</td>
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<tr>
<td></td>
<td>Lecture: Course Introduction</td>
<td>Lecture: Nature of Light</td>
<td>Lecture: Bohr Model/Wave</td>
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<tr>
<td></td>
<td>Reading: 7.1 – 7.2</td>
<td>Reading: 7.3 – 7.4</td>
<td>Nature of Matter</td>
</tr>
<tr>
<td>10</td>
<td>Lab: 11 - Atomic Spectrum of Hydrogen</td>
<td>Lab: 34 – Development of a Qual. Scheme</td>
<td>14</td>
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<td>Reading: 7.5 – 7.6</td>
<td>Reading: 8.2 – 8.4</td>
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<td>17</td>
<td>Dr. Martin Luther King, Jr. Holiday – No Class</td>
<td>Lab: Quiz 1 – Chapter 7</td>
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<td>Lecture: Ions</td>
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<td>Reading: 8.8 – 8.9</td>
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<td>24</td>
<td>Lab: Quiz 2 – Chapter 8</td>
<td>Lab: 40 – Ten Test Tube Mystery</td>
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<td>Lecture: Chemical Bonds/Valence Electrons</td>
<td>Lecture: Exam 1 Review</td>
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<td>Reading: 7, 8</td>
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<td>Lecture: Bonding, Electronegativity, Polarity</td>
<td>Lecture: VSEPR Theory</td>
<td>Lecture: Bond Energies and Lengths</td>
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<tr>
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<td>Reading: 9.4 – 9.6</td>
<td>Reading: 10.2</td>
<td>Reading: 9.10 – 9.11</td>
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<td>7</td>
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<td>Lab: 10 – Al/Zinc Alloy</td>
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<th><strong>Friday</strong></th>
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<tr>
<td>2</td>
<td>Lab: Gas Constant (handout)</td>
<td>Lecture: Bond Energies and Lengths</td>
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<td>Lecture: Lewis Structures, Resonance, Formal Charge</td>
<td>Reading: 9.10 – 9.11</td>
<td>Lecture: Bonding, Electronegativity, Polarity</td>
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<td>Reading: 9.7 – 9.9</td>
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<td>Reading: 10.5</td>
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<td>Lecture</td>
<td>Reading</td>
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<td>14</td>
<td>13  - Geometric Structure of Molecules (handout)</td>
<td>Valence Bond and Molecular Orbital Theories</td>
<td>10.6 - 10.8</td>
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<td>16</td>
<td>Quiz 4 - Chapter 10</td>
<td>Intermolecular Forces</td>
<td>11.2 - 11.4</td>
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<td>18</td>
<td>Lecture: Vapor Pressure/Sublimation/Fusion</td>
<td>Reading: 11.6 - 7</td>
<td>Assignment 8 due</td>
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<tr>
<td>21</td>
<td>Lab: 9 - Molar Mass of a Volatile Liquid</td>
<td>Phase Diagrams</td>
<td>11.8 - 11.9</td>
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<tr>
<td>23</td>
<td>Lab: 15 - Vapor Pressure and Heat of Vaporization (handout)</td>
<td>Exam 2 Review</td>
<td>9, 10</td>
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<td>Reading: 9, 10</td>
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**March**

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<thead>
<tr>
<th>Date</th>
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<th>Reading</th>
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<tr>
<td>2</td>
<td>Quiz 5 - Chapter 11</td>
<td>Solutions, Solubility, and Energetics</td>
<td>12.2 - 12.3</td>
<td>10 due</td>
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<td>4</td>
<td>Lecture: Factors Affecting Solubility</td>
<td>Reading: 12.4</td>
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<td>7</td>
<td>Lab: 19 - Molar Mass by Freezing Point Depression</td>
<td>Solution Concentration/Vapor Pressure</td>
<td>12.5 - 12.6</td>
<td>11 due</td>
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<td>9</td>
<td>Quiz 6 - Chapter 12</td>
<td>Lab Notebooks due Check-out</td>
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<td>11</td>
<td>Lecture: Final Exam Review</td>
<td>Colligative Properties/Colloids</td>
<td>12.7 - 12.8</td>
<td>12 due</td>
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<td>14</td>
<td>FINAL EXAM</td>
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<td>12:00 p.m. - 1:50 p.m.</td>
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<td>Chapters 7 - 12</td>
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REQUIRED COURSE INFORMATION

Instructor: Dr. Danika LeDuc
Office: Science S 432
E-mail: danika.leduc@csueastbay.edu
Phone: (510) 885-3463
Lecture Hours: MWF 12:00 p.m. – 12:50 p.m. in MI 2002
Office Hours: MW 1:15 p.m. – 2:15 p.m., F 10:30 a.m. – 11:30 a.m., and by appointment

Course Materials: Your choice of bound notebook

Lecture text options:
1) The bookstore offers custom editions of Chemistry, A Molecular Approach by Tro Revised 1st edition split into 3 versions for each of the 3 quarters (1101, 1102, 1103) with the online homework system (www.masteringgenchem.com, Course ID MCLEDUC26108).
2) You could buy a complete version of the book. If you buy a used book, you would need to buy access to the homework system. This homework system will be good for two years from time of purchase.
3) You could get an e-book version of the entire book that includes the homework system.
4) You could just get the homework system and use the books on reserve at the library.

Lab text options:
1) The bookstore offers Chemical Principles in the Laboratory, by Slowinski and Wolsey 9th Ed. used all 3 quarters (1101, 1102, 1103).
2) You can buy the experiments individually off ichapters.com and print them out using this link: http://www.ichapters.com/market/isbn.html?isbn=0495112887&cid=D2S
3) Lab manuals will also be available in the library.

Grade Determination:

<table>
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<th>Component</th>
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<tr>
<td>Homework (12)</td>
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<tr>
<td>ASAs (9)</td>
<td>45</td>
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<tr>
<td>Lab Reports (9)</td>
<td>135</td>
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<tr>
<td>Photography Report</td>
<td>30</td>
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<tr>
<td>Lab Notebook</td>
<td>20</td>
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<tr>
<td>Quizzes (6)</td>
<td>120</td>
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<tr>
<td>Midterms (2)</td>
<td>200</td>
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<tr>
<td>Final Examination</td>
<td>200</td>
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<td><strong>Total</strong></td>
<td>810</td>
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</table>

Final grades are assigned based on total points accumulated. Students earning similar point totals will receive similar letter grades.

Note: Earning a grade of C- or better in CHEM 1102 is required for enrollment in CHEM 1103.
All students who did not take CHEM 1102 at CSUEB during the Winter 2009 quarter should bring proof that they have passed CHEM 1102 or its equivalent (unofficial transcripts are fine) to me by the 2nd class meeting (April 2, 2010).

Steps for Success:
1) Read relevant sections in the text before the lecture on the material. That way, the lecture will have context, and you can ask questions as they arise.
2) After reading the section, do the example and practice problems at the end. The more problems you do, the better prepared you will be.
3) If you are having trouble with these problems, do the corresponding tutorials in Mastering General Chemistry.
4) Seek help when you need it—hints for on-line homework, office hours, tutoring, and study groups are all great resources! We encourage you to enroll in the concurrent Supplemental Instruction course (CHEM 1113).
5) When you have finished reading the chapter, go through the “Chapter in Review” section. Make sure you know all the meanings of the “Key Terms”—you may want to draw a concept map to give yourself a visual picture of how the terms are related.

Course Policy:
Homework: Homework must be submitted on-line using the MasteringGeneralChemistry website by 11:59 p.m. on the due date. Points will be deducted from late homework assignments (10%/day). Students whose documented disability prevents them from using this program should make separate arrangements with me.

Lab: Lab attendance is mandatory. Completion of the laboratory portion of the course is mandatory in order for a student to receive credit for the course. Advance Study Assignments (ASA’s) are due in lab the day of the experiment. Experiments should be completed on time, and lab reports should be submitted to the instructor either at the end of the lab session (strongly encouraged!) or at the beginning of the next lab period. Points will be deducted from late laboratory reports (10%/day). No grade is assigned in lab. The total number of points is carried over to the lecture, and the lecture instructor assigns grades. The lecture instructor reserves the right to adjust student laboratory points to a common average in order to compensate for variation in lab instructor point assignment.

Students who miss an experiment should consult with their lab instructor immediately upon their return to class, if not earlier. If a valid excuse is discussed with the instructor, the student may be granted credit for the experiment if calculations can be completed on substitute data. The Advance Study Assignment should be done and handed in late. If the absence is not excused, zero points will be assigned for the experiment. Quizzes missed for an excused absence will be assigned the average of the student’s other quiz scores. If the absence is not excused, zero points will be assigned for the quiz. A maximum of one absence can be excused for the quarter.
A Laboratory Notebook is required for Chem 1103 and should be brought to every experimental session in Chem 1103.

**General Notebook Requirements:**
1. You may use any bound (not spiral) notebook comprised of lined pages.
2. All entries in the notebook should be made in black or blue pen.
3. Any mistakes or errors should be crossed out with a single line.
4. Reserve the first few pages for a Table of Contents.
5. If your notebook doesn’t have numbered pages, number them in a consistent corner.

**Before the experiment write:**
1. Name and date of the experiment.
2. Title and purpose of the experiment. (1 – 2 sentences)
3. Experimental procedure or flow scheme. (A brief plan of what you will do in lab – a few sentences or flow chart)
4. Special safety precautions and waste disposal.

**During the experiment write:**
1. Observations, data, and any deviations from your experimental plan. (Use your worksheet as a guide of what to record.)

**After the experiment write**
1. Conclusions drawn from the results of the experiment. (1 – 2 sentences)

See the deadline for turning in your lab notebook on the following calendar. Please discuss your notebook with your lab instructor during the quarter if you have any questions about grading.

Safety goggles with side shields are required whenever experimental work is being conducted. You are responsible for purchasing your own goggles. You may wish to store them in your laboratory locker so you won’t forget them. You are expected to follow the laboratory safety rules discussed during lab check-in at all times throughout the quarter.

**Exams:** Examinations must be taken as scheduled. If for some reason beyond your control you cannot take an exam on time, please contact me and present an excused absence upon return to class. An unexcused missed exam will receive a failing grade.

**Disability:** If you have a documented disability and wish to discuss your approved academic accommodations, or if you would need assistance in the event of an emergency, please make an appointment to meet with me to discuss this as soon as possible.

**Academic Dishonesty:** Please review the policy concerning academic dishonesty in the university catalog. Students found guilty of cheating on an exam or quiz or submitting work other than his/her own will receive an F for that work, and an “Academic Dishonesty Incident Report” will be filed with the Academic Affairs Office. The student will receive a copy of the report.
<table>
<thead>
<tr>
<th>Date</th>
<th>Monday</th>
<th>Wednesday</th>
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<tbody>
<tr>
<td>March</td>
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| 29   | Lecture: Introduction  
Lab: Check-in, Safety | | |
| 31   | Cesar Chavez Holiday  
University Closed | | |
| April |
| 2    | Lecture: Reading: 13.2 - 13.3 | | |
| 5    | Lecture: Effect of Temperature on Reaction Rate  
Reading: 13.4 - 13.5  
Lab: #20 Iodination of Acetone | 7 Lecture: Reaction Mechanisms  
Reading: 13.6 - 13.7  
Lab: #21 Clock Reaction Assignment 1 due | 9 Lecture: Dynamic Equilibrium  
Reading: 14.2 - 14.3  
Assignment 2 due |
| 12   | Lecture: Equilibrium Constant  
Reading: 14.4 - 14.5  
Lab: Quiz 1 (Ch. 13) | 14 Lecture: Reaction Quotient  
Reading: 14.6 - 14.8  
Lab: #22 Systems in Chemical Equilibrium Assignment 3 due | 16 Lecture: Le Châtelier’s Principle  
Reading: 14.9 |
| 19   | Lecture: Acids & Bases/K<sub>a</sub>  
Reading: 15.2-15.4  
Acid-Base Equilibrium  
Lab: #23 Determination of Equilibrium Constant Assignment 4 due | 21 Lecture: Water, pH, and Bases  
Reading: 15.5-15.7  
Lab: Quiz 2 (Ch. 14) | 23 Lecture: Ions, Salts, and Polyprotic Acids  
Reading: 15.8-15.9 Assignment 5 due |
| 26   | Lecture: Acid Strength and Structure/Lewis Acids and Bases  
Reading: 15.10-15.11  
Lab: #24b Standardization of a Basic Solution (Handout) | 28 Lecture: Exam I Review  
Lab: #25 pH Measurements Assignment 6 due | 30 Lecture: Exam I (Chs. 13 & 14) |
| May  |
| 3    | Lecture: Buffers  
Reading: 16.2-16.3  
Lab: #26 Determination of a Solubility Product | 5 Lecture: Titrations and pH Curves  
Reading: 16.4  
Lab: Quiz 3 (Ch. 15) | 7 Lecture: K<sub>sp</sub> Calculations  
Reading: 16.5-16.6 Assignment 7 due |
| 10   | Lecture: Qualitative Analysis/Complex Ions  
Reading: 16.7-16.8  
Lab: #39 Identification of a Pure Ionic Solid (ASA in text) | 12 Lecture: Entropy, 2<sup>nd</sup> Law  
Reading: 17.2-17.3  
Lab: Quiz 4 (Ch. 16) Assignment 8 due | 14 Lecture: Entropy Changes, Gibbs Free Energy  
Reading: 17.4-17.5 |
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<tr>
<th>Date</th>
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<th>Reading</th>
<th>Lab</th>
<th>Assignment/Due</th>
<th>Additional Suggested Practice Problems (not graded):</th>
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| 17     | Thermodynamics in Chemical Reactions | 17.6 - 17.7         | Making Photographic Prints (handout)     | Assignment 9 due                | **Chapter 13:** 29, 31, 33, 37, 41, 45, 47, 49, 51, 55, 59, 61, 63, 67, 69, 75, 77, 85, 87, 89, 91, 107  
**Chapter 14:** 21, 25, 33, 35, 37, 39, 41, 43, 45, 47, 49, 51, 53, 55, 57, 59, 63, 69, 71, 73, 91, 93  
**Chapter 15:** 33, 35, 41, 43, 47, 51, 55, 61, 77, 89, 109, 111, 113, 115, 117, 119, 121, 129, 145  
**Chapter 16:** 27, 53, 57, 61, 71, 73, 75, 77, 91, 99, 101, 103, 105, 109, 111, 117, 119, 123, 143  
**Chapter 17:** 27, 29, 33, 35, 37, 43, 47, 49, 51, 57, 59, 65, 71, 75, 77, 81, 83, 87, 89, 97, 99, 101  
**Chapter 18:** 37, 39, 41, 43, 47, 53, 55, 57, 61, 63, 65, 73, 77, 79, 87, 89, 97, 103, 107, 113, 129 |