Syllabus-R1.01: Chemical Science (Chem 100-402), Semester I, 17-18

The Syllabus is subject to change. Any changes will be announced at least once during lecture and posted to D2L as Syllabus-R\text{\textit{x}}, where \textit{x} will be greater than the previous value (for example, the version handed out the first day of class usually has \textit{x} = 1.00).

**Course**: Introductory course in general inorganic chemistry designed for the student with little or no previous science training.

**Description**: Lecture:
MWF 11:00 – 11:50 AM in Chem 190

**Sections**: Discussions 611 – 620

**Instructor**: Dr. Thomas Sorensen  Phone: 229-4012

**Office Hours**: MWF 10:00 – 10:50 AM in Chem 109

Course web-site, see D2L: d2l.uwm.edu

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

In order for you to be successful in this course you will be required to identify and set-up problems and perform algebraic manipulations.

**Course Materials**: See D2L for additional details and options.

<table>
<thead>
<tr>
<th>Component:</th>
<th>Estimated Cost</th>
<th>Comments:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bauer, Birx, and Marks, 4\textsuperscript{rd} Ed.</td>
<td>$25 – $250</td>
<td>Recommended</td>
</tr>
<tr>
<td>ALEKS 360</td>
<td>$70 – $130</td>
<td>Required, code includes an ebook</td>
</tr>
<tr>
<td>Non-Programmable Calculator</td>
<td>$10 – $50</td>
<td>For exams and quizzes</td>
</tr>
<tr>
<td>TopHat ‘Clicker’ access</td>
<td>$18 – $38</td>
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</tbody>
</table>

No programmable calculators will be allowed on quizzes or exams!

**Policies**: 
**UWM**: You must follow the policies and procedures outlined in the current Schedule of Classes. See: http://www.uwm.edu/Dept/SecU/SyllabusLink.pdf

**Department of Chemistry and Biochemistry**: You are expected to fully understand these policies including the limits placed on the maximum amount of material that can be missed, excused or otherwise, and still pass the course.

**Drop, Section Change**: These are done on PAWS. Make sure to follow all the rules established by UWM and the Department of Chemistry and Biochemistry.

**Incomplete**: An Incomplete can be given only to a student who has been doing satisfactory (C) work but who is unable to continue attending the course for a reason judged valid. The request for an Incomplete must be accompanied by documentation.

**Academic Dishonesty**: Cheating on an examination 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. In short, academic dishonesty in any form will not be tolerated.

**Attendance**: It will be a significant advantage for you to attend every lecture. You are responsible for all material presented in lecture. If you miss a lecture, you are responsible for obtaining the lecture material.

**Discussion**: You need to bring hand-written copies of five (5) worked examples from the text, copied word-for-word and relating to current lecture material, to each discussion. There may also be a quiz/worksheet given in each of your scheduled Discussion meetings. These will be combined and recorded four times during the semester. The average of these four grades constitutes your Discussion grade.

**Homework**: You will need to establish an ALEKS account and complete your Initial Assessment right away (see D2L for details). Most Objectives are due on Sunday, except the last one which is due the last day of class (the night before Study Day) but check ALEKS for official due dates.

Half (50\% of your homework grade comes from the average of all your ALEKS assignments (as shown in the ALEKS gradebook). The other half (50\%) comes from the percent of the topics you have mastered (as shown on the top of your ALEKS "pie") as of the last day of the semester (the day before the Study Day).

**Lecture**: You will need to establish a TopHat (‘clicker’) account right away (see D2L for details). There will be a quiz associated with the current lectures given about twice a week. It may be given (unannounced) in
lecture on paper or using ‘clickers’, or it may be announced in lecture when a quiz on D2L or ALEKS opens and closes. The average of all the lecture quizzes constitutes your Lecture grade.

**Early/Make-Up/Late Work:** There are no early, make-up, or late exams, homework, or quizzes. For a scheduled absence (e.g., University athletics, music, etc.), the instructor must be notified at least 24 hours prior to the absence. If an exam or quiz is missed for a non-medical reason not approved beforehand, a grade of zero (0) will be given. For medical absences, a written letter signed by your physician is required. For an excused absence the next quiz or exam will count double.

**Assessment:** Your course grade will be determined from the following elements:

<table>
<thead>
<tr>
<th>Assignment</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Discussion</td>
<td>100pts</td>
</tr>
<tr>
<td>Homework</td>
<td>150pts</td>
</tr>
<tr>
<td>Lecture</td>
<td>50pts</td>
</tr>
<tr>
<td>Hour Exam I</td>
<td>100pts</td>
</tr>
<tr>
<td>Hour Exam II</td>
<td>100pts</td>
</tr>
<tr>
<td>Hour Exam III</td>
<td>100pts</td>
</tr>
<tr>
<td>Redemption Exam</td>
<td>Extra Credit</td>
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<tr>
<td>Final Exam</td>
<td>200pts</td>
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If you miss the final exam for any reason other than a legitimate medical excuse you cannot pass the course, regardless of your other grades.

**Approximate R1.01 Schedule for Chemical Science (Chem 100-402), Semester I, 17-18**

<table>
<thead>
<tr>
<th>Week of</th>
<th>Lecture</th>
<th>ALEKSa</th>
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<tbody>
<tr>
<td>Sep 5</td>
<td>Lec01</td>
<td>Initial Assessment</td>
</tr>
<tr>
<td>11</td>
<td>Lec02 – Lec03</td>
<td>Obj1</td>
</tr>
<tr>
<td>18</td>
<td>Lec04 – Lec05</td>
<td>Obj2</td>
</tr>
<tr>
<td>25</td>
<td>Lec06</td>
<td>Obj3b</td>
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<td></td>
<td>Exam I, Monday, 9-25-17, 5:30 – 6:30 PM Over Lec01 – Lec06</td>
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<tr>
<td>Oct 2</td>
<td>Lec07 – Lec09</td>
<td>Obj4</td>
</tr>
<tr>
<td>9</td>
<td>Lec10 – Lec12</td>
<td>Obj5</td>
</tr>
<tr>
<td>16</td>
<td>Lec13 – Lec15</td>
<td>Obj6</td>
</tr>
<tr>
<td>23</td>
<td>Lec16 – Lec17</td>
<td>Obj7b</td>
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<td></td>
<td>Exam II, Monday, 10-23-17, 5:30 – 6:30 PM Over Lec07 – Lec17</td>
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<tr>
<td>Nov 30</td>
<td>Lec18 – Lec19</td>
<td>Obj8</td>
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<tr>
<td>6</td>
<td>Lec20 – Lec22</td>
<td>Obj9</td>
</tr>
<tr>
<td>13</td>
<td>Lec23 – Lec25</td>
<td>Obj10</td>
</tr>
<tr>
<td>20</td>
<td>Lec26</td>
<td>Obj11b</td>
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<td></td>
<td>Exam III, Monday, 11-20-17, 5:30 – 6:30 PM Over Lec18 – Lec26</td>
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<tr>
<td>Dec 27</td>
<td>Lec27 – Lec29</td>
<td>Obj12</td>
</tr>
<tr>
<td>4</td>
<td>Lec30 – Lec32</td>
<td>Obj13</td>
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<tr>
<td></td>
<td>Redemption Exam, Monday, 12-11-17, 5:30 – 6:30 PM Covers lectures and the text</td>
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<td></td>
<td>Final Exam (covers lectures and the text)</td>
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<tr>
<td></td>
<td>See Schedule of Classes</td>
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</tbody>
</table>

a See ALEKS for exact due dates. Start assignments well before their due date.
b An ALEKS assessment is required before you are allowed to start the next assignment.

You will find that your understanding of the material increases as you work more problems. Please get help when you need it. Sometimes 10 – 15 minutes spent in the TA or my office saves hours of confusion and frustration. I will attempt to remain on schedule as much as possible, but changes may be made with reasonable notice.

**Some Advice:** We will cover a large amount of material in this course. The amount of time you need to spend reading and solving problems is significant. You are expected to read the material before each lecture and should not expect all assigned material to be explicitly covered in class. Write down questions that you
have and note things that you don’t understand; bring your questions to me or your TA for discussion. If you are having trouble with the material, you must seek help fast or the rapid pace of the course will leave you far behind. The TAs and I are available and eager to help you.

**How to do well in the course:**

- Read the appropriate section(s) of the book before the material is presented in lecture — that is, come prepared for class.
- Attend lecture and discussion sessions — and take them seriously. Be punctual and take notes.
- Do problems as they are assigned — *don’t wait* until right before an exam when they may seem overwhelming.
- Form a *study group* with others in the class and work on homework questions together. Teaching one another is perhaps the best way to learn.
- Try to make your own connections between material presented during different lectures. Don’t just assume because we say that something is connected that you understand the connections.
- If you have problems, see me and/or your TA and find out the ways that we can help you.

**D2L Resources include:**

- Information on ALEKS and TopHat.
- PowerPoint slides for each chapter.
- Your grades.

### Chemistry 100 Lectures

Reading and associated problems from the textbook by lecture.

**Lec01: Introduction to Chemistry**

Reading- Ch01: 1.1, 1.2 (p 13, 18, 19, 21, 23 – 27), and Ch02: 2.5 (p 75 – 78). Qualitative only, calculations will be done later.


**Lec02: Atomic Theory — The Basics**

Reading- Ch02: 2.1 and 2.2.

Problems- Ch02: 3 – 42.

**Lec03: Atoms and Ions**

Reading- Ch02: 2.3.


**Lec04: Atomic Theory — Isotopes**

Reading- Ch02: 2.4.


**Lec05: Light, Electrons, and the Bohr Model**

Reading- Ch07: 7.1 and 7.2 (ignore calculations for now).

Problems- Ch07: 1 – 36.

**Lec06: Electron Configurations and the Periodic Table**

Reading- Ch07: 7.3 and 7.4.

Problems- Ch07: 37 – 70.
Lec07: **Hund’s Rule, Valence and Core Electrons**  
Reading- Ch07: 7.5 and 7.6.  
Problems- Ch07: 71 – 84.

Lec08: **Lewis Dot Structures**  
Reading- Ch03: 3.1, Ch08: 8.1 (p 304 – 306) and 8.3 (p 313 – 322).  
Problems- Ch03: 5 – 7, Ch08: 3 – 12, and 45 – 64.

Lec09: **Molecular Shape**  
Reading- Ch08: 8.5.  
Problems- Ch08: 83 – 94.

Lec10: **Polarity**  
Reading- Ch08: 8.1 (p 307 – 309) and 8.5 (p 333 – 335).  
Problems- Ch08: 17 – 26, 107 – 112, 119, and 120.

Lec11: **Intermolecular Forces**  
Reading- Ch10: 10.2 (p 410 – 417).  
Problems- Ch10: 41 – 74.

Lec12: **Ionic Compounds and Chemical Formulas**  
Reading- Ch08: 8.2, Ch03: 3.2 and 3.3.  
Problems- Ch08: 28, 35, 36, 40 – 42, and CH03: 11 – 38.

Lec13: **Periodic Trends**  
Reading- Ch07: 7.7.  
Problems- Ch07: 85 – 94 and 102 – 108.

Lec14: **Nomenclature**  
Reading- Ch03: 3.5.  

Lec15: **Algebraic Review and Scientific Notation**  
Reading- Math Tool Box 9.2 (p 379 and 380) and Math Tool Box 1.1 (p 35 and 36).  
Problems- Ch01: 3 – 8.

Lec16: **Significant Figures**  
Reading- Math Tool Box 1.2 (p 37 – 41).  
Problems- Ch01: 9 – 14.

Lec17: **Unit Conversions – Dimensional Analysis**  
Reading- Math Tool Box 1.3 (p 41 – 45).  
Problems- Ch01: 19, 20, 23, 24, 122, 128, and 131 – 133.

Lec18: **Density and the Temperature Scales: Fahrenheit, Celsius, and Kelvin**  
Reading- Ch01: 1.2 (p 16 – 23).  
Problems- Ch01: 70 – 78 and 83 – 87.

Lec19: **Formula Calculations – The Mole**  
Reading- Ch04: 4.2.  
Problems- Ch04: 9 – 30.
Lec20: **Formula Calculations – The Mole, Part II**
   Reading- Ch04: 4.2.
   Problems Ch04: 36 – 48 and 53 – 60.

Lec21: **Percent Composition and Empirical Formulas**
   Reading- Ch04: 4.1 and 4.3.
   Problems- Ch04: 3, 4, 8, 67, 68, 73, and 74.

Lec22: **Empirical Formulas and Molecular Formulas**
   Reading- Ch04: 4.3 (p 148 and 149).
   Problems- Ch04: 82 – 85 and 87 – 89.

Lec23: **Solutions**
   Reading- Ch04: 4.4.
   Problems- Ch04: 91 – 114.

Lec24: **Chemical Reactions – General**
   Reading- Ch05: 5.1 – 5.3 and 5.4 (p 183 – 185).
   Problems- Ch05: 3 – 52.

Lec25: **Chemical Reactions – Single Displacement**
   Reading- 5.4 (p 190 – 193).
   Problems- Ch05: 61 – 68.

Lec26: **Chemical Reactions – Double Displacement – Precipitation Reactions**
   Reading- Ch05: 5.4 (p 193 – 196).

Lec27: **Mole and Mass Ratios**
   Reading- Ch06: 6.1 – 6.3.

Lec28: **Formula Units – Molecules**
   Reading- Ch06: 6.1 – 6.3.

Lec29: **Limiting Reactant, Theoretical Yield, and Percent Yield**
   Reading- Ch06: 6.4 and 6.5.

Lec30: **Solutions and Stoichiometry**
   Reading- Ideas from Ch04 and Ch06.
   Problems- Handout.

Lec31: **Gases – General Principles and Concepts**
   Reading- Ch09: 9.1 – 9.3.
   Problems- Ch09: 1 – 36 and 81 – 93.

Lec32: **Gases – Ideal Gas Law and Stoichiometry**
   Reading- Ch09: 9.1 – 9.3.
   Problems- Ch09: 37 – 80 and 115 – 118.