

# CHM 211 - Principles of Chemistry I – Spring 2018

(T,R 4:00-5:15, Section 204, CRN 2373, Room S-473)

**Attendance at Exams is Required** (see below)

**Required Text:** *Principles of General Chemistry*, Third Edition by Martin S. Silberberg, McGraw-Hill, 2013.

**Additional Required Items:** ALEKS online homework account (see [www.aleks.com](http://www.aleks.com) and the bookstore), Scientific Calculator

**Prerequisite:** 'MTH ACT of 23 or better' or 'C or better in CHM 111' or passing placement exam

**Instructor:** Dr. Lawrence R. Schmitz; **Office Hours** M,W: 12:30 – 2:00; F: 1:00 – 3:00

**Office:** Science 488; Phone: 696-2373; Email: [Schmitz@marshall.edu](mailto:Schmitz@marshall.edu)

**Catalog Description:** Principles of Chemistry I. 3 hrs. I, II, S.

A study of the properties of materials and their interactions with each other. Development of theories and applications of the principles of energetics, dynamics and structure. Intended primarily for science majors and pre-professional students. 3 lec. (PR or CR: CHM 217; PR: MTH ACT of 23 or better or C or better in CHM 111 or pass placement exam)

## Course Policies:

This course will be conducted adhering to university policies. Copies of these policies can be found at: [www.marshall.edu/academic-affairs/policies/](http://www.marshall.edu/academic-affairs/policies/). Academic dishonesty will not be tolerated. Students engaging in academic dishonesty will be sanctioned as per the university policy. Attendance at exams is required. Make up exams will only be given for university excused absences as defined in the policy. Students with disabilities will be accommodated in accordance with university policy.

## APPROXIMATE LECTURE AND EXAM SCHEDULE

<u>Date</u>	<u>Chapter</u>	<u>Topic</u>
Jan. 9, 11, 16	1	Keys to the Study of Chemistry
Jan. 16, 18, 23	2	The Components of Matter
<b>Jan. 30</b>	<b>1-2</b>	<b>EXAM I (Chapters 1-3)</b>
-----		
Jan. 25, Feb. 1, 6	3	Stoichiometry of Formulas and Equations
Feb. 8, 13	4	Three Major Classes of Chemical Reactions
<b>Feb. 20</b>	<b>1-4</b>	<b>EXAM II (emphasizing Chapters 3-4)</b>
-----		
Feb. 15, 22	5	Gasses and the Kinetic-Molecular Theory
Feb. 27, March 1, 6	6	Thermochemistry: Energy Flow and Chemical Changes
<b>March 13</b>	<b>1-6</b>	<b>EXAM III (emphasizing Chapters 5-6)</b>
-----		
March 6, 8, 15	7	Quantum Theory and Atomic Structure
March 27, 29	8	Electron Configuration and Chemical Periodicity
April 3, 5	9	Models of Covalent Bonding
<b>April 12</b>	<b>1-9</b>	<b>EXAM IV part 1 (emphasizing Chapters 7-9)</b>
-----		
April. 10, 17	10	The Shapes of Molecules
April 19, 24	11	Theories of Covalent Bonding
April 26	1-11	Review
<b>April 28</b>	<b>1-11</b>	<b>FINAL EXAM (Chapters 1-11) (SATURDAY 9:50 AM)</b>

Learning objectives	Objective will be taught through...	Objective will be assessed by...
Become familiar with the atomic structure of matter.	-Lecture -Online assignments -In-class example problems	-Exams -Online assignments
Develop analytical skills to solve problems presented in a chemical context.	-Lecture -Online assignments -In-class example problems	-Exams -Online assignments
Understand how energy is utilized in natural systems.	-Lecture -Online assignments -In-class example problems	-Exams -Online assignments
Describe and predict the basic chemical bonding patterns that explain the physical and chemical properties of matter.	-Lecture -Online assignments -In-class example problems	-Exams -Online assignments

**Online Problems:** The culmination of the studying process in chemistry is working problems. Working problems is also the culmination of the testing process. Therefore, it is very important that you learn to work problems. In order to ensure that you do some problems, there is required online homework in this class. The online homework will be delivered using software called ALEKS. ALEKS asks that you master a number of learning objectives. Your grade in the homework portion of the course will be based on the percentage of objectives you complete overall and on time.

**Additional Problems:** As you read the chapters of your text, you may find it useful to work the problems imbedded in the text of the chapter. This should help ensure that you understood the previous section. After reading the text, working the imbedded problems and listening to my lectures you should then attempt the online homework. After completing the required online homework, you may feel the need to do additional problems. If so, there are many additional problems at the end of the chapters in you text.

**Grading:** Your overall grade in this course will be based on 10% homework and 90% exams *i.e.*  
 Course Average = 0.10 X homework + 0.90 X average exam score.

The homework score will be composed of 50% the percent of the ALEKS topics you complete on time and 50% on the percent of the topics completed by the end of the course whether they were completed on time or not. The exam grading policies are given in the next two pages. Your grade for the course will be the highest grade possible based on the criteria below:

<u>Course Average</u>	<u>Grade</u>
≥ 90	A
≥ 80	B
≥ 70	C
≥ 60	D
< 60	F

# EXAM Grading Policies

Lawrence R. Schmitz

There will be four exams and a final in this course. You may earn points towards your exam grade on these exams. The final exam will be counted as two hour exams and your lowest grade will be dropped in determining your average. Your average score for the exams will be calculated as shown below:

$$\text{Average Score} = \{\text{Exam1} + \text{Exam2} + \text{Exam3} + \text{Exam4} + [2*(\text{FinalExam})] - \text{LowestExam}\} / 5.$$

(Note: Should a scheduling problem require we only have three hour exams, the final will still count twice and your lowest will still be dropped.) The “LowestExam” can be one of the hour exams or the final. Note that the final exam will be 1/5 (20%) of your grade if you do poorly on it, but 2/5 (40%) of your grade if you do well. **Attendance at exams is required. Make-up exams will only be given for university excused absences as defined by university policy.** If you have an excused absence for a university function, the appropriate university official should provide me with documentation. If you miss an exam because of illness or other personal reasons, you should discuss this with the Dean for Student Affairs, and his office will notify me if the absence is excused. Once you receive an excused absence and I have been notified, it is your responsibility to talk with me ASAP so that we can arrange a time for a make-up exam. A score of zero will be recorded for unexcused missed exams.

My exams tend to vary in degree of difficulty. This can cause problems in determining which exam is indeed your poorest. For example, suppose I give you an exam and that I determine that you need 90% correct to get an A on this exam. Assume that you get 85% correct, a B grade. Suppose that the next exam is much harder than the first. Because of this, I determine that 80% correct is an A. Further suppose that you get 82% correct on this exam, an A grade. The situation is then as shown below:

<u>Exam</u>	<u>%Correct</u>	<u>Grade</u>
1	85	B
2	82	A

Which exam should be dropped? Obviously, these exams need to be put on a common basis.

Therefore, I have developed a scaling technique to help overcome this problem. The mathematics of this technique is described later. After I apply this technique, you will receive a scaled score. Your average score (as described above) will be determined using the scaled scores from each exam. Your grade for exams will be the highest grade possible based on the criteria below:

<u>Average Scaled Score</u>	<u>Grade</u>
≥ 90	A
≥ 80	B
≥ 70	C
≥ 60	D
< 60	F

# The Mathematics of Scaling

After you are given an exam, I will grade the exams and determine a raw score for each individual in the class. Based on my judgment of the difficulty of the exam and of what level of performance is necessary to receive a given grade, I will determine what is the minimum score necessary to receive an "A" and what score is the minimum "C". If everyone performs exceptionally well, I will be happy to draw the A line in a position such that everyone will receive an A. At the other extreme, if the performance of all individuals is very poor I will draw the lines in a way that reflects this. Your grades are, therefore, actually determined by my judgment of your performance.

In order for the scaling technique to be in agreement with the 90, 80, 70, 60 grading criteria given above, I make two boundary conditions. The lowest A must scale to a 90 and the lowest C must scale to a 70. My scaling technique is linear and as such is based on the equation for a straight line ( $y = mx + b$ ). In this case the equation is:

$$\text{ScaledScore} = (m * \text{RawScore}) + b$$

where  $m$  and  $b$  are constants not yet determined. To determine the two scaling constants, I apply the two boundary conditions to yield the following equations:

$$90 = (m * \text{LowestA}) + b$$

$$70 = (m * \text{LowestC}) + b$$

By subtracting the second boundary equation from the first and solving for  $m$ , you will see that:

$$m = 20 / (\text{LowestA} - \text{LowestC}).$$

You can then substitute the now known value of  $m$  into the first boundary equation to obtain:

$$b = 90 - (m * \text{LowestA}).$$

At this point, your raw score and both  $m$  and  $b$  are known. Therefore, you can determine your scaled score [ $\text{ScaledScore} = (m * \text{RawScore}) + b$ ].

When you take an exam, I will do all this math for you. When I return the exam to you, there will be both a raw score and a scaled score on the exam. **It will be very easy to determine how you did on an exam. Just look at the scaled score and remember the 90, 80, 70, 60 grading criteria.** The raw score is there so you can check to see that I added up your score correctly. I will also announce the values of the Lowest A, Lowest C,  $m$  and  $b$ , so you can check my math if you like. You should also check the grading of each problem and let me know if you have any questions or grievances.