Course Syllabus
CH1160 – University Chemistry II
College of Science and Arts
Spring 2016

Instructor Information
Instructor: Andrew Galerneau
Office Location: 601B (NW corner of 601) Chemical Sciences and Engineering Building
Telephone: Office – (906)281-7725
E-mail: ajgalern@mtu.edu
Office Hours: MW 4:00 p.m. to 5:00 p.m. or by appointment (See my Google calendar)

Course Identification
Course Number: CH1160
Course Name: University Chemistry II
Course Location: 135 Fisher Hall
Class Times: MWF 11:05am – 11:55am

Course Description/Overview
CH1160-University Chemistry II is the second of a two-semester sequence designed to give you an overview of the fundamental chemistry topics and problem solving skills required by most science and engineering disciplines. The prerequisite for this class is CH1150, and builds on the material covered in that class. A separate recitation section (CH1163) is also offered, and you may choose to register for CH1163 even if your major does not require you to do so. The recitation sessions will emphasize problem solving, and will be graded on attendance and class. Students in CH1160 are required to take the associated laboratory (CH1161) as a co-requisite.

Course Resources
Course Website
- Canvas <https://www.mtu.instructure.com/>

Required Course Text

Online Homework Software
Canvas will be used to administer online homework and quizzes, provide resources, and manage communications.
Help
There are many ways to get help in CH1160. Immediately before or after lecture is an excellent time to ask questions or to make an appointment with the class instructor. Also, I encourage you to make use of your peers via the Canvas’ online discussion board, Piazza. Finally, the Chemistry Learning Center (CLC) provides a myriad of options for obtaining assistance. Details are below.

Chemistry Learning Center
The Chemistry Learning Center (CLC) is a free service provided by the Department of Chemistry and the University to provide resources for students enrolled in organic chemistry. The Center is located on the 2nd floor of the Chemical Sciences Building (#19) in Room 208. The CLC is staffed by upper level undergraduates (coaches) who have a good background in chemistry and are familiar with the course. Services offered during the fall are walk-in assistance and informal study groups as well as providing a good place to study with additional resources available.

Fall walk-in hours:
Monday through Thursday 10:00 am – 5:00 pm &
Sunday through Wednesday 7:00 p.m. – 9:00 p.m.

CH0100: Students who would like to have a weekly individual or team learning group should stop by the CLC during the first week of class to sign up for a time. Plan to attend your first weekly appointment, which begins the second week of classes. Students with regular appointments should be enrolled in CH0100. If you are not enrolled when you sign up for a time, you will be automatically enrolled. There is no cost for CH0100. Plan to attend every appointment. However, you are allowed to miss one appointment if an emergency comes up and still receive a satisfactory grade. Walk-in hours are also available in between appointments or team meetings.

SI (Supplemental Instruction) Reviews are with Anna Nelson in TBD. The SI sessions are optional but highly recommended. A significant number of hours each week are required to learn the material so that you are prepared for next semester. You will not be able to learn everything in your short CLC session each week. Since you will need to spend this time studying anyway, students have found it effective to attend 1, 2, or 3 SI sessions each week. Students attending on a regular basis usually earn a full grade higher than those who do not attend. The SI leaders will announce the study session times and locations.
**Grading Scheme**

Grading System – Your grade will be based upon the percentage of the total points available that you accumulate. Achieving a grade of 90% or better of the total points awarded will earn you an A. There is no curve, there are no quotas. I reserve the right to lower the minimum score required to achieve an A, but it will not be raised. While there is no curve, some of your Canvas homework and i>clicker scores will be dropped, and I will round up totals at the end.

<table>
<thead>
<tr>
<th>Grade</th>
<th>Percentage Required</th>
<th>Grade points/credit</th>
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</thead>
<tbody>
<tr>
<td>A</td>
<td>90% &amp; above</td>
<td>4.00</td>
</tr>
<tr>
<td>AB</td>
<td>85 – 89%</td>
<td>3.50</td>
</tr>
<tr>
<td>B</td>
<td>78 – 84%</td>
<td>3.00</td>
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<tr>
<td>BC</td>
<td>75 – 77%</td>
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</tr>
<tr>
<td>C</td>
<td>60 – 74%</td>
<td>2.00</td>
</tr>
<tr>
<td>CD</td>
<td>58 – 59%</td>
<td>1.50</td>
</tr>
<tr>
<td>D</td>
<td>55 – 57%</td>
<td>1.00</td>
</tr>
<tr>
<td>F</td>
<td>54% &amp; below</td>
<td>0.00</td>
</tr>
<tr>
<td>I</td>
<td>Incomplete; given only when a student is unable to complete a segment of the course because of circumstances beyond the student’s control. A level of incomplete may be given only when approved in writing by the department chair or school dean.</td>
<td></td>
</tr>
<tr>
<td>X</td>
<td>Conditional, with no grade points per credit; given only when the student is at fault in failing to complete a minor segment of a course, but in the judgment of the instructor does not need to repeat the course. It must be made up within the next semester in residence or the level becomes a failure (F). An (X) level is computed into the grade point average as a (F) level.</td>
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**Grading Policy**

Your grade will be based upon the percentage of the total points available that you accumulate and are divided between assignments as shown below:

<table>
<thead>
<tr>
<th>Assignment Type</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Canvas module assignments</td>
<td>15%</td>
</tr>
<tr>
<td>In-class Participation</td>
<td>15%</td>
</tr>
<tr>
<td>Exams &amp; Final</td>
<td>70%</td>
</tr>
<tr>
<td><strong>Total Percentage</strong></td>
<td><strong>100%</strong></td>
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</tbody>
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**Canvas Module Assignments:**

In a standard week of class, you can expect up to four Canvas assignments; 3 pre-lecture assignments and one weekly review assignment.

Each class period will have a pre-lecture assignment that will be 3-5 questions in length. The goal of these assignments is to engage and assess your understanding of the current textbook reading relevant to the next lecture. These pre-lecture assignments will be available as soon as we have finished the previous lecture, and they will be due at 8:00 a.m. the day of the next lecture.

The weekly review assignment will also be about 5 questions in length, and it will pull questions similar in structure to the prior pre-lecture assignments. The goal of the weekly review is to assess your mastery of concepts covered throughout the week in the text and in lecture. These weekly review assignments
will be available once the final pre-lecture assignment is released, and they will be due the following Sunday at 11:59 p.m. before the next sequence of lectures.

Each pre-lecture assignment will be worth 5 points, and the weekly review assignment will be worth 10 points. Obtaining a 100% on a weekly review will drop the lowest score of a pre-lecture assignment for that week from consideration in your final grade.

**In-class Participation:**
In class participation will be assessed through the use of i>clickers. The goals of the in-class i>clicker questions are: 1) Maximize your learning by keeping you engaged with the material that we are covering in class that day. 2) Provide me direct feedback to your learning. The quality of your responses communicates to me how much time we need to spend on a topic on that day or the next day of class. I place a lot of value on this tool’s feedback, which is why I felt that it was worth assigning points.

You can plan on i<clickers to be in use every day that we have class. For every day of use, there will be a total of 5 points possible for that day’s activities. As the goal of the i>clicker tool is educational in nature, I will drop four days of participation (for the purposes of “bad days” or absences) from the final cumulative point value used for calculating your 15% In-class participation. I will give you a rolling update by way of a single value as to how many points you have around the time of every exam.

In order to receive credit for in-class participation, you will need to register your i>clicker remote ID in Canvas within the first week of class. You can do so as follows:

1. Log in to Canvas using Firefox or Chrome.
2. Click the i>clicker link on the left bar.
3. Enter the code from the back of your i>clicker, and press register.

i>clicker will be used every day in class, and you are responsible for bringing your remote daily.

**Exam format:**
There will be three “hour” exams worth 100 points each, and one cumulative multiple-choice final exam worth 200 points.

- The “hour” examination will take place at 6:00 p.m. on:
  - Wednesday, February 10th 2016
  - Wednesday, March 16th 2016
  - Wednesday, April 13th 2016

- In lieu of each evening exam, the following classroom sessions will be cancelled:
  - Friday, February 12th 2016 (Post exam 1 break)
  - Friday, March 4th 2016 (Friday before Spring Break)
  - Friday, April 15th 2016 (I will be travelling or doing taxes…)

- The final exam will be Wednesday, April 27th 2016 from 10:15 a.m. to 12:15 p.m.

**Course Policies**

1. **ELECTRONIC DEVICES:** Please silence AND stow all unapproved electronic devices for the duration of each class period. The only approved devices are calculators, dedicated language translators, documented assistive technologies, and i>clickers. The use of computers, mobile phones, and other electronic devices are increasingly creating a significant classroom distraction, so I am
asking you to please refrain from using them. Only dedicated calculators and foreign language translation devices may be used during examinations.

2. ABSENCE POLICY: An unexcused absence is an automatic zero for any exam that is missed. Only the Office of Student Affairs, or your instructor may grant an excused absence. If you know that you will have an official university excused absence on a scheduled exam day (university event, religious holiday, or funeral), you must make arrangements at least one week before the exam date, and provide documentation. Excused absences will not be given to travel home or attend “social” events such as birthdays or weddings, or for sufferers of the “Common Cold.” Therefore, you should plan to take your exam at the scheduled time. If you believe you are too sick to take an exam, you must contact the instructor BEFORE the exam and subsequently provide a doctor’s note to the dean of students stating your illness prevented you from taking the exam, not simply that you visited the doctor’s office.

3. FINANCIAL AID SATISFACTORY ACADEMIC POLICY: Federal financial aid regulations now require students make satisfactory academic progress towards their degree to remain eligible for financial aid, which means we must report whether you failed a class “with effort” or “without effort.” For the purpose of this class, I have decided that anyone who does not complete ALL examinations, or attend at least 75% of classes will be considered to have failed “without effort.”

4. LEARNING ACCOMMODATIONS: If you require accommodations, a quiet place to take exams, recorded textbooks etc., please contact the Coordinator of Student Disability Services in the Dean of Students Office, Room 170 Administration, 487-2212. If we do not know about you, we cannot help you. So, please be proactive about asking for help.

All university approved exam accommodations are being handled by the university’s testing center. To give everyone sufficient time to reserve space and prepare for the examination, you must request an accommodated exam at least five working days before the exam.

Cut-off dates are as follows (these are not exam dates):
- **Exam 01:** 5pm Wednesday February 3rd, 2016
- **Exam 02:** 5pm Friday March 4th, 2016 (Friday before Spring Break)
- **Exam 03:** 5pm Wednesday April 6th, 2016
- **Final:** 5pm Wednesday April 20th, 2016

To request your exam contact Andrew Galerneau (ajgalern@mtu.edu).

5. ACADEMIC INTEGRITY: Both students and faculty are responsible for insuring the academic integrity of the University according to the procedures in “Academic Integrity at Michigan Tech - A Guide for Students and Faculty.” Specific violations in this course would be the intentional use of any unauthorized study aids, equipment, or another’s work during an examination (cheating) or allowing/helping another individual to cheat (facilitating academic dishonesty). Possible sanctions include an academic integrity warning, grade reductions, an “F*” grade indicating failure due to academic dishonesty, suspension or expulsion. The standard penalty for cheating in this class will be an “F” grade, so please do not put yourself in a position where you will be tempted to cheat.

**University Policies**

Academic regulations and procedures are governed by University policy. Academic dishonesty cases will be handled in accordance the University's policies.

If you have a disability that could affect your performance in this class or that requires an accommodation under the Americans with Disabilities Act, please see me as soon as possible so that we
can make appropriate arrangements. The Affirmative Action Office has asked that you be made aware of the following:

*MICHIGAN TECH COMPLIES WITH ALL FEDERAL AND STATE LAWS AND REGULATIONS REGARDING DISCRIMINATION, INCLUDING THE AMERICANS WITH DISABILITIES ACT OF 1990. IF YOU HAVE A DISABILITY AND NEED A REASONABLE ACCOMMODATION FOR EQUAL ACCESS TO EDUCATION OR SERVICES AT MICHIGAN TECH, PLEASE CALL THE DEAN OF STUDENTS OFFICE, AT 487-2212. FOR OTHER CONCERNS ABOUT DISCRIMINATION, YOU MAY CONTACT YOUR ADVISOR, DEPARTMENT HEAD OR THE AFFIRMATIVE ACTION OFFICE, AT 487-3310*

**Academic Integrity:**
[http://www.studentaffairs.mtu.edu/dean/judicial/policies/academic_integrity.html](http://www.studentaffairs.mtu.edu/dean/judicial/policies/academic_integrity.html)

**Affirmative Action:**
[http://www.admin.mtu.edu/aaao/](http://www.admin.mtu.edu/aaao/)

**Disability Services:**
[http://www.admin.mtu.edu/urel/studenthandbook/student_services.html#disability](http://www.admin.mtu.edu/urel/studenthandbook/student_services.html#disability)


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**Course Schedule (Tentative – changes announced in class/on Canvas)**

The lecture meets Monday, Wednesday, and Friday in Fisher 135 at 11:05 a.m. The lectures only provide you with a guide to the material and you must, therefore, read the relevant textbook chapters prior to the class and again after the class. Unless you have a photographic memory, I also recommend you take notes from the book as you read. The following list of topics is subject to change:

**Week 1 (Beginning January 11)**
Chemical Kinetics
Wednesday: 13.1-13.3 Introduction to Reaction Rates and Effect of Concentration on Reaction Rate  
Friday: 13.3 Integrated Rate Laws

**Week 2 (Beginning January 18)**
Chemical Kinetics
Wednesday: 13.4 Reaction Rates, Temperature, and the Arrhenius Equation  
Friday: 13.5-13.6 Reaction Mechanisms and Catalysts

*Monday (01/18): Martin Luther King Day Recess.*

**Week 3 (Beginning January 25)**
Chemical Equilibrium  
Monday: 14.1-14.3 Equilibrium Constants, $K_c$ and $K_p$  
Wednesday: 14.4-14.5 Equilibrium Constants and Reaction Quotients  
Friday: 14.6-14.8 Heterogeneous Equilibria, Le Chatelier’s Principle, and Calculation Based on $K$

*Friday (01/29): Last day to drop without a grade.*
**Week 4 (Beginning February 1)**
Chemical Equilibrium & Aqueous Equilibria
Monday: 14.9-14.10 Equilibrium & Thermodynamics, Changing K with Changing Temperature
Wednesday: 15.1-15.2 Acids & Bases, Acid Strength

*Wednesday (02/03): Winter Carnival Recess Begins at 10:00 p.m.*

**Week 5 (Beginning February 8)**
Aqueous Equilibria
Monday: 15.3-15.4 pH, $K_a$, and $K_b$

*Wednesday (02/10): Exam I in evening 6:00 – 7:00 p.m.*

*Friday (02/12): No class*

**Week 6 (Beginning February 15)**
Aqueous Equilibria
Monday: 15.5-15.6 Polyprotic Acids and pH of Salt Solutions
Wednesday: 15.7-15.8: The Common-Ion Effect and pH Buffers
Friday: 15.8-15.9 pH Buffers and Titrations

**Week 7 (Beginning February 22)**
Aqueous Equilibria & Coordination Compounds
Monday: 15.9-15.10 Titrations and Solubility Equilibria
Wednesday: 16.1-16.5 Lewis Acids & Bases, Complex Ions, Polydentate Ligands, Chelate Effect
Friday: 16.6-16.8 Crystal Field Theory and Magnetism

**Week 8 (Beginning February 29)**
Electrochemistry
Monday: 17.1-17.2 Electrochemical Cells
Wednesday: 17.3-17.5 Standard Potentials and Chemical Energy & Chemical Work

*Friday (03/04): No class, spring break begins at 10:00 p.m.*

**Week 9 (Beginning March 14)**
Electrochemistry
Monday: 17.6 The Effect of Concentration on Electrochemical Cells
Friday: 17.7-17.8 Battery Capacity and Electrolytic Cells

*Wednesday (03/16): Exam II in evening 6:00 – 7:00 p.m.*

**Week 10 (Beginning March 21)**
The Solid State
Wednesday: 18.3-18.4 Structures of Metals and Alloys
Friday: 18.4-18.6 Alloys, Crystalline Nonmetals, and Ionic Solids

*Friday (03/25): Last day to drop full semester courses with a grade of W.*
Week 11 (Beginning March 28)
The Solid State & Organic Chemistry
Monday: 18.7-18.8 Ceramics and X-ray Diffraction
Wednesday: 19.1-19.2 Alkanes
Friday: 19.3-19.4 Alkenes, Alkynes, and Aromatics

Week 12 (Beginning April 4)
Organic Chemistry & Biochemistry
Monday: 19.5-19.7 Amines, Alcohols, Ethers, and Carbonyl Compounds
Wednesday: 19.8-20.1 Organic Isomers and Proteins
Friday: 20.2-20.3 Protein Structure & Function and Carbohydrates

Week 13 (Beginning April 11)
Biochemistry
Monday: 20.3-20.6 Carbohydrates, Lipids, and Nucleotides & Nucleic Acids
Wednesday (04/13): Exam III in evening 6:00 – 7:00 p.m.
Friday (04/15): No class

Week 14 (Beginning April 18)
Nuclear Chemistry
Monday: 21.1-21.3 Fusion and the Belt of Stability
Wednesday: 21.4-21.6 Rates of Decay, Fission, and Measuring Radioactivity
Friday: 21.7-21.9 Medical Application of Radionuclides and Radiometric Dating

Finals Week (Beginning April 25)
Wednesday (04/27): Final Exam 10:15 a.m. – 12:15 p.m.
Suggested Problems (Tentative)

The odd numbered problems have answers in the back of the book and will greatly help you prepare for examinations because some exam questions will draw from the textbook problems. While I encourage you to work all of these problems and any extra you feel necessary, keep in mind that the book subdivides these questions into sections. This would allow you to selectively work problems in only areas which you feel you need the additional practice.

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<thead>
<tr>
<th>Chapter</th>
<th>Problems</th>
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<tr>
<td>13</td>
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