Syllabus-R1.00: Chemical Science (Chem 100-401, 402), Semester II, 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\(x\), where \(x\) will be greater than the previous value (for example, the version handed out the first day of class usually has \(x = 1.00\)).

**Course**
Introductory course in general inorganic chemistry designed for the student

**Description:**
with little or no previous science training.

**Lecture 401:**
MWF 9:00 – 9:50 AM in Chem 190  Discussions 601 – 609

**Lecture 402:**
MWF 10:00 – 10:50 AM in Chem 190  Discussions 610 – 618

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

**Office Hours:**
MWF 11:00 – 11:50 PM 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>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>Required for exams and quizzes</td>
</tr>
<tr>
<td><strong>No graphing/programmable calculators will be allowed on quizzes or exams!</strong></td>
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<tr>
<td>Non-mechanical # 2 pencils</td>
<td>$0.05 – $0.20</td>
<td>Required, for exams</td>
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<tr>
<td><strong>Only regular (wood), non-mechanical # 2 pencils will be allowed on quizzes or exams!</strong></td>
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<td></td>
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<tr>
<td>TopHat ‘Clicker’ access</td>
<td>$18 – $38</td>
<td>Required</td>
</tr>
<tr>
<td>Bauer, Birk, and Marks, 4(^{rd}) Ed.</td>
<td>$25 – $215</td>
<td>Recommended (printed version of the ebook)</td>
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</table>

**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:** Bring your completed Lecture Exercises to each discussion as well as your calculator. There may be a quiz/worksheet given in each of your scheduled Discussion meetings. These components 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 at 11:59 PM, except the last one which is due the last day of class (the night before Study Day) but check ALEKS for official due dates.

Your homework grade is based on the average of all your ALEKS objectives and the total number of topics you have mastered/learned 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/attendance given/taken at least once during most lectures. The average of these 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>Element</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Discussion</td>
<td>100 pts</td>
</tr>
<tr>
<td>Homework</td>
<td>150 pts</td>
</tr>
<tr>
<td>Lecture</td>
<td>50 pts</td>
</tr>
<tr>
<td>Hour Exam I</td>
<td>100 pts</td>
</tr>
<tr>
<td>Hour Exam II</td>
<td>100 pts</td>
</tr>
<tr>
<td>Hour Exam III</td>
<td>100 pts</td>
</tr>
<tr>
<td>Redemption Exam</td>
<td>Extra Credit</td>
</tr>
<tr>
<td>Final Exam</td>
<td>See Schedule of Classes 200 pts</td>
</tr>
</tbody>
</table>

If you score less than the 35th percentile on the final exam, or miss the final exam for any reason other than a legitimate medical excuse you cannot pass the course, regardless of your other grades.

**Approximate R1.00 Schedule for Chemical Science (Chem 100-401, 402), Semester II, 17-18**

<table>
<thead>
<tr>
<th>Week of</th>
<th>Lecture</th>
<th>ALEKS$^a$</th>
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</thead>
<tbody>
<tr>
<td>Jan 22</td>
<td>lec01</td>
<td>Initial Assessment</td>
</tr>
<tr>
<td>29</td>
<td>lec02 – lec03</td>
<td>Obj1</td>
</tr>
<tr>
<td>Feb 5</td>
<td>lec04 – lec05</td>
<td>Obj2$^b$</td>
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<tr>
<td>12</td>
<td>lec06</td>
<td>Obj3</td>
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<td></td>
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<td>Exam I, Monday, 2-12-18, 5:30 – 6:30 PM through lec06</td>
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<tr>
<td>19</td>
<td>lec07 – lec09</td>
<td>Obj4$^b$</td>
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<tr>
<td>26</td>
<td>lec10 – lec12</td>
<td>Obj5</td>
</tr>
<tr>
<td>Mar 5</td>
<td>lec13 – lec15</td>
<td>Obj6$^b$</td>
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<tr>
<td>12</td>
<td>lec16 – lec17</td>
<td>Obj7</td>
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<tr>
<td></td>
<td></td>
<td>Exam II, Monday, 3-12-18, 5:30 – 6:30 PM through lec17</td>
</tr>
<tr>
<td>19</td>
<td>Spring Break</td>
<td>No Classes</td>
</tr>
<tr>
<td>26</td>
<td>lec18 – lec19</td>
<td>Obj8$^b$</td>
</tr>
<tr>
<td>Apr 2</td>
<td>lec20 – lec22</td>
<td>Obj9</td>
</tr>
<tr>
<td>9</td>
<td>lec23 – lec25</td>
<td>Obj10$^b$</td>
</tr>
<tr>
<td>16</td>
<td>lec26</td>
<td>Obj11</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Exam III, Monday, 4-16-18, 5:30 – 6:30 PM through lec26</td>
</tr>
<tr>
<td>23</td>
<td>lec27 – lec29</td>
<td>Obj12$^b$</td>
</tr>
<tr>
<td>30</td>
<td>lec30 – lec32</td>
<td></td>
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<tr>
<td>May 7</td>
<td>Review</td>
<td>Obj13</td>
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<tr>
<td></td>
<td></td>
<td>Redemption Exam, Monday, 5-7-18, 5:30 – 6:30 PM Covers lectures and the text</td>
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<tr>
<td></td>
<td></td>
<td>Final Exam (covers lectures and the text)</td>
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<tr>
<td></td>
<td></td>
<td>See Schedule of Classes</td>
</tr>
</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 objective.

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 (as PDF).
• Your grades.
Chemistry 100 Lectures for Chemical Science (Chem 100-401, 402), Semester II, 17-18

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.
lec 25: **Chemical Reactions – Single Displacement**
Reading- 5.4 (p 190 – 193).
Problems- Ch05: 61 – 68.

lec 26: **Chemical Reactions – Double Displacement – Precipitation Reactions**
Reading- Ch05: 5.4 (p 193 – 196).

lec 27: **Mole and Mass Ratios**
Reading- Ch06: 6.1 – 6.3.

lec 28: **Formula Units – Molecules**
Reading- Ch06: 6.1 – 6.3.

lec 29: **Limiting Reactant, Theoretical Yield, and Percent Yield**
Reading- Ch06: 6.4 and 6.5.

lec 30: **Solutions and Stoichiometry**
Reading- Ideas from Ch04 and Ch06.
Problems- Handout.

lec 31: **Gases – General Principles and Concepts**
Reading- Ch09: 9.1 – 9.3.
Problems- Ch09: 1 – 36 and 81 – 93.

lec 32: **Gases – Ideal Gas Law and Stoichiometry**
Reading- Ch09: 9.1 – 9.3.
Problems- Ch09: 37 – 80 and 115 – 118.