University Chemistry II (CH1120)

Spring Semester, 2005

Lecture: Dr. Paul Charlesworth 402C Chemical Sciences Bldg  Email: pcharles@mtu.edu
Laboratory: Ms. Lorri Reilly 508B Chemical Sciences Bldg  Email: lareilly@mtu.edu
Learning Center: Ms. Lois Blau 206A Chemical Sciences Bldg  Email: lablau@mtu.edu
SI Leader: Ms. Amber Bertoni  Email: amberton@mtu.edu

Office Hours: Monday and Wednesday 1:30pm to 3:30pm, or by appointment.
Course Materials: http://www.chemistry.mtu.edu/pages/courses/index.php
WebCT: http://courses.mtu.edu

Introduction:
University Chemistry provides an overview of the chemical concepts that I believe are important to your science and engineering careers. It is my hope that by the end of this course you will have both an appreciation of how important chemistry is to our daily lives, and a greater interest in the subject than when you arrived here. University Chemistry II is the second semester of a one-year course for majors requiring a full year of chemistry. I strongly recommend you complete both semesters of University Chemistry before summer 2004. Failure to complete classes can leave you with all manner of scheduling problems that could plague your remaining years at Michigan Tech.

Role of Instructor:
The role of your instructor will be to guide you through your studies by presenting outlines of material considered important, helping you understand concepts by working through examples, and by providing other useful resources and assistance to help you with your studies. Your instructor cannot provide you with all the information you need to learn and understand material for this class.

Your instructor will also assess your progress by providing challenges such as online and assigned homework, in-class quizzes, problem sets, and examinations.

Role of Student:
Your role as a student at Michigan Tech is to participate in class, show respect for others, and accept responsibility for your own learning. It is up to you, as the student, to decide how hard you want to work, and therefore how well you will perform when challenged by your instructor. Although there are times when you may not agree, your performance in the class will be a reflection of the amount of effort you make to learn and understand the material. It is quite easy to spend many hours looking at the textbook and not learn anything. Do not fall into the trap of thinking that time is a measure of effort or learning. You will learn more by studying intensely for two fifteen or twenty-minute sessions each hour than you would by vaguely staring at your notes for several hours.

Class Schedule:
The material presented in class, particularly during spring, is only sufficient to provide you with a guide on which you base your private study. If you take very good notes in class and learn that material well, you should pass. However, if you want a good grade then you must spend a few more hours
writing out your notes, solving problems, and making sure that you understand the theory behind problems you are solving.

The vast majority of assignments for this class will come directly from the textbook or class worksheets. However, if you are stuck on a problem there are plenty of additional resources for you to use. The Chemistry Learning Center will probably be the first place to go and can help you with many problems, but is not a panacea for all ills. There will be things that even the coaches cannot answer and then you, and maybe your coach, will need to seek additional help. There are several shelves of books in the Learning Center, a quick Google search can often turn up many answers, and the library has even more shelves of books. If you still do not understand something, then you should come and talk to me and I would be happy to try and help you. Do not just give up on the problem, it is important and it may be on an exam.

Attendance in lecture is mandatory. However, you may not receive any warnings or punishments for not attending lecture or studying, but when it comes to exams and you do not understand the material, I will have no sympathy for you. The truth is that, with guidance, you make your own decisions about attending class and studying, or going out and getting wasted. If you choose not to study effectively for the recommended minimum of six to nine hours per week for this class that is your choice.

Topics Covered:
The topics covered in this semester include, but are not limited to, the following. Please refer to the table for a specific timeline.

Oxtoby Freeman and Block:

- Chapter 10: Thermochemistry – Recap of important points.
- Chapter 11: Enthalpy, entropy, free energy and their relation to equilibrium and phase changes.
- Chapter 12: Redox reactions and basic electrochemical cells.
- Chapter 13: Standard potentials, free energy, equilibrium, Nernst effects, and electrometallurgy.
- Chapter 14: Chemical Kinetics including rates, orders, and mechanisms.
- Chapter 18: Molecular Orbital Theory and Spectroscopy
- Chapter 19: Coordination Complexes and Crystal Field Theory
- Chapter 20: Crystallography, Symmetry and Structure, Crystal defects, and liquid crystals.
- Chapter 21: Semiconductors, silicates, and ceramics.
- Chapter 22: Chemical processes
- Chapter 24: Hydrocarbons, functional groups, drugs, and simple reaction mechanisms.
- Chapter 25: Preparation and properties of synthetic polymers.

Textbook Problems and Assigned Homework:
The textbook problems have been selected to provide you with a good overview of the content areas I believe you need to be familiar with. Although working through the problems provides no guarantee that you will get a grade A in the class, it certainly increases your chances. The problems I would like you to complete each week are listed in the table along with the assigned reading for that week.

Recitations:
This class has no separate recitation, but we will cover problems during group sessions taking place at the completion of every chapter, or directly preceding an exam. This will be graded.
Assignments and Grading:
Your examination dates are as follows:
- Exam 01: Wednesday, February 16th from 6:00pm to 7:00pm
- Exam 02: Wednesday, March 23rd from 6:00pm to 7:00pm
- Exam 03: Wednesday, April 13th from 6:00pm to 7:00pm
- Final: Tuesday, April 26th from 2:45 - 4:45 pm

You should plan to arrive for the exam at least 10 minutes before it is due to start. We reserve the right to refuse entry to the examination if you are more than 10 minutes late. No one arriving late to the exam will receive extra time. Persons who, for whatever reason, require extra time or isolation to take the exam should see me at the start of the semester so that need can be determined and arrangements can be made.

Grading will be based on a combination of WebCT homework (100pts), Friday-class problems (60pts), three one-hour exams (80pts each), laboratory (200 pts) and a comprehensive two-hour final exam (200pts). Your grade will be based upon the percentage of the total points available that you accumulate as shown below. Improvements throughout the term may be taken into consideration when grades are assigned. Your score on the final exam plays a significant role in determining your final grade.

**Important:** The lab portion of CH1120 is worth 25% of your final grade. You must pass both the lecture and the laboratory portions of CH1120. Anyone who fails the either section of CH1120 automatically fails the entire class regardless of the total scores.

All important equations and constants will be provided as a sheet with the examination. You will not be allowed to bring a note card.

If you would like a photocopy of your answer (Scantron) sheet from an exam, complete the request form located outside Ms. Blau’s office (206A ChemSci). A photocopy of your answer sheet will be available the next day.

The grading scale is based on over 5 years of refinement and rewards effort. It is designed so that, in theory, it is possible for everyone to obtain a grade A in this class *if you work hard enough!* If you do not obtain the grade you desire, it is your fault. Excuses will not be accepted. The pass mark for this class is set at 60%, a grade C is set at 68%, a Grade B is set at 78%, a Grade A is set at 88%.

**Handouts:**
Handouts will be distributed during the course to complement the text. The class PowerPoint slides will be printed at a rate of four slides per page and sent to you through the campus email. They are also available at: http://www.chemistry.mtu.edu/pages/courses/index.php. It is assumed that you all have a computer or printer, but for those who do not, a limited number will be available in the CLC.

These notes are NOT designed to replace taking good notes, but they will reduce your need to copy everything from the slides and so allow you to pay more attention to classroom discussion. *The lecture will be paced based on the assumption that you are using the RediNotes.*
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 Center 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; team learning groups, walk-in assistance, reference library, computer-assisted learning and a comfortable place to study chemistry. Two services operate through the Learning Center:

1. Supplemental Instruction (SI): The Chemistry Learning Center will be offering Supplemental Instruction for CH1120, University Chemistry 2 this semester. CH1120 has been targeted for Supplemental Instruction because it is a historically challenging course requiring large amounts of reading from a difficult text and examinations that will focus on application and analysis.

The SI sessions are regularly scheduled, informal review sessions that provide a chance for you to get together with people in your class to compare notes, discuss important concepts, develop strategies for studying the subject, and to test yourselves before your professor does, so that when he does, you'll be ready. A trained SI leader facilitates and encourages the group to process the material rather than acting as authority figures that lecture to participants.

Your SI leader is Amber Bertoni who successfully completed CH1120 with Dr. Charlesworth last Spring Semester. She is prepared to share with you what she has learned about how to study effectively for this course. She knows the course content and is anxious to help guide you through it. She'll also be in class with you every day, taking notes, listening closely to the professor, and will assist you during Friday problem sessions. Amber will survey the class during the first week to discover the best times to offer sessions and will inform the class when and where the sessions will be held.

SI is provided for all students who want to improve their understanding of course material and improve their grades. Research indicates that students who attend the SI sessions regularly do better than those students who attend periodically or not at all. Participation in SI is voluntary, free-of-charge, and open to all students in this course. Students who are interested in participating in Supplemental Instruction do not need to enroll in CH0011.

2. CH0011 - Development of Chemistry Skills (1 credit): Students who would like to have a scheduled weekly appointment or participate in a team learning group must be enrolled in CH0011. Students enrolled in CH0011 should visit the CLC during the first week of class to sign up for a weekly appointment time with a coach or a Team Learning Group. You must attend your first weekly appointment or team meeting, which begins the second week of classes. Grades in CH0011 are satisfactory/unsatisfactory based on attendance. You are expected to attend every appointment or group meeting. However, you are allowed to miss one appointment or three team meetings and still receive a satisfactory grade.

<table>
<thead>
<tr>
<th>Spring Semester Walk-in Hours</th>
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<tr>
<td>EVENING: Monday through Wednesday</td>
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<td>DAYTIME: Monday through Thursday</td>
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Absence Policy and Academic Integrity:
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 or religious holiday), you are required to make arrangements as early as possible in advance of the exam date. Other examples of excused absences granted in the past are serious illness or a death (including your own). Please note that studies have shown that poor performance of students in classes often leads to the unexplained deaths of grandparents around exam time and we suggest you work hard to protect the life of your loved ones. Excused absences will not be given to travel home or to attend a social event. Plan to take your exam at the scheduled time.

Both students and faculty are responsible for insuring the academic integrity of the University according to the procedures in “Academic Integrity at MTU – 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, an “F*” grade indicating failure due to academic dishonesty, suspension or expulsion.

MTU 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 MTU, please call Dr. Gloria Melton, Associate Dean of Students at 2212.
# Class Schedule and Assigned Problems

<table>
<thead>
<tr>
<th>Week</th>
<th>Start Date</th>
<th>Monday</th>
<th>Wednesday</th>
<th>Friday</th>
<th>End of Chapter Problems</th>
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<td>1</td>
<td>01/10/05</td>
<td>10-3 and 10-4</td>
<td>10-5 and 10-6</td>
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<td>Ch.10: 1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 25, 29, 31, 33, 37, 39, 43, 47, 49, 51, 53, 59, 61</td>
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<td>11-6 to 11-8</td>
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<td>Ch.11: 1, 5, 9, 11, 13, 19, 23, 27, 29, 33, 35, 37, 43, 47, 49, 55, 61, 63, 69, 71, 73, 75</td>
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<tr>
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<td>01/24/05</td>
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<td>01/31/05</td>
<td>13-1 and 13-2</td>
<td>13-4 and 13-5</td>
<td><em>Chapter 13 Problems</em></td>
<td>Ch.13: 1, 3, 7, 9, 13, 15, 17, 21, 23, 25, 27, 31, 33, 39, 41, 43, 47</td>
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<tr>
<td>5</td>
<td>02/07/05</td>
<td>14-1 and 14-2</td>
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<td>Ch.14: 1, 3, 5, 9, 11, 13, 15, 19, 21, 23, 25, 27, 29, 31, 35,</td>
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<td>6</td>
<td>02/14/05</td>
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<td>Ch.14: 37, 39, 41, 42, 43, 44, 45, 46, 47, 49, 51, 53, 55, 57</td>
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<td>02/21/05</td>
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<td>15-3 and 15-4</td>
<td><em>Ch. 14 &amp; 15 Problem</em></td>
<td>Ch.15: 1, 3, 5, 9, 11, 13, 19, 23, 25, 27, 31, 35, 41, 43, 45, 47, 49</td>
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<td>8</td>
<td>02/28/05</td>
<td>18-1</td>
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<td>Ch.18: 1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 25, 27, 29, 31, 35, 37, 39, 41, 43</td>
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<td>9</td>
<td>03/14/05</td>
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<td>19-1 and 19-2</td>
<td><em>Ch 18 &amp; 19 Problems</em></td>
<td>Ch.19: 1, 3, 5, 7, 9, 11, 15, 17, 19, 20, 23, 24, 25, 27, 29, 31, 33, 35, 37, 39, 41</td>
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<tr>
<td>10</td>
<td>03/21/05</td>
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<tr>
<td>11</td>
<td>03/28/05</td>
<td>20-2 and 20-3</td>
<td>20-3 to 20-5</td>
<td><em>Ch. 19 &amp; 20 Problems</em></td>
<td>Ch.21: 1, 3, 5, 7, 9, 13, 17, 19, 21, 27, 29, 31, 33</td>
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<td>12</td>
<td>04/04/05</td>
<td>21-1 and 21-3</td>
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<td><em>Ch. 21 &amp; 22 Problems</em></td>
<td>Ch.22: 7, 9, 11, 13, 19, 23, 25, 27, 29, 35, 37, 41</td>
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<tr>
<td>13</td>
<td>04/11/05</td>
<td>24-1 and 24-2</td>
<td>24-2 and 24-3</td>
<td><em>No Class</em></td>
<td>Ch.24: 1, 3, 5, 7, 9, 10, 11, 12, 13, 14, 15, 17, 18</td>
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<tr>
<td>14</td>
<td>04/18/05</td>
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<td>25-3</td>
<td><em>Ch 24 &amp; 25 Problems</em></td>
<td>Ch.25: 1, 2, 3, 4, 5, 6, 7, 8</td>
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**Final Exam:** Tuesday, April 26th from 2:45 - 4:45 pm