Syllabus-R1.01: General Chemistry 102, Semester III, 16-17
(Versions before R1.00 are tentative and subject to change.)

This introductory college chemistry course is the first of two semesters. The first semester emphasizes the principles which determine the composition, properties, and structure of matter.

Instructor: Dr. Thomas Sorensen  CHM 109  MTWR 8:30 – 9:20  229-4012
Course web-site: d2l.uwm.edu (Summer 2017 Chem 102)

Prerequisites: A grade of C or better in Chemistry 100; or 1 year of high school Algebra and 1 year of high school Chemistry and a placement of 1 (score of 20) on the Chemistry Placement Test and a Math Placement score of 3 (old test) or 30 (new test) [or a grade of C or better in Math 105]. Not open for credit to students who have had Chemistry 111 or 117.

In order for you to be successful in this course you will be required to set-up problems, perform algebraic manipulations, work with square roots and logarithms, and solve linear and quadratic equations. If you have difficulties with basic algebra, etc., you should consider dropping the course and taking it at a time when you have acquired these skills.

Course Materials:

- General Chemistry: The Essential Concepts, 7e, by Chang and Overby.
- General Chemistry 102 Laboratory Manual, the current versions is available from Clark Graphics, 2915 N. Oakland Ave., Milwaukee, Wisconsin.
- Laboratory Notebook (carbon-less copies preferred) and safety goggles. State approved safety goggles are absolutely mandatory. They must seal around the eyes and have shielded vents. You must have these prior to the first laboratory period, and they must be worn at all times while you are in the laboratory.
- Scientific calculator with logarithm and exponential functions. Graphing calculators will not be permitted for exam use.
- Recommended: Problem Solving Workbook for Chang 6e, ACS Study Guide, and a course summary such as Schaum’s College Chemistry Crash Course.

<table>
<thead>
<tr>
<th>Component:</th>
<th>Estimated Cost</th>
<th>Comments:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chang, General Chemistry 7e</td>
<td>$125 – $295</td>
<td></td>
</tr>
<tr>
<td>Lab Notebook</td>
<td>$15 – $35</td>
<td>Carbon-less copies preferred</td>
</tr>
<tr>
<td>Lab Manual</td>
<td>$10 – $25</td>
<td>Get these from Clark Graphics</td>
</tr>
<tr>
<td>State Approved Safety Goggles</td>
<td>$5 – $20</td>
<td>Required by the first lab</td>
</tr>
<tr>
<td>Problem Solving Workbook for Chang 6e</td>
<td>$95 – $95</td>
<td>Recommended</td>
</tr>
<tr>
<td>College Chemistry Crash Course</td>
<td>$10 – $15</td>
<td>Recommended</td>
</tr>
<tr>
<td>ACS General Chemistry Study Guide</td>
<td>$12 – $30</td>
<td>Recommended, same as for Chem 104</td>
</tr>
</tbody>
</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 the policies posted on bulletin boards across from CHM 195 and adjacent to CHM 164.
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.

**Email:** Unanswered emails are not an excuse to do nothing. If you send me an email and I don’t respond within three (3) school days your question was covered in the Syllabus, was discussed during one or more lectures, an answer was posted on D2L, and/or it was discussed in a ‘mass’ email. If you haven’t already found the answer to your question in the Syllabus, on D2L, in an old email, or from another student, you should see me during office hours.

**Quiz:**
There will be a quiz given in each of your scheduled Discussion meetings. Your average constitutes your Discussion grade. Your Quiz grade has two components. The first is the average on any quizzes given in lecture and the second is your Discussion grade.

**Laboratory:** Labs will start June 28, 2017. Make sure that you have your lab manual, safety goggles, and have completed all pre-lab assignments before your scheduled lab period. Proper attire must be worn at all times during laboratory.

Labs cannot be rescheduled or taken late, and you must attend your scheduled lab. If you are late for lab, you will not be allowed to participate and will receive a grade of zero (0) for that lab. Failure to follow safety procedures will result in expulsion from laboratory and a grade of zero (0) for the lab. Completed labs are due **by the start** of the next scheduled lab period. Labs turned in late will receive a score of zero (0). You must attend lab and personally turn in your work or your lab will be graded as a zero (0). If you get a zero on more than two (2) labs, you fail laboratory.

**Laboratory Practical:** The in-laboratory Laboratory Practical is graded as you execute various techniques while you complete your experiments. If you get less than 60%, you fail laboratory and fail the course.

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

<table>
<thead>
<tr>
<th>Component</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Laboratory</td>
<td>100 pts</td>
</tr>
<tr>
<td>Laboratory Practical</td>
<td>100 pts</td>
</tr>
<tr>
<td>Homework</td>
<td>100 pts</td>
</tr>
<tr>
<td>Quiz</td>
<td>100 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>ACS Final Exam</td>
<td>200 pts</td>
</tr>
</tbody>
</table>

**Early/Make-Up/Late Work:** There are no early, make-up, or late exams, homework, quizzes, or labs. 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 lab 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 lab or exam will count double.

If you fail laboratory, score less than 35-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 Schedule for General Chemistry 102, Semester III, 16-17

<table>
<thead>
<tr>
<th>Week of</th>
<th>Lecture</th>
<th>Laboratory</th>
</tr>
</thead>
<tbody>
<tr>
<td>June 26 MT</td>
<td>Ch 1</td>
<td>No labs</td>
</tr>
<tr>
<td>WR</td>
<td>Ch 2</td>
<td>Safety Handout and Skill Inventory</td>
</tr>
<tr>
<td>July 3 MT</td>
<td>Ch 3</td>
<td>No Labs</td>
</tr>
<tr>
<td>WR</td>
<td>TBA</td>
<td></td>
</tr>
<tr>
<td><strong>Exam I, Friday, 7-7-17, in class Over Ch 1, 2, and 3</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10 MT</td>
<td>Ch 4</td>
<td>Nomenclature I (on D2L)</td>
</tr>
<tr>
<td>WR</td>
<td>Classification of Matter</td>
<td></td>
</tr>
<tr>
<td>17 MT</td>
<td>Ch 5</td>
<td>MgO: Pooled Data Statistics† (Handout)</td>
</tr>
<tr>
<td>WR</td>
<td>Ch 6</td>
<td>Qualitative Analysis</td>
</tr>
<tr>
<td><strong>Exam II, Friday, 7-21-17, in class Over Ch 4, 5, and 6</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>24 MT</td>
<td>Ch 7</td>
<td>Stoichiometry and Acid/Base Titrations†</td>
</tr>
<tr>
<td>WR</td>
<td>Ch 8</td>
<td>Beer’s Law†</td>
</tr>
<tr>
<td>31 MT</td>
<td>Ch 9</td>
<td>Color my Nanoworld</td>
</tr>
<tr>
<td>WR</td>
<td>Ch 10</td>
<td>Gas Laws†</td>
</tr>
<tr>
<td><strong>Exam III, Friday, 8-4-17, in class Over Ch 7, 8, and 9</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Redemption Exam, Wednesday, 8-16-17, on D2L Covers all of 102</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>ACS Final Exam (covers all of Chem 102)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Friday, 8-18-2017 (in class)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

† Includes one or more graded Techniques for the Lab Practical

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.

**Laboratory Reports:** If you go on to perform research or work as a chemist, you will be required to keep a proper laboratory notebook. In this course a more flexible style has been adopted. Your notebook should contain all the information needed to perform the experiment and your data, observations, and results. All entries must be done in ink (use a black ballpoint pen). The goal is to effectively and efficiently communicate what was done during laboratory. Expect that your instructor will check your notebook for completeness before you are allowed to start the experiment. In this section of the course you are allowed to use the bound portion of your laboratory manual during your Laboratory Practical.

For each experiment include:

1. Print your name, laboratory section number, and the date on the top of each page of your notebook. Carbon-less copies are best as you must retain a copy of all work you submit for grading. Record everything in ink (use a black ballpoint pen). Page numbers must be sequential and your writing legible or the report will be graded as a zero (0).

2. Title of the experiment (as given in the manual).

3. Answers to all pre-laboratory questions (can omit all but the ‘practical application’ question IF there was a quiz on D2L).

4. A brief statement of the objectives of the experiment.

5. The experimental procedure in outline form. Essentially, this will be the procedure given in the manual with any additional information you need to complete the experiment.

6. Data and observations. Data is best recorded in tables. Think about the best way to construct these as you prepare for the experiment. As a general rule, you should expect to perform triplicate
analysis. Record observations such as color changes, the formation of a precipitate, or a change in the temperature of the reaction vessel as you perform the experiment.

7. Calculations and results. Make sure to include all equations. If the same calculation must be performed a number of times, only one of them should be recorded in detail. Use a spreadsheet program such as OpenOffice calc for plotting and repeated calculations.

8. Conclusions and final results.

9. References (if not included as footnotes).

Typically, items 7 and 8 account for at least 50% of a lab. Note: Attending lab and turning ‘something’ in is not enough for you to get a passing grade in lab.

**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, discussion and laboratory 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:**

- Nomenclature summary with common polyatomic ions.
- Information/handouts related to various components of the course.
- PowerPoint slides for each chapter.
- Some old exams from previous semesters.
- Your grades.
Laboratory Grading Rubric

1. (2 points) Name, laboratory section number, and date on each page.

2. (2 points) Title (from the manual).

3. (20 points) Pre-Lab questions. A good answer for the ‘practical application’ question could result in the addition of up to five points (making the lab worth up to 105 points). The remaining questions are worth fifteen points, if there was a pre-lab quiz for the experiment on D2L the points are assigned here and removed based on the score on D2L:

   25 points Outstanding ‘practical application’ answer (see below).
   20 points ‘Practical application’ question answered.
   15 points ‘Practical application’ question not answered.

   If there was not a pre-lab quiz for the experiment on D2L:

   20 - 25 points All questions answered correctly and the ‘practical application’ question was answered to an additional depth (including detail beyond one or two sentences and possibly including secondary information).
   15 - 20 points All questions answered correctly.
   10 - 15 points All questions answered correctly with 1 or 2 incorrect answers, depending on the number of pre-lab questions (i.e. for pre-labs with 3 or 4 questions one incorrect answer constitutes 15 points; for pre-labs with five or more questions, two incorrect answers constitutes 15 points).
   5 - 10 points All questions answered, but there were multiple incorrect answers.
   0 - 5 points Most questions answered incorrectly or not attempted.
   0 points All questions answered incorrectly or not attempted.

4. (3 points) Objective.

5. (7 points) Procedure. The procedure is outlined in individual steps that identifies:
   - what the student is to do
   - when to record data
   - safety issues or disposal directions
   - time(s) involved

   7 points Procedure is complete and not missing individual steps or components listed above.
   4 – 7 points Procedure is missing individual steps or one component listed above.
   2 – 4 points Procedure is missing individual steps and/or one or two components listed above.
   0 – 2 points Procedure is missing individual steps and/or two or three components listed above.
   0 points Procedure is missing or inaccurate.

6. (20 points) Data and Observations. These must be recorded in real time, not added later. Sometimes observations are contrary to predictions, it is critical that they be recorded anyway.

   10 – 20 points Includes actual amounts of materials used and complete observations detailing any color change, gas evolution, temperature change, etc. To receive maximum points these must be written in such a way that another chemist could use them as a reference.
   5 – 10 points A complete report, but not terribly detailed would earn 20 points. This grade indicates that an important observation or a very small amount of data was missing.
   0 – 5 points A report with very little detail. Missing data and observations.
   0 points The section is missing or shows a gross lack of effort by the student.
7. (2 point) Names and signatures of all members of the assigned group (if applicable, otherwise added to the base).

8. (2 point) Serial numbers of equipment used (if applicable, otherwise added to the base).

9. (20 point) Calculations and Results.

20 points Calculations are correct and all results are presented with proper units.

10 – 20 points One of the following possibilities occurs:
   – Calculations are correct and all results are presented but missing units (1 point per missing unit).
   – Calculations are incorrect with only one mistake in the process (even if it effects more than one calculation) but all results are presented.
   – All results are not presented, but calculations are correct for those presented.

5 – 10 points Two of the above occur.

0 – 5 points Calculations are incorrect, all results are not presented, units are missing or incorrect, or calculations are missing.

0 points Section is missing or all calculations are incorrect and all units are missing or incorrect.

10. (20 points) Conclusions.

15 – 20 points The conclusion: is related to the original problem, is supported by the data, and the implications are completely discussed with little or no error.

10 – 15 points The conclusion: is related to the original problem, is supported by the data, and the implications are partially discussed with some errors and omissions.

5 – 10 points The conclusion: draws upon the language of the experiment and presents scientific terms, but does not define or discuss the relevance to the original problem; is in conflict with the experimental results; is related to the problem but is supported by the data to a limited extent.

0 – 5 points The conclusion: is missing, illustrates inaccurate understanding of the scientific concepts underlying the experiment, is not related to the stated problem, or most implications are missing.

0 points The conclusion: is missing or the conclusion is unrelated to the experiment and not supported by the results.

11. (2 point) References (if applicable, otherwise this is added to the base).

A few things take points right off the top. Write the penalty and reason right on their lab.

-10 points If the lab was not legibly written in ink, double the points off if it happens a second time, and grade as zero (0) if it happens more than twice.

-10 points The first time they miss any portion of the pre-lab talk or come in late, double it if it happens a second time, and record their grade as zero (0) if it happens more than twice.

-10 points If they fail to clean up or put equipment away.

Auto 0 If you are caught without goggles, you will get a zero (0) on the experiment and asked to leave laboratory. Note that if it happens a second time you cannot pass laboratory.

Auto 0 Late labs are not graded and receive a score of zero (0). Put ‘Not Graded, Received Late’ and the date on the first page. Completed labs are due by the start of their next scheduled lab period.