INTRODUCTION: CH1160-University Chemistry II is the second of a two-semester sequence covering fundamental chemical concepts 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. Some majors are required to take the associated laboratory (CH1161) as a co-requisite. For lab questions, please contact Lorri Reilly (Chem. Sci. 508B, lareilly@mtu.edu, 7-2044). 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 as pass/fail based on attendance and class assignments related to the lecture material. To register for recitation, please contact your advisor or Lois Blau (Chem. Sci. 206A, lablau@mtu.edu, 7-2297)

ELECTRONIC DEVICES: Please turn 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.

EXAMINATIONS: There will be three "hour" exams worth 150 points each, and one multiple-choice final exam worth 300 points. The "hour" examinations will be in class and will take place on:

- Monday, October 8th
- Monday, November 5th
- Monday, December 10th
- Final exam dates are located at www.mtu.edu/registrar (look under Most Viewed Pages)

GRADING: Your grade will be based upon the percentage of the total points available that you accumulate and are divided between assignments as shown below. The pass mark for this class is officially set at 60%, a grade C =70%, a Grade B=80%, and a Grade A=90%. Final "curve" will be set after the last exam.

<table>
<thead>
<tr>
<th>Component</th>
<th>Points</th>
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<tbody>
<tr>
<td>CONNECT/CANVAS Homework</td>
<td>150 pts</td>
</tr>
<tr>
<td>i&gt;clicker</td>
<td>150 pts</td>
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<tr>
<td>Hour Exams</td>
<td>450 pts</td>
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<tr>
<td>Final Exam</td>
<td>300 pts</td>
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<tr>
<td>TOTAL</td>
<td>1000 pts</td>
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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.

STUDYING - Chemistry is really easy to pass, but it is even easier to fail: It is your actions that will determine where you lie on this scale. I whole heartedly encourage you to explore what Michigan Tech
has to offer, but do this AFTER you have completed a couple of hours studying each night and you will be much happier in your classes. If you choose not to study the recommended minimum of 3 hours per credit per week you may find your grades are not quite what you expected.

i>CLICKER: Studies have shown that it is extremely important for students to be engaged in the classroom experience if they are to maximize their learning. In an attempt to engage all of you and get you thinking about the problem posed in class we will use i>clicker in class. The i>clicker is a response system that allows you to respond to questions I pose during class, and you will be graded on your responses, and your participation. The purpose of i>clicker remotes is to help guide your learning rather than simply acting as a measure of attendance. You will be able to accumulate maximum of 10 points per lecture (1 point for answering the question and 2 points for answering the question correctly). In addition, I will drop up to 10% of the lowest scores so that you can "have bad days" or absences without significant penalty. We will begin accumulating points in Week 2.

In order to receive this credit, you will need to register your i>clicker remote online within the first TWO WEEKS of class by Roll Call Registration.

1. Look for your name and ID ie lastname, firstname, and Michigan Tech ISO Login (e.g. tiwari).
2. Press the LETTER next to your Name/ID to register your i>clicker.
3. Press the SECOND LETTER next to your Name/ID to CONFIRM your registration.

i>clicker will be used almost every day in class, and you are responsible for bringing your remote daily. After the first two weeks I will upload scores on a weekly basis and do not backdate for people who forget to register.

CAMPUS Learning Management System (LMS): Michigan Tech is using a new LMS called CANVAS. To access CANVAS, go to http://mtu.instructure.com and enter your Michigan Tech ISO username and password. Once logged in, you can select your course from the "courses & groups" menu. Select the one that is labeled "CH1160 University Chemistry II (tiwari)" for access to class related materials.

REDINOTES: The class PowerPoint slides will be made available on CANVAS for you to download and print. These notes are NOT designed to replace taking good notes, but they will allow you to pay closer attention to classroom discussion, write down any additional information, and participate via the i>clicker system.

ONLINE HOMEWORK: You received a code card with the purchase of your textbook, or as a separate package, that will give you access to the Connect homework system. Do not lose it! The Connect online homework has about 30 problem sets plus learn-smart assignments that will become available throughout the semester. Each problem set consists of a series of questions, many of which include help should you have difficulties. Questions about your online homework must be sent to __________@mtu.edu

If you were in CH1150 during Spring 2012, your CONNECT username and password will still be active. If you are new to this class, you will need to buy an access code online (about $50) or buy a textbook with an included code card.

When registering on Connect, you MUST use your Michigan Tech email address to receive credit for the work you do. DO NOT USE ANY OTHER EMAIL.
A. If you were in CH1150, you can simply use your existing username and password:
   1. Go to http://connect.mcgraw-hill.com/class/---------- starting September 10th and log in to your account by entering the email and password you used during Spring 2012, and clicking sign in.
   2. If you cannot remember your email or password, you will need to contact customer support by following the link on the registration page.

B. If you were NOT in CH1150 in Spring 2012, you can register for access to the online homework as follows:
   1. Go to http://connect.mcgraw-hill.com/class/________.
   2. Click the red REGISTER NOW button.
   3. Enter your Michigan Tech email address and click Submit. If you enter any other address the software will not be able to communicate with the Michigan Tech Canvas system, and your scores will not transfer.
   4. The system will check whether your name is in the system and guide you from there. If you do not have an account, you will be prompted to enter the 20-digit alphanumeric registration code from the card that came with your textbook pack.
   5. Once the code has been accepted, you will be prompted to complete the form and create a password and then click "Complete Registration."
   6. Once registration is complete you must click "Go to Connect Now" on the page that is presented. This finalizes registration and adds you to the course.
   7. Registration help may be found at the following address, which provides answers and movies: http://mpss.mhhe.com/student_connect_resources.php

ABSENCE POLICY: For exams, an unexcused absence is an automatic zero for any exam that is missed. 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 day that an exam is scheduled (university athletic event, religious holiday, or funeral), you are required to make arrangements as early as possible in advance of the exam date. Failure to provide at least one weeks notice may result in a grade penalty. I do not write make up exams, so you will generally be expected to take the exam immediately before leaving. Where this is not feasible we use the score from your next exam. Excused absences will not be given to travel home, or attend "social" events such as weddings. 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, or Ms Blau BEFORE the exam and then have a doctors note stating your illness prevents (or prevented) you from taking the exam, not simply that you visited the doctors office.

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.

CHEMISTRY LEARNING CENTER (CLC): The CLC is a free service provided by the Department of Chemistry and the University to provide support for students enrolled in first year chemistry lecture courses. The CLC is located in room 208 of the chemical sciences building and staffed by upper level undergraduates (coaches), who have a good background in chemistry and are familiar with the courses.
Services offered include weekly appointments, walk-in assistance, reference library, computer-assisted learning and a comfortable place to study chemistry. Stop by or contact Lois Blau (CLC Director, Chem. Sci. 206A, lablau@mtu.edu, 7-2297) for more information.

**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.

*Chemistry Learning Center Walk-In Hours*

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<thead>
<tr>
<th>Day</th>
<th>Times</th>
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<tbody>
<tr>
<td>Sunday</td>
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<tr>
<td>Monday</td>
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<td>Tuesday</td>
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<td>7:00 - 9:00 pm</td>
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<tr>
<td>Wednesday</td>
<td>10:00 - 4:00 pm</td>
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<tr>
<td></td>
<td>7:00 - 9:00 pm</td>
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<tr>
<td>Thursday</td>
<td>10:00 - 4:00 pm</td>
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<tr>
<td></td>
<td>Closed</td>
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</tbody>
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**CLASS SCHEDULE:** The lecture meets Monday, Wednesday and Friday in Fisher 138 at 9:05 AM. 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:

- **Topic 01:** Chemical Kinetics II
  - Rates of reaction & Rate Law (Section 13.1 & 13.2)
  - Integrated rate laws (Section 13.3)
  - Temperature dependence (Section 13.4)
  - Reaction Mechanisms (Section 13.5)
  - Enzyme Catalysis (Section 13.6)

- **Topic 02:** Chemical Equilibrium II
  - Equilibrium Concept & Constants (Section 14.1, 14.2 & 14.3)
  - Equilibrium concentrations (Section 14.4)
  - Le Châtelier's Principle (Section 14.5)

- **Topic 03:** Aqueous Equilibrium
  - Acid-Base Concepts (Sections 15.1, 15.2, & 15.12)
  - pH - A Measure of Acidity (Section 15.3)
  - Acid-Base Strength (Section 15.4 & 15.9)
  - Acid Ionization Constants (Section 15.5-15.7)
  - Diprotic & Polyprotic Acids (Section 15.8)
  - Acid-Base Properties of Salts (Section 15.10 & 15.11)
  - The Common Ion Effect (Section 16.2)
  - Buffer Solutions (Section 16.3)
  - Acid-Base Titrations (Section 16.4 & 16.5)
  - Solubility Equilibria (16.6-16.10)
Topic 04: Thermodynamics
Thermochemistry (Sections 6.1 - 6.6)
Spontaneous Processes and Entropy (Sections 18.1 - 18.4)
Free Energy and Equilibrium (Section 18.5 & 18.6)
Living Systems (Section 18.7)

Topic 05: Electrochemistry
Redox Reactions (Sections 4.4 & 19.1)
Galvanic Cells and Reduction Potentials (Sections 19.3 & 19.4)
Concentration Effects (Section 19.5)
Batteries and Corrosion (Sections 19.6 & 19.7)
Electrolysis (19.8)

Topic 06: Organic and Polymer
Organic Nomenclature Review (Sections 24.1-24.4 & Handout)
Basic Aliphatic and Aromatic Reactions (Sections 24.1-24.4 & Handout)
Basic synthetic pathways (Sections 24.1-24.4 & Handout)
Synthetic and Biological Polymers (Sections 25.1-25.4)

Topic 07: Nuclear Chemistry (Sections 23.1 - 23.8)

Topic 08: Chemistry and the Environment
Earth's Atmosphere (Section 17.1-17.3)
The Greenhouse Effect (Section 17.5)
Acid Rain, Smog, & Pollution (Section 17.6-17.8)
SUGGESTED TEXTBOOK PROBLEMS: The even numbered problems have answers in the back of the book and will greatly help you prepare for examinations because exam questions are usually based on textbook problems.

**Topic 01**  
Chapter 13: 2, 3, 6, 8, 10, 14, 15, 16, 18, 24, 25, 26, 31, 33, 35, 37, 38, 40, 42, 44, 45, 46, 47, 48, 49, 51, 52, 53, 54, 55, 56, 62, 63, 64, 65, 70, 74, 75, 86, 88, 96, 100, 101, 104.

**Topic 02**  
Chapter 14: 1, 2, 5, 7, 8, 14, 16, 18, 20, 26, 28, 29, 30, 31, 32, 37, 38, 40, 42, 44, 46, 48, 49, 50, 52, 53, 54, 55, 58, 62, 64.

**Topic 03**  
Chapter 04: 10, 20, 32, 34  
Chapter 15: 4, 5, 8, 16, 18, 20, 24, 31, 32, 33, 34, 44, 46, 48, 54, 56, 59, 62, 64, 68, 76, 78, 96, 100, 106, 118, 120, 124  
Chapter 16: 1, 4, 6, 8, 10, 12, 14, 16, 18, 20, 26, 28, 32, 34, 40, 43, 45, 50, 52, 54, 56, 60, 62, 64, 66, 68. (If covered in class 70, 76, 78)

**Topic 04**  
Chapter 06: 1, 7, 11, 12, 14, 16, 21, 23, 26, 28, 32, 34, 36, 38, 46, 54, 58, 76, 82.  
Chapter 18: 1, 2, 3, 5, 6, 10, 12, 14, 17, 18, 20, 21, 24, 26, 28, 30, 38, 42, 44, 48, 54, 60, 62

**Topic 05**  
Chapter 04: 35, 37, 39, 40, 44, 46, 48, 50, 54, 56  
Chapter 19: 1, 2, 3, 4, 6, 11, 12, 13, 14, 16, 18, 21, 22, 23, 24, 28, 29, 30, 31, 32, 34, 46, 48, 49, 50, 52, 58.

**Topic 06**  
Chapter 24: 12, 14, 16, 20, 24, 26, 27, 28, 31, 32, 34, 35, 36, 38, 40, 41, 42, 46, 55, 58, 60  
Chapter 25: 1, 3, 5, 8, 9, 10, 11, 12, 33.

**Topic 07**  
Chapter 23: 1, 2, 3, 4, 5, 6, 8, 10, 14, 16, 20, 24, 26, 30, 34

**Topic 08**  
Chapter 17: 13, 14, 16, 18, 24, 26, 28, 31, 32, 33, 34, 35, 36, 38, 40, 43, 44, 45, 46, 47, 48, 50, 51, 55, 58, 66, 68, 72, 86

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*Michigan Tech complies with all federal and state laws and regulations regarding discrimination, including the Americans with Disabilities Act of 1990 (ADA). If you have a disability and need a reasonable accommodation for equal access to education or services at Michigan Tech, please call Christy Oslund, Student Disability Services (cmoslund@mtu.edu), or the Dean of Students office, at 1-906-487-2212.*