Syllabus-R1.00: Chemical Science (Chem 100-404), Semester I, 19-20

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

Course: Introductory course in general inorganic chemistry designed for the student
Description: with little or no previous science training.
Lecture: TR 12:30 – 1:45 PM in Chem 190
Sections: Discussions 631 – 640
Instructor: Dr. Thomas Sorensen  Phone: 229-4012
Office Hours: TR 11:00 – 12:15 PM in Chem 109
Course web-site, see D2L: d2l.uwm.edu

Prerequisites: Math 105(C) or Math 108(C) or Math 116(C) or Level 30 on Math Placement Test.
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, Birk, and Marks, 5th Ed.</td>
<td>$25 – $250</td>
<td>Recommended</td>
</tr>
<tr>
<td>ALEKS 360 (aleks.com)</td>
<td>$70 – $150</td>
<td>Required, code includes an ebook</td>
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<tr>
<td>Chem 100 Lecture Exercises</td>
<td>$10 – $40</td>
<td>Required, available at Clark Graphics, 2915 N Oakland Ave</td>
</tr>
<tr>
<td>Non-Programmable Calculator</td>
<td>$10 – $50</td>
<td>For exams and quizzes</td>
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<tr>
<td>TopHat access (tophat.com)</td>
<td>$18 – $50</td>
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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: There may be a quiz/worksheet given or attendance taken 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>Activity</th>
<th>Points</th>
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<tbody>
<tr>
<td>Discussion</td>
<td>100 pts</td>
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<tr>
<td>Homework</td>
<td>150 pts</td>
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<tr>
<td>Lecture</td>
<td>50 pts</td>
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<tr>
<td>Hour Exam I</td>
<td>100 pts</td>
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<tr>
<td>Hour Exam II</td>
<td>100 pts</td>
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<tr>
<td>Hour Exam III</td>
<td>100 pts</td>
</tr>
<tr>
<td>Redemption Exam</td>
<td>Extra Credit</td>
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<tr>
<td>Final Exam</td>
<td>200 pts</td>
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If you score less than 60% 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 100-404), Semester I, 19-20**

<table>
<thead>
<tr>
<th>Week of</th>
<th>Lecture</th>
<th>ALEKSa</th>
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<tbody>
<tr>
<td>Sep</td>
<td>Lec01</td>
<td>Initial Assessment</td>
</tr>
<tr>
<td>3</td>
<td>Lec02 - Lec03</td>
<td>Obj1</td>
</tr>
<tr>
<td>9</td>
<td>Lec04 - Lec05</td>
<td>Obj2</td>
</tr>
<tr>
<td>16</td>
<td>Lec06</td>
<td>Obj3b</td>
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<tr>
<td>23</td>
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<tr>
<td>Exam I, Monday, 9-23-19, 5:30 – 6:30 PM Over Lec01 – Lec06</td>
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<tr>
<td>Oct</td>
<td>Lec07 - Lec09</td>
<td>Obj4</td>
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<tr>
<td>30</td>
<td>Lec10 - Lec12</td>
<td>Obj5</td>
</tr>
<tr>
<td>7</td>
<td>Lec13 - Lec15</td>
<td>Obj6</td>
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<tr>
<td>14</td>
<td>Lec16 - Lec17</td>
<td>Obj7b</td>
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<tr>
<td>Exam II, Monday, 10-21-19, 5:30 – 6:30 PM Over Lec07 – Lec17</td>
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<tr>
<td>Nov</td>
<td>Lec18 - Lec19</td>
<td>Obj8</td>
</tr>
<tr>
<td>28</td>
<td>Lec20 - Lec22</td>
<td>Obj9</td>
</tr>
<tr>
<td>4</td>
<td>Lec23 - Lec25</td>
<td>Obj10</td>
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<tr>
<td>11</td>
<td>Lec26</td>
<td>Obj11b</td>
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<tr>
<td>18</td>
<td>Lec27 - Lec29</td>
<td>Obj12</td>
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<tr>
<td>Exam III, Monday, 11-25-19, 5:30 – 6:30 PM Over Lec18 – Lec26</td>
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<tr>
<td>Dec</td>
<td>Lec30 - Lec32</td>
<td>Obj13</td>
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<tr>
<td>2</td>
<td>Review</td>
<td></td>
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<tr>
<td>9</td>
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<tr>
<td>Redemption Exam, Monday, 12-09-19, 5:30 – 6:30 PM Covers lectures and the text</td>
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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, 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).


**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 – 8, Ch08: 3 – 12, and 45 – 65.

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 – 116, 119, and 120.

Lec11: Intermolecular Forces
  Reading- Ch10: 10.2 (p 410 – 420).
  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.

Lec14: Nomenclature
  Reading- Ch03: 3.5.
  Problems- Ch03: 39 – 50, 53 – 64.

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 – 18.

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, and 67 – 74.

Lec22: Empirical Formulas and Molecular Formulas
   Reading- Ch04: 4.3 (p 148 and 149).
   Problems- Ch04: 82 – 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 182 – 190).
   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- Lecture Exercises.

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.