Syllabus – Chemistry 100, Chemical Science (Lec 403), Spring 2017

The syllabus is subject to change. Only the most current version of this syllabus is valid. If the syllabus is changed after the start of classes, one verbal announcement will be made in lecture and the new version will be uploaded to D2L with the version date in the file name. For version date see bottom of each page.

Instructor: Dr. Maria Shteynbuk  
Office: Room 137  
Office Hours: By appointment  
Email: shevyrev@uwm.edu

(All emails correctly addressed will be answered within 24 hrs. To ensure that your email is correctly addressed you must include your Course number and lecture number in the subject line, ex: chem 100 - 403, and the email must be sent from your UWM email account.

Overview of the course

Introductory course in general inorganic chemistry designed for the student with little or no previous science training. 3 hours of lecture and 1 hour of discussion.

Prerequisites

Not open for cr to students who have cr in Chem 102(ER), 111(ER), or 117(ER). Prereq: a math placement score of 30 or a grade of C or better in Math 105(P).

Dropping the Course, Changing Sections, Incompletes

All drops, adds, and section changes of Chemistry Department courses should first be attempted using PAWS. Any changes to your schedule that cannot be done using PAWS will require the stamp of the Chemistry Department. This may also require my signature. A discussion TA can never sign an add/drop form.

You will be responsible for knowing the deadlines for drops or withdrawals as determined by the University. This includes the final day to withdraw from any class for academic reasons. After this day, I will not sign any withdrawals from the course for academic reasons.

An incomplete can be given only for a student who has been doing satisfactory work (C or above), but is unable to complete the course for a reason, which I judge to be valid, and must be accompanied by appropriate documentation.

Required Materials

Grading considerations will only be given if the student was responsible in letting the course instructor know of any issues in a timely manner.

Homework System-ALEKS 360 (ebook included): We will use this homework system for this course. Access to this system comes with the eBook. If you choose to buy the book not through the bookstore or the eBook you will need to purchase the
system separately.

Calculator: Non-graphing or non-programmable *scientific calculator* with logarithms, exponential functions, etc. – expected cost approximately $20

**Graphing calculators, cell phone calculators, laptops, pda’s, etc. are strictly forbidden in exams or quizzes. You may only use a NON-PROGRAMMABLE, scientific calculator for exams or quizzes.**

Attendance System: We will be using TOP HAT in the Department of Chemistry & Biochemistry

Cost $18 depending on length of subscription. More details will be given on D2L.

Lesson Plan: Clark Graphics

**Lectures**

Chemistry 190
TR 5:30 pm – 9:50 am
D.S. 619-627

**Lecture attendance is mandatory for success in this course.** Part of the learning process involves thinking about what is being said in lecture, writing it down, and even re-writing it to clarify what you have heard.

You are expected to read your textbook before coming to class and again after class. It is very important to remember that learning material involves taking time to think things through, develop the knowledge (or process) and practice this. It is also very helpful to test yourself on your knowledge development. Using the quiz or exam as a means to test if you have learned something could be too late to determine you still have a gap in knowledge. Remember, lecture is very important in seeing process and models and hearing concepts and their derivation and application BUT is not the beginning and end of learning. It would be unusual to learn something simply from sitting in lecture. As always, seek help, seek help, and seek help!

Lecture attendance will be monitored via. the TopHat attendance system. Lecture attendance and participation is counted in the Attendance section of the grades.

**Homework and Lecture Quizzes**

**Homework:**

There will be homework assigned through ALEKS 360 Homework System. Graded homework will contribute to the total points of your homework grade. There will be more possible points of the homework than the amount of points that will be collected. The lowest 2 grades of objective
will be dropped. **There is no possibility for late homework.** If you missed homework assignment your grade for that homework assignment will results in zero. The homework grades will contribute 100 points towards your final grade.

**Do not wait until the due date to begin your homework!** This is an online homework system, thus the system is prone to any issues that any other web pages are prone to. If you wait until the due date to start your homework assignment there will be no accommodations made for internet issues. This includes internet outages, computer problems, web site issues, etc....

**Lecture Attendance:** Attendance in lecture will be monitored via the TopHat system. You will be asked small amount of questions via TopHat in lecture and this way your attendance and understanding of the class material will be monitored. You will not be penalized for answering incorrectly. If you will not participate you will not receive the attendance points and your total point will be reduced. I will collect only 10 weeks worth of lecture points for the total of 50 points that will contribute to the overall grade.

**Lecture Quizzes:**

There will be weekly quizzes with the exception of the first week. In Lecture quizzes will be given at the end of most Thursdays lectures (lecture 403) including exam weeks (some quizzes will be online). Each quiz will be worth 10 points (minimum). **Only ten highest quiz grades will be collected** and contribute 100 points to the final grade. I will drop the lowest three quizzes and for that reason there will be no make up quizzes.

**There are no make up /late/early quizzes given (see excused absence policy).** Quizzes may include extra credit. Quiz solutions will be posted on the D2L website.

**Grading Policy:**

Your graded quiz will be returned in your discussion section. **Your TA will not be authorized to change the number of points given for partial credit or change your score in any other way.**

If you believe that your quiz has been unfairly graded you must return the quiz to your TA before the end of the discussion section. If you leave the discussion room with the quiz, the score will not be changed even if it was graded incorrectly.

He/she will get the exam/quiz to me and I will re-grade it completely. You should be aware that if you elect to do this, your grade may be higher, the same, or lower, depending on whether or not other problems may have been graded too generously.

**Discussion Sections/Problem Solving**

You are required to attend your discussion section, and attendance will be recorded. Your attendance and participation in discussion sections is essential because your final grade
depends critically on your ability to solve problems. In order to have a positive experience in discussion, it is to your benefit to participate. Your discussion section is your opportunity to further understand problems on a more personal basis – you can go over finer details and questions than is simply possible in lecture. Use discussion time wisely.

You can only learn to solve problems by doing them. You must attempt to solve ALL of the assigned problems as an absolute minimum. It is very important for you to make every attempt to solve problems before seeking help elsewhere. The solution to a problem always looks easier when someone else shows it to you. Remember that you will not be afforded this luxury on an exam.

There will be worksheets to encourage questions in discussion. These worksheets will be made available only from your TA (in discussion) and can only turned in during your registered discussion session (at the START of the discussion session) each week.

You will have an opportunity to ask questions about the worksheet material and further work on the worksheet in discussion with the help of the discussion TA. Your highest 10 discussion grades will count towards your discussion total. These will contribute a maximum of 100 points towards your final grade. No makeup worksheets will be given.

Examinations

Four 1-hour exams are scheduled as follows. The final examination (cumulative) will be given on Thursday May 12th from 5:30-7:30

<table>
<thead>
<tr>
<th>Exam</th>
<th>Date</th>
<th>Time</th>
<th>Place</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hour Exam #1</td>
<td>2/13/2015 (Monday)</td>
<td>5:30 pm</td>
<td>TBA</td>
<td>100</td>
</tr>
<tr>
<td>Hour Exam #2</td>
<td>3/13/2015 (Monday)</td>
<td>5:30 pm</td>
<td>TBA</td>
<td>100</td>
</tr>
<tr>
<td>Hour Exam #3</td>
<td>4/17/2015 (Monday)</td>
<td>5:30 pm</td>
<td>TBA</td>
<td>100</td>
</tr>
<tr>
<td>Hour Exam #4</td>
<td>5/08/2015 (Monday)</td>
<td>5:30 pm</td>
<td>TBA</td>
<td>100</td>
</tr>
<tr>
<td>Final Exam</td>
<td>see schedule of classes</td>
<td></td>
<td></td>
<td>200</td>
</tr>
</tbody>
</table>

There will be no early exams, no late exams, and no make-up exams (see excused absence policy). The final exam is mandatory. If you have problems with an employer, travel plans, reservations, athletic or music trips, etc. work them out at an early date. Take this syllabus to your employer if necessary. This is not designed to be punitive. With many students, logistics make this policy necessary.

Although the problems I work in lecture are meant to provide some examples of the types of questions that you may see on an exam. You will not receive exam or quiz questions in advance of the exams or quizzes. The more you practice to prepare for exams by going to lecture, reading your lecture notes, reading your textbook, and working problems the better prepared you will be for exams. Lowest exam score will be dropped. The highest three exam score will be collected. Your exams will be returned to you in your discussion. The final exam is mandatory.
A standardized final will be used in order to be eligible to pass the course, you must score 35th percentile or higher on the standardized final examination. If you do not take the final exam, you cannot pass the course.

Supplemental Instruction (Chemistry Department):

The Chemistry department has started to offer supplemental instruction. This is open to all students in class to attend. Students with risk will be encouraged to attend and some extra credit may be added to low scoring exam. Further directions will be provided in lecture.

Absence Policy

There are no early, make-up, or late exams, homework, or quizzes.

Note: I will drop the lowest exam grade and three lowest quiz grades for the semester. There will be more than 100 points possible for the homework problems

If you cannot make it to the exam on scheduled time, your exam grade will become zero and will be automatically dropped as the lowest exam grade for the semester.

Academic Dishonesty

Cheating on an examination, quiz or other graded material will result in a grade of zero as a minimum consequence. Failure in the course and referral to the Dean may also occur. Academic dishonesty or misconduct in any form will not be tolerated. This includes the use of unauthorized materials during a quiz or exam – such as graphing calculators, etc.

Grading

The total number of points for the class is 900. A general breakdown by letter grade is shown but may be altered as needed. Breakdown of the 900 points is as follows:

<table>
<thead>
<tr>
<th>Points</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>One-Hour Exams</td>
<td>300</td>
</tr>
<tr>
<td>Final Exam</td>
<td>200</td>
</tr>
<tr>
<td>Quizzes</td>
<td>100</td>
</tr>
<tr>
<td>Discussions</td>
<td>100</td>
</tr>
<tr>
<td>Homework</td>
<td>100</td>
</tr>
<tr>
<td>Attendance</td>
<td>50</td>
</tr>
<tr>
<td>Reading Assignment</td>
<td>50</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>900</strong></td>
</tr>
<tr>
<td>Percentage</td>
<td>Letter Grade</td>
</tr>
<tr>
<td>------------</td>
<td>-------------</td>
</tr>
<tr>
<td>92.5-100</td>
<td>A</td>
</tr>
<tr>
<td>89.5-92.4</td>
<td>A-</td>
</tr>
<tr>
<td>86.5-89.4</td>
<td>B+</td>
</tr>
<tr>
<td>82.5-86.4</td>
<td>B</td>
</tr>
<tr>
<td>79.5-82.4</td>
<td>B-</td>
</tr>
<tr>
<td>76.5-79.4</td>
<td>C+</td>
</tr>
</tbody>
</table>

Exams: Each one-hour exam is worth 100 points; for a total of 300. I drop the lowest exam grade.

Final Exam: The cumulative final exam is comprised of 200 points. In order to be eligible to pass the course, you must score a 35% or higher on the final examination.

Quizzes: Quizzes will be given weekly. Each quiz will be worth 10 points and some may include extra credit. The ten highest quiz grades will contribute 100 points to your final grade.

Discussion: Discussion sections points will be accumulated from attending discussion, completing the supplemental problems and for discussion attendance. These will be graded and the ten highest will count 100 points towards your final grade.

Homework: Online homework will be assigned weekly. Your homework comprised of two parts: Objective score (50%) and your overall pie completion (50%) at the end of the semester. Your ALEKS grade will be normalized for 100 point towards your total class points.

Attendance: Attendance will be taken via the TopHat attendance system. A minimum of 100 pts will be available for attendance. Attendance will only be accepted via signature during the first week of the semester.

Reading Assignments: You will be asked to complete reading assignments and answer questions via Classroom Salon. This will constitute 50 points for the semester. More information will be presented in lecture.

Department of Chemistry Policies

Departmental policies regulating the conduct of this course can be found in the main office of the Chemistry Building (CHM 144). University policies can be found at http://www.uwm.edu/Dept/SecU/SyllabusLinks.pdf
**Disclaimer:**
Teaching policies and regulations for this course are not open for discussion or negotiation.

This syllabus has been constructed to be as complete as possible but is by no means a binding document. I reserve right to alter policies and regulations as needed.

<table>
<thead>
<tr>
<th>Week of</th>
<th>Lecture</th>
<th>Homework ALEKS</th>
<th>Quiz</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jan 23</td>
<td>Syllabus, Introduction to Chemistry.</td>
<td>I. A.</td>
<td>Quiz 1 R (2/2)</td>
</tr>
<tr>
<td>Jan 30</td>
<td>Introduction to Chemistry, Atomic Theory</td>
<td>OBJ 1 2/5</td>
<td></td>
</tr>
<tr>
<td>Feb 6</td>
<td>Atomic Theory Continue, Electronic Theory</td>
<td>OBJ 2 2/12</td>
<td>Quiz 2 R 2/9</td>
</tr>
</tbody>
</table>
| Feb 13   | Electronic Theory, Covalent bonding          | OBJ 3 2/19     | Quiz 3 R 2/16|%

Exam 1, Monday 2/13 5:30-6:30pm

<table>
<thead>
<tr>
<th>Date</th>
<th>Lecture</th>
<th>Homework ALEKS</th>
<th>Quiz</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feb 20</td>
<td>Covalent Bonding</td>
<td>OBJ 4 2/26</td>
<td>Quiz 4 R 2/23</td>
</tr>
<tr>
<td>Feb 27</td>
<td>Intermolecular Forces</td>
<td>OBJ 5 3/5</td>
<td>Quiz 5 R 3/2</td>
</tr>
<tr>
<td>Mar 6</td>
<td>Periodic Trends, Nomenclature</td>
<td>OBJ 6 3/12</td>
<td>Quiz 6 R 3/9</td>
</tr>
<tr>
<td>Mar 13</td>
<td>Unit Conversion, The mole</td>
<td>OBJ 7 3/19</td>
<td>Quiz 7 R 3/16</td>
</tr>
</tbody>
</table>

Exam 2, Monday 3/13, 5:30-6:30pm

<table>
<thead>
<tr>
<th>Date</th>
<th>Lecture</th>
<th>Homework ALEKS</th>
<th>Quiz</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mar 20</td>
<td>No Class, Spring Break</td>
<td>OBJ 8 4/2</td>
<td>Quiz 8 R 3/30</td>
</tr>
<tr>
<td>Mar 27</td>
<td>Formula Calculations, Empirical Formulas</td>
<td>OBJ 9 4/9</td>
<td>Quiz 9 R 4/6</td>
</tr>
<tr>
<td>Apr 3</td>
<td>Aqueous Solutions, Chemical reactions</td>
<td>OBJ 10 4/16</td>
<td>Quiz 10 R 4/13</td>
</tr>
<tr>
<td>Apr 10</td>
<td>Types of Chemical reactions, Stoichiometry</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Time Spent on the Course:
To estimate the time that a student should expect to spend on this course, one can use the standard method of a minimum of 3 hours outside of class for every hour in class (lecture and discussion). Therefore for a 4 credit course a student may expect to spend a minimum of 12 hours per week on the course outside of class. This includes studying, reading, doing homework, writing laboratory reports and rewriting class notes.

Some notes on studying
Learning in this class may come with hard work and dedication. Please remember that much of your learning takes place through your own reading of the textbook, reading of your lecture notes, working problems, and conversations with me, your TA, and your classmates. Please do not expect to learn all of the concepts by attending lecture only. Your teaching team (me and your discussion TA) will work cohesively to present you with learning opportunities. To best use these opportunities, please come prepared. Otherwise much of what is discussed may be confusing or frustrating. I am hopeful that by the end of the semester, you will find that learning chemistry is exciting and rewarding.

Here are some tips for success in Chemistry 100:

Read the text (on the lecture material for the day) before attending the lecture.

Attend lecture and discussion sessions. Take these times seriously. Be on time, stay attentive and take notes.

Use your lecture notes – how may be very individual to you. This could include recopying or rereading after lecture (the closer to the lecture the better), adding to lecture notes from textbook material, adding problems, or discussing within a study group. Your lecture notes should be considered another source of information for this course (like your textbook).

Do as many problems as you are able – more than those assigned.

You will probably have to average 5-6 problems a day, seven days a week to be
**successful in the course.** Don’t wait until right before the exam – you will most likely be overwhelmed and unable to properly understand the material. If you have difficulty solving a particular problem, go back to the more straightforward related problems in the text and work them first. Indeed, one of the main purposes of this course is to help you develop your own method of **thinking through** problems. See your homework as an opportunity to test yourself on your own learning – this will allow you to find where you have succeeded in understanding and where you may still need to work through some concepts. Please do not wait until a quiz or exam to test your learning. See me if you would like help with ways to check your learning.

**Form a study group or attend the group tutoring sessions** – these can be a very effective method of learning.

**Strive for understanding instead of just familiarity.** It may take several attempts to gain the level of understanding that will allow you to articulate and use the models presented in this course. Be patient with yourself!

**Be proactive!** If you are struggling to understand something – seek help. Chemistry builds on previous concepts – without fully understanding one concept, it is very difficult to understand the next concept on which it builds.

I hope your experience this semester will be a rewarding one.

**Learning Objectives**

"Because this is a general education course, there are GER Distribution Outcomes of providing the "students with a broad body of knowledge" (UWM Fac. Doc. 1382, p. 2, II, par 1). Additionally, this course has objectives of:

- developing of ‘a strong foundation of verbal and quantitative skills’
- understanding ‘the rules of methods and processes‘ (UWM Fac. Doc. 1382, p. 1, par. 2)
- introducing ‘major concepts of a natural science discipline, providing insights into its breadth and its relationship to other disciplines’
- illustrating ‘relationships between experiments, models, theories and laws’
- illustrating ‘the generation and testing of data and the application of concepts and knowledge to the solution of problems’ (UWM Fac. Doc. 1382, p. 3, par. 7)

In order to set these objectives within the framework of this course, a set of objectives have been designed to give you a better understanding of what you are expected to learn over the course of the semester, and some indication of how it will be measured as to what degree this has occurred. These will be incorporated through all types of assessments but will be formally
measured on the weekly quizzes and hourly exams. In order to prepare for this, there will be certain objectives, which will be presented each week in discussion with exercises for practice.

The examples of how these may be measured are examples ONLY and should not be interpreted as an inclusive ‘check list’.

**Objective 1: Understand spatial scale, particularly to the very sizes (on the order of atoms).**

As an example you should be able to: estimate measurement, conceptualize relative sizes, use measurement tools skillfully, correctly compare numbers, convert measurements and scales, be able to compare specific objects (atoms and molecules, for example) by size and use the atom as a starting point in representing matter and changes.

**Objective 2: Understand the language of chemistry including naming simple compounds.**

As an example you should be able to: properly define important key terms, give a name for a chemical formula of a simple compound, give the chemical formula for a name, give the charges and names for the monoatomic and polyatomic ions of interest (these will be specified).

**Objective 3: Understand the relationship between macroscopic, particle and symbolic representations of matter including atom relationships in molecules and compounds.**

As an example you should be able to: identify macroscopic vs particle representations, read chemical formula, represent bonding detail in molecules, know that some elements exist as diatomic molecules, and be able to interpret organic chemical formulas from line drawings.

**Objective 4: Understand the relationship between the composition of atoms and their properties.**

As an example you should be able to: identify the number of protons, neutrons, and electrons for any isotope or ion, approximate the relative abundance of certain isotopes given the periodic table and additional information (for example, the number of isotopes and the number of neutrons in each), and calculate weighted averages, isotopic masses or relative abundances.

**Objective 5: Understand the basics of chemical reactions.**

As an example you should be able to: balance chemical equations, correctly use terms and states of matter and correctly represent chemical formula.

**Objective 6: Understand the basics of mixtures and chemical reactions involving water as a solvent.**

As an example you should be able to: define key terms of mixtures, represent solutions on a macroscopic and particle-level, quantitatively represent concentrations using various units.
Objective 7: Understand quantitative relationships between substances represented in a balanced chemical equation.
   As an example you should be able to: do stoichiometric calculations involving moles, masses, volumes, pressures, particles, and concentrations of reactants and/or products also including limited quantities of a reactant.

Objective 8: Understand the basics of the properties and behavior of gases on both the macroscopic and particle level.
   As an example you should be able to: relate pressure, volume, temperature and amount of an ideal gas, explain the ideal gas law in terms of gas particles, and calculate properties of a mixture of gases.

Objective 9: Understand the basics of the modern model of the atom as it applies to electrons in atomic orbitals as well as writing electron configurations.
   As an example you should be able to: define key terms, know the general rules for relative energy of atomic orbitals, apply Hunds rule and correctly write electron configurations.

Objective 10: Understand periodicity of certain properties of the elements.
   As an example you should be able to: define key terms, give periodic trends for certain properties, and give general descriptive chemistry facts.

Objective 11: Understand chemical bonding and molecular shape.
   As an example you should be able to: be able to draw a Lewis dot structure, determine a molecular shape from VSEPR theory, determine molecular polarity.

Objective 12: Understand the experimental nature of science.
   As an example you should be able to: define all components of the scientific method, identify key experiments and the conclusions made (particularly in atomic and electronic theory), conduct simple experiments in laboratory, use measurement tools accurately, and read equipment to the correct number of significant figures and maintain the correct number of significant figures throughout the calculations.