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. 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.

ELECTRONIC DEVICES: Please turn off (or silence) AND stow 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 and so I am asking you to please refrain from using them. Students whose electronic devices create a distraction may find themselves responsible for punitive action being taken against the whole class. Only dedicated calculators and foreign language translation devices may be used during examinations.

EXAMINATIONS: There will be three "hour" exams worth 100 points each, and one multiple-choice final exam worth 200 points. The "hour" examinations will take place at 6:00pm on:

- February 7th - Note that this exam is on Monday of Winter Carnival weekend; therefore we will cancel class on Wednesday February 9th (Carnival Wednesday) for this exam.
- March 16th - Note that this exam is on the Wednesday after spring break; therefore we will cancel class on Friday March 4th (Friday before Spring Break) for this exam.
- April 13th - Note that this exam is on a Wednesday and we will cancel class on Friday April 8th for this exam.

Final exam dates are located at http://www.admin.mtu.edu/em/students/plan/finalexam.php

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 = 68%, a Grade B = 78%, and a Grade A = 88%. Final "curve" will be set after the last exam.

- ARIS Homework 100
- Blackboard Homework 100
- i>Clicker 100
- Hour Exams 300
- Final Exam 200

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 do not wait until you are failing your classes to ask for help.
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 strongly encourage you to explore what Michigan Tech has to offer, but do this AFTER you have reviewed your notes and completed homework, 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. Remember that 3 hours of study should not include 2 hours of chatting or texting! Expect the need to ramp up your study level from anything you did in CH1150.

REDINOTES: The class PowerPoint slides will be made available on Blackboard for you to download and print. Copies will also be available, at cost, in the Chemistry Learning Center. 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.

ARIS: If you were in CH1150, your ARIS username and password should still be active. If you are new to this class, you will need to buy an access code online ($50) or buy a textbook with an included code card. When registering on ARIS you MUST use your Michigan Tech email address to receive credit for the work you do. The ARIS online homework has a number of problem sets that will become available throughout the semester. In addition to ARIS the tutorial problems, there are a number of assignments that will become available on Blackboard shortly before each examination.

A. If you were in CH1150, you can simply use your existing username and password:
   1. Go to www.mharis.com and log in to your account
   2. Scroll to the bottom of the page and enter the section enrollment number (D78-ED-7B8) using CAPITAL letters in the box marked "Enroll in Another Course."
   3. Click GO.
   4. You should now see "CH1160 University Chemistry II" listed under Current Courses and Sections.

B. If you were NOT in CH1150, you can register for access to the online homework as follows:
   1. Go to www.mharis.com and click students under "New Users Register Here."
   2. Under Join a Course, Enter the section enrollment number (D78-ED-7B8) using CAPITAL letters.
   3. Click Next>>
   4. Enter the 20-digit alphanumeric registration code from the card that came with your textbook or click BUY ONLINE.
   5. Enter your Michigan Tech email address and click Submit. Do not enter any other address.
   6. Create your account by entering your Michigan Tech email address and creating a password (WRITE IT DOWN) that you will use to access your online homework on future visits.
   7. Select "Michigan Technological Univ (Houghton)" for your school, create a security question in case you forget your password, and accept the terms of service agreement. Then click the Complete My Registration button.
   8. Once registered, you will see a page that shows announcements and assignments. You will also receive two messages from noreply-he@mcgraw-hill.com confirming your registration. Save them!

If you were not in CH1150 and know someone who did not continue from CH1150 to CH1160, you can negotiate with that person to have him or her transfer the registration to you. This can be achieved by asking him or her to log in to their ARIS account, change the username to your Michigan Tech email address, and then creating a new password for you to use. Once the ARIS account is in your name, you will proceed with the registration steps listed in option "A" above. Note that ARIS codes activated Fall 2010 will expire spring 2012, while those activated Fall 2009 will expire spring 2011, so check which semester your "friend" first activated their code.
**BLACKBOARD:** Although ARIS is being used for your weekly online homework; we are using Blackboard to deliver course materials and exam reviews. To access Blackboard, go to [http://courses.mtu.edu](http://courses.mtu.edu) and enter your Michigan Tech ISO username and password. Once logged in, you will be presented with a list of the courses you are currently registered in. Select the one that is labeled “CH1160 University Chemistry II” for access to class related materials.

**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. One way of doing this is to ask questions, have discussions, and perform in-class quizzes. In an attempt to get you all thinking about the material and considering the problems, we will use i>clicker remotes (available at the bookstore). 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 to help guide your learning rather than them simply acting as a measure of attendance. In an attempt to achieve this, I will drop up to 10% of the lowest scores so that you can “have bad days” or absences without significant penalty.

In order to receive this credit, you will need to register your i>clicker remote online within the first **TWO WEEKS** of class as follows:

1. Before registering, you must come to class and vote on at least one question in order to complete this registration properly. This should, hopefully, have happened on the first day.
2. Once you have voted on a question in my class, go to [http://www.iclicker.com/registration](http://www.iclicker.com/registration).
3. Complete the fields with your first name, last name, student ID, and remote ID.
   a. Your **student ID must be you Michigan Tech ISO Login** (e.g. pcharles) otherwise the i>clicker software will not communicate with Blackboard and you will not get credit.
   b. Your remote ID is the series of numbers and sometimes letters found on the bottom of the back of your i>Clicker remote.

   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.

**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.**

**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 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>
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<tbody>
<tr>
<td>Sunday</td>
<td>Not open</td>
<td>Spring Semester</td>
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<tr>
<td>Monday</td>
<td>10:00 – 4:00 pm</td>
<td>7:00 – 9:00 pm</td>
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<tr>
<td>Tuesday</td>
<td>10:00 – 4:00 pm</td>
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<tr>
<td>Wednesday</td>
<td>10:00 – 4:00 pm</td>
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</tr>
<tr>
<td>Thursday</td>
<td>10:00 – 4:00 pm</td>
<td>Closed</td>
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**SUPPLEMENTAL INSTRUCTION (OPTIONAL):** 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 won’t 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.

**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.

**CLASS SCHEDULE:** The lecture meets Monday, Wednesday and Friday in Fisher 135 at 11:05 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: Organic and Polymer**
- Organic Nomenclature (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 25.1-25.5)

**Topic 02: 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)
Topic 03: **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 04: **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 05: **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)
Green Chemistry on Blackboard - Availability to be announced

Topic 06: **Thermodynamics**
Spontaneous Processes and Entropy (Sections 18.1 - 18.4)
Free Energy and Equilibrium (Section 18.5 & 18.6)
Living Systems (Section 18.7)

Topic 07: **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 08: **Elements and Compounds II - More Bonding Theories**
Lewis and VSEPR Review (Sections 9.6-9.9, 10.1, & 10.2)
Valence Bond Theory & Orbital Hybridization (Sections 10.3-10.5)
Molecular Orbital Theory (Section 10.6-10.7)
Delocalized Molecular Orbitals (Section 10.8)
Band Theory of Electrical Conductivity (Section 20.3)
Coordination Complexes (Section 22.1-22.4, and 22.7)
Crystal Field Theory (22.5 & 22.6)

Topic 09: **Nuclear Chemistry - Time Permitting** (Sections 23.1-23.8)
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 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.  
*Organic handout available on Blackboard, or consider purchasing "Organic Chemistry I Workbook for Dummies" by Arthur Winter (ISBN 9780470251515); currently $11.83 on Amazon.*

**Topic 02**  
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 03**  
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 04**  
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, 98, 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 05**  
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  
*Green Chemistry Handouts on Blackboard*

**Topic 06**  
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 07**  
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, 33, 34, 46, 48, 49, 50, 52, 58.

**Topic 08**  
Chapter 09: 43, 44, 45, 47, 95, 105  
Chapter 10: 8, 10, 12, 14, 15, 16, 17, 20, 25, 26, 28, 29, 32, 34, 36, 40, 42, 45, 47, 50, 52, 54, 56, 58, 61, 64, 66, 68, 74, 76, 84, 89  
Chapter 20: 12, 19, 20, 21, 22  
Chapter 22: 1, 2, 5, 6, 9, 10, 12, 13, 15, 16, 18, 19, 20, 23, 24, 26, 27, 28, 29, 30, 31, 32, 34, 35, 36, 37, 41

**Topic 09**  
Chapter 23: 1, 2, 3, 4, 5, 6, 8, 10, 14, 16, 20, 24, 26, 30, 34

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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 Dr. Gloria Melton, Dean of Students (7-2212).*