CHEM 112: General Chemistry I (3 Hours)  
SUMMER 2008

South Dakota School of Mines and Technology

Chemistry/Chemistry Engineering Building, Room C303

Time: MWTh: 8:00-10:00 pm  
(Subject to modification)

INSTRUCTOR: Justin P. Meyer  
Office: Chemistry and Chemical Engineering 122
Phone: 394-2431
Email: Justin.Meyer@sdsmt.edu

Office Hours: Monday, Wednesday, Thursday 1:00 to 2:30 am, or by appointment

Course Description: An introduction to the basic principles of chemistry for students needing an extensive background in chemistry (including chemistry majors, science majors, and pre-professional students).

Course Prerequisites: One year of high school chemistry, and concurrent enrollment in or completion of Math 102. (Alternatively, a score on the math placement exam of Math 115 or higher.) Efficient use of a scientific calculator and computer will be beneficial.

Instructional Methods: The course will be taught primarily using power point lectures. Access to the power points for the course can be found on the course web site on D2L, and it is recommended that student have these available during lectures in either paper or electronic form. Evaluation will be done primarily electronically through the use of tablet PC’s.

REQUIRED TEXT AND EQUIPMENT:
Other: Tablet PC.


COURSE WEB SITE: Course materials and grades will be posted to the course web site at:  
https://d2l.sdbor.edu/index.asp

If you can’t access this site you need to contact your instructor as soon as possible. Also remember that the grades posted to this web site are not the ‘final’ grades. Grades from the instructor’s grade book are the final grades, and those are posted to the web site with the best accuracy possible. That being said, if you see a grade that doesn’t appear correct on D2L, you should contact the instructor to verify the grade.

COURSE POLICIES:
Attendance: Attendance at lectures is expected.
Assessment/Grading: Your grade for the course will be based on a total possible score of 650 points, calculated as follows:†

<table>
<thead>
<tr>
<th>Component</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quizzes/Homework</td>
<td>100</td>
</tr>
<tr>
<td>Four Hour Exams Scores</td>
<td>400</td>
</tr>
<tr>
<td>(100 points each)</td>
<td></td>
</tr>
<tr>
<td>Final Exam Score</td>
<td>200</td>
</tr>
<tr>
<td>Total</td>
<td>700</td>
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</tbody>
</table>

A: 90%  B: 80%  C: 70%  D: 60%  F: <60%

†These levels may change, but they will not increase.
**Hour Exams:** Four ~1 hour exams of will be given during this course each worth 100 points for a total of 400 possible points. Exams will be given electronically using ExamView player and files on the network drive. Instructions on how to access the web site can be found on the course web site and will be covered in class. You must know how to access the files in the specified network folder during class to take the exam. If you show up to an exam without knowing how to access the needed material to take the exam the instructor will not have time to inform you on how to do this, and your grade will be taken at the end of the exam. **For exams, you should bring your tablet PC with a fully charged battery. Make up exams will not be given.** If you know you will be missing an exam you need to contact your instructor prior to the exam to schedule a time to take the exam.

**Final Exam:** The final exam for the course (200 possible points towards course grade) will be comprehensive and will be given on Thursday, July 24th at 8:00 am. If you must miss the final exam **for an excusable reason** (e.g., illness requiring medical treatment, death in immediate family) the instructor will schedule a make-up final exam prior to the scheduled final exam time.

**Quizzes/Homework:** Quizzes will be given frequently, each worth ~10 points. Two quiz scores can be dropped during the period of the course. **Quizzes missed for any reason can not be made up and will be given a grade of zero.** You will also be given five 10 point homework assignments that will be completed electronically, these scores cannot be dropped. Make sure to check D2L for the deadlines for homework sets. The average of a student’s quiz and homework scores will be given a percentage and that will be converted to points towards your final grade (90% → 90 points).

**Course Objective:** Students will obtain a foundation in the fundamental principles and models of chemistry necessary for an understanding of the composition, structure, and properties of matter and the changes that matter undergoes.

**Course Outcomes:**

- Understand, and use correctly, the symbolic representations, chemical notation, formulas, and systematic rules of nomenclature that characterize the language of chemistry.
- Understand and apply the mole concept in a variety of chemical calculations, including calculating the number of particles in a given mass of substance (and vice versa), and the quantitative relationships between reactants and products in a chemical reaction.
- Recognize the different types of chemical transformations: acid-base, precipitation, combination, decomposition, single-replacement, oxidation-reduction, double replacement, and combustion.
- Understand the basic principles of energy transfer involving chemical systems, including the transfer of heat and work between system and surroundings, the qualitative and quantitative interpretation of thermochemical equations, and the application of Hess’s Law.
- Understand the various models of atomic structure, the basic principles of quantum theory, and the experiments that led to those principles.
- Write ground-state electron configurations for atoms and ions of any representative element and the 3d transition series elements.
- Understand the fundamental aspects of chemical bonding, including writing Lewis structures, describing the bonding in molecules by simple valence-bond theory, and using Valence Shell Electron Pair Repulsion Theory to predict the geometries of molecules and ions.
- Use modern atomic theory to understand and predict the properties of different elements.
- Understand the properties of the different states of matter.
- Qualitatively and quantitatively describe the properties of the gaseous state and the fundamental laws governing the behavior of gases.
- Understand, qualitatively and quantitatively, the behavior of solutions and their colligative properties.
- Understand how fundamental intermolecular interactions among particles determine the physical and chemical properties of a system.
- Understand the fundamental postulates of kinetic-molecular theory and use them to explain the physical behavior of the three states of matter.

**Incomplete Grades (INC):** According to University policy, the grade of INC may be assigned at the discretion of the instructor when a student, for good reason (e.g., serious health problems) has not completed a portion of the work for the course while the rest of the work for the course has been satisfactorily completed. Therefore, except for extenuating circumstances, a grade of incomplete will only be assigned to students who are earning a grade of C or better. When the incomplete is granted, the instructor will stipulate what work is required to complete the course and a deadline for completion of that work; grades for all of the student’s work completed before assignment of the incomplete, in combination with the work completed after the assignment of the incomplete will be used to complete the final grade for the course.

**ADA Statement:** Students with special needs or requiring special accommodations should contact the instructor, (Justin Meyer at 394-2431) and/or the campus ADA coordinator, Jolie McCoy, at 394-1924 at the earliest opportunity.

**Freedom in learning:** Under Board of Regents and University policy student academic performance may be evaluated solely on an academic basis, not on opinions or conduct in matters unrelated to academic standards. Students should be free to take reasoned exception to the data or views offered in any course of study and to reserve judgment about matters of opinion, but they are responsible for learning the content of any course of study for which they are enrolled. Students who believe that an academic evaluation reflects prejudiced or capricious consideration of student opinions or conduct unrelated to academic standards should contact dean of the college which offers the class to initiate a review of the evaluation.

**Electronic Devices Policy:** Please turn off your cell phone before class starts. No text messaging in class. No headphones. If you wish to use a laptop in this class for purposes of note taking, that’s great; however, you will be required to download DyKnow software and then join CHEM112 to activate. Any attempt to circumvent the DyKnow monitoring system will be considered a form of cheating and a breach of academic integrity. Note that according to “Policy Governing Academic Integrity” in the SDSM&T Undergraduate Catalog, the instructor of record for this course has discretion of how acts of academic dishonesty are penalized, subject to the appeal process, and that “Penalties may range from requiring the student to repeat the work in question to failure in the course” (72-73). No other use of any other electronic/computer media is allowed during class time.

My version of Electronic Devices Policy: Please turn off your cell phone before class starts. No text messaging in class. No headphones. If you wish to use a laptop in this class for purposes of note taking, that’s great, but if you are caught playing games or browsing ‘nonducational’ web sites you will be asked to leave, with multiple violations resulting in dropping of a letter grade for the course. Electronic devises may be distracting to others, so please be aware of this. You will not be able to use a cell phone for a calculator on exams and quizzes. I will be monitoring your computers during the course using DyKnow, so you must sign up for the Chem 112 class on DyKnow before you can take an exam. If you need to download DyKnow to your laptop you should see tablet central in the basement of the library for instructions on how to do so.

**Academic Honesty:** We will not tolerate any cheating as defined by the student code of conduct (http://sdmines.sdsmt.edu/sdsmt/studentconduct/main). Cases of cheating will be handled on a case by case basis as defined in the student code of conduct. From my experience, the use of technology in evaluations can make it very tempting to use various methods to cheat. Keep in mind that with this
technology comes more freedom, but there are also ways to monitor one’s activities, and you will be caught.

TENTATIVE LECTURE AND EXAM SCHEDULE
*EXAM DATES ARE SUBJECT TO CHANGE!*

<table>
<thead>
<tr>
<th>Week</th>
<th>Chapter(s) *</th>
<th>Exams</th>
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<tbody>
<tr>
<td>June 2nd-5th</td>
<td>1,2</td>
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<tr>
<td>June 9th-12th</td>
<td>3</td>
<td>Exam 1: Thursday June 12th</td>
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<td>June 16th-19th</td>
<td>4,5</td>
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<tr>
<td>June 23rd-26th</td>
<td>5,6</td>
<td>Exam 2: Wednesday June 25th</td>
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<td>June 30th-July 3rd</td>
<td>6</td>
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<tr>
<td>July 7th-10th</td>
<td>8,9,10</td>
<td>Exam 3: Wednesday July 9th</td>
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<td>July 14th-17th</td>
<td>10,11</td>
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<tr>
<td>July 21st-23rd</td>
<td>11,12</td>
<td>Exam 4 Monday July 21st</td>
</tr>
<tr>
<td>July 24th</td>
<td></td>
<td>Final Exam</td>
</tr>
</tbody>
</table>

* Approximate schedule of chapters covered in lecture during a given week.

**Studying Hints:** I will be lecturing using power point slides. After we cover a few sections I give a brief review of important concepts and some practice problems. I will also give quizzes frequently. I will also be posting practice sets of problems for each chapter. Between the quizzes and the practice problems you will have a good selection of problems to study for an exam. Problems similar to these, along with the concepts, will be included on exams for the most part. REALIZE THAT EXAMS MAY HAVE SOME QUESTIONS THAT ARE NOT SIMILAR TO PRACTICE PROBLEMS OR QUIZ PROBLEMS. Make sure to know the concepts as well as the problems. Other hints are:

- Use your text book (online site)
- Take your own notes from the textbook, separate from the lecture notes.
- If you have questions, get them answered as soon as possible. Make sure to review questions you got wrong on quizzes or exams.
- Study groups.
- Check D2L for answers to practice problems, and other notices.
- Review your quizzes; you don’t want to miss the same question twice.
- Do the practice problems.