CHEM 112: General Chemistry I (3 Hours)  
SUMMER 2009  
South Dakota School of Mines and Technology  
Chemistry/Chemistry Engineering Building, Room C303  
Time: MWTh: 8:00-9:50 AM  
(Subject to modification)

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

Office Hours: by appointment

Catalogue Description: (3-0) 3 credits. Prerequisite: Math. 102. 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). Completion of a high school course in Chemistry is recommended.

Course Prerequisites: Completion of Math 102 or a score on the math placement exam sufficient to place in Math 115 or higher.

REQUIRED TEXT AND EQUIPMENT:
To purchase:  
2. Scientific Calculator. (Cell phones may not be used for this purpose)  
3. 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. The quiz tool on D2L will also be utilized for evaluation purposes in class. Also remember that the grades posted to this web site are not the ‘final’ grades but are meant to serve as information for the student. Grades from the instructor’s grade book are the final grades. 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 700 points, calculated as follows:  
<table>
<thead>
<tr>
<th>Quizzees/Homework</th>
<th>100 points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Four In Class Exams:</td>
<td>400 points (100 points each)</td>
</tr>
<tr>
<td><strong>Total:</strong></td>
<td><strong>500 points</strong></td>
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<tr>
<td>A: 90%</td>
<td>B: 80%</td>
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*These levels may change, but they will not increase.*
Hour Exams: Four ~1 hour exams of will be given during this course each scaled to 100 points for a total of 400 possible points. Exams will be given using scan forms. For exams, you need to bring your own calculator and a pencil. 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. All students are expected to make arrangements with their employer, if necessary, to get the time off to take the exam at the scheduled time. All students must take all exams on the dates and times scheduled. If participation in a school-sponsored activity requires you to be absent on the day an exam is scheduled, you are required to take the exam prior to leaving on the activity. Arrangements to do so must be made with me, in person, a minimum of one week in advance of the exam date.

Quizzes/Homework: Quizzes will be given frequently. Two quiz scores can be dropped during the period of the course. Quizzes missed for any reason cannot be made up and will be given a grade of zero. You will also be given frequent homework assignments that will be completed electronically on WileyPlus. These homework scores cannot be dropped. It is your responsibility to check Wiley Plus for assignments and announcements pertaining to class. Homework not completed by the due date will not receive a score. The average of a student’s quiz scores and homework scores will be given a percentage and that will be converted to points toward your final grade (example: 90% → 90 points).

Course Description: Chemistry 112, General Chemistry I, is the first semester of a two-semester sequence that surveys the important concepts, principles, and models of chemistry. Topics treated in the first semester are: measurements, atomic theory, stoichiometry, thermochemistry, states of matter, periodicity, bonding, and physical properties of solutions.

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. 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 ‘noneducational’ web sites you will be asked to leave, with multiple violations resulting in dropping of a letter grade for the course. You will not be able to use a cell phone for a calculator on exams and quizzes. During the class lecture I am requesting that you have your screens locked in the down position if you prefer to use your tablet during class. The use of solving programs on your calculator during a quiz or exam is not
allowed unless it a program that you have created yourself and get it okayed with the instructor prior to using it on a quiz or exam.

**Academic Honesty:** *We will not tolerate any cheating as defined by the student code of conduct ([http://sdmines.sdsmt.edu/sdsmt/studentconduct/main](http://sdmines.sdsmt.edu/sdsmt/studentconduct/main)). Cases of cheating will be handled on a case to 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>Exam</th>
<th>Chapter(s) *</th>
<th>Exams</th>
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<tbody>
<tr>
<td>Exam 1</td>
<td>1-3</td>
<td>Thursday, June 11th</td>
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<tr>
<td>Exam 2</td>
<td>4-6</td>
<td>Thursday, June 25th</td>
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<td>Exam 3</td>
<td>7-9</td>
<td>Wednesday, July 8th</td>
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<tr>
<td>Exam 4</td>
<td>10-12</td>
<td>Thursday, July 23rd</td>
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* Approximate schedule of chapters covered in that exam

**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 and homework 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 HOMEWORK PROBLEMS OR QUIZ PROBLEMS. Make sure to know the concepts as well at 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 quizzes, exams, and other notices.
- Review your quizzes; you don’t want to miss the same question twice.
- Do the homework.