Course Syllabus for CH3510 Summer 2012
Ph Chem I: Thermodynamics, Equilibrium, Kinetics
Department of Chemistry

Instructor Information
Instructor: Loredana Valenzano, PhD, Assistant Professor
Current Office Location: 117 Fisher Hall
Telephone: Physics – (906) 487-2086
E-mail: lvalenza@mtu.edu
Office Hours: TF 11:00 am – 12:00 pm (Fisher 117)
Or by appointment

Course Identification
Course Number: CH3510-0A
Course Name: Ph Chem I: Thermodynamics, Equilibrium, Kinetics
Course Location: Room 101 - Chemical Sciences & Engr Bldg
Class Times: MTWR 9:35 am - 10:50 am

Course Description/Overview
To introduce concepts useful in explaining and interpreting the nature of physical and chemical properties of matter. This course will cover the following areas of Physical Chemistry: thermodynamics, chemical equilibrium, and chemical kinetics.

Course Learning Objectives
To provide students with foundation in thermodynamics principles governing chemical phenomena. To guide students in developing quantitative reasoning, problem solving, rigorous thinking but also physical-chemical intuition.

Course Resources
Online Resources
- Canvas: https://mtu.instructure.com/login
- E-mail List: ch3510-0a-su12-L@mtu.edu
Required Course Text


Other useful sources may be represented by:

- Donald A. McQuarrie and John D. Simon, *Molecular Thermodynamics*, University Science Books, Sausalito-California, 1999
- A comprehensive little wonderful (and cheap) reference is: Enrico Fermi, *Thermodynamics*, Dover Publication Inc., New York, 1936

**Grading Scheme**

Grading System

<table>
<thead>
<tr>
<th>Points</th>
<th>Letter Grades</th>
</tr>
</thead>
<tbody>
<tr>
<td>93-100</td>
<td>A</td>
</tr>
<tr>
<td>87-92</td>
<td>AB</td>
</tr>
<tr>
<td>82-86</td>
<td>B</td>
</tr>
<tr>
<td>76-81</td>
<td>BC</td>
</tr>
<tr>
<td>70-75</td>
<td>C</td>
</tr>
<tr>
<td>65-69</td>
<td>CD</td>
</tr>
<tr>
<td>60-64</td>
<td>D</td>
</tr>
<tr>
<td>0-59</td>
<td>F</td>
</tr>
</tbody>
</table>

Grading Policy

Your grade for this course will be based on the following:
Max points per type of assignment

<table>
<thead>
<tr>
<th>Assignment</th>
<th>Max Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weekly Online Quizzes (6 – 10 points each)*</td>
<td>60*</td>
</tr>
<tr>
<td>Homework (3 – 20+15+15 points, respectively)</td>
<td>50</td>
</tr>
<tr>
<td>Mid-Term Exams (1 – 50 points)</td>
<td>50</td>
</tr>
<tr>
<td>Final Exam (1 – 50 points)</td>
<td>50</td>
</tr>
<tr>
<td><strong>Total Points</strong></td>
<td><strong>210</strong>**</td>
</tr>
</tbody>
</table>

* Your total for this assignment will be averaged at the end of the Course over 5 (not over 6!).

** Your total score in the Course will be converted to 100%.

Late Assignments
No late assignment will be considered.

Course Policies
Your grade will be based on:

- 6 online quizzes assigned via Canvas. At the end of the course, your points will be averaged over 5 (not 6!) to balance missed assignments, silly mistakes, and so forth. Note that the weight of these online quizzes equals 25% of your Final Grade in the Course (!) therefore my friendly suggestion to you is try not to miss them;
- 3 homeworks;
- 1 mid-term exam;
- 1 final term exam.

Weekly, I will assign **online quizzes via Canvas**. Typically, you will be asked to answer from 7 to 10 questions. You will have a 24 hours window to access the quiz and solve it in 14-20 minutes, according to the number of questions (roughly 2 minutes per question as during Exams).

**Homework** will be assigned roughly every 2 weeks and will be collected in class the same day one week after (example: homework assigned on Friday, 7th will be due on Friday, 14th). No late homework will be accepted. Students who will not turn in homework without documented and satisfactory explanation will receive a grade of 0.0 (see the last page of this document “Excused Absence”).

**Mid-Term and Final Exams** will be assigned in the form of multiple-choice questions where you will be asked both to show the development of your reasoning skills and your capabilities in solving and deriving equations to solve specific thermodynamic problems. Students who will
not show up for Mid-Term and Final Exams without documented and satisfactory explanation will receive a grade of 0.0 (see the last page of this document “Excused Absense”).

Laptops are allowed in class only, not during exams. The following are not allowed at any time: cell phones, Blackberries, iPods, PDAs, or any other electronic devices. Calculators on other devices are strictly prohibited during the exams. Information exchanges on electronic devices during class and exams are also prohibited and violate the Academic Integrity Code of Michigan Tech.

**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

**Affirmative Action:**
http://www.admin.mtu.edu/aaop/

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

**Equal Opportunity Statement:**
# Tentative Course Schedule

<table>
<thead>
<tr>
<th>Main Topics</th>
<th>Chapter</th>
<th>Week</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic Concepts, 0th Law, Equation of State, Mathematical Techniques, Gas Laws, Non-ideal Gases</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Work and Heat, Internal Energy, 1st Law, State Functions, Enthalpy, Heat Capacities, Joule-Thompson Coefficients, Hess’s Law</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Carnot Cycle, Entropy, 2nd and 3rd Laws</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Spontaneity Conditions, Gibbs and Helmholtz Energies, Natural Variable Equations, Maxwell Relationships, Chemical Potential, Fugacity</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>Chemical Equilibrium, Solution and Condensed Phases, Changes in Equilibrium Constants (van’t Hoff Equation)</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>Multi-Component Systems: Raoult’s and Henry’s Laws, Liquid/Liquid, Liquid/Gas, Colligative Properties</td>
<td>7</td>
<td>6</td>
</tr>
<tr>
<td>Kinetics and Rate Laws, Arrhenius, Parallel and Consecutive Reactions</td>
<td>20</td>
<td>7</td>
</tr>
</tbody>
</table>
More Information about Online Quizzes, Homework, Midterm and Final Exams

Please, note that the adopted textbook contains problems at the end of each chapter that you may consider to solve even though they will be not assigned as homework. Homework and Exams may be partially based on them and/or related to them.

**Homework** will be assigned and returned in class according to the following schedule:

<table>
<thead>
<tr>
<th>Assignment</th>
<th>Assigned</th>
<th>Due Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Homework #1</td>
<td>Wednesday, 16th May 2012</td>
<td>Wednesday, 23rd May 2012</td>
</tr>
<tr>
<td>Homework #2</td>
<td>Wednesday, 30th May 2012</td>
<td>Wednesday, 6th June 2012</td>
</tr>
<tr>
<td>Homework #3</td>
<td>Wednesday, 13th June 2012</td>
<td>Wednesday, 20th June 2012</td>
</tr>
</tbody>
</table>

Homework can be solved with the support of books, notes, calculators. Students are allowed to work in groups.

**Midterm Exam** is scheduled for:


Midterm Exam can be solved with the support of calculators only. No books or notes will be allowed. I will provide the formula sheet.

The last lecture prior to the Midterm will be devoted to a Review of the material covered in class.

**Final Exam** is not scheduled at the time this Syllabus has been completed. The final exam will be scheduled by the Registrar’s office later on in the semester.

The Final Exam can be solved with the support of calculators only. No books or notes will be allowed. I will provide the formula sheet.

The Final Exam will be a comprehensive 2-hour examination.

The last two/three lectures of the Course, before the Final will be devoted to a general Review of the material covered.
Getting Help in Learning

*From me, as your Instructor*

Please, know that I am always available to my students! Therefore, do not hesitate in contacting me for any problem or for guidance regarding the material covered in class.

In particular, my office hours are scheduled after each lecture (TF after class) in my office in the Physics Department (Fisher 117). I am also always available to provide assistance by appointment. In this case, you can priory contact me by email ([lvalenza@mtu.edu](mailto:lvalenza@mtu.edu)).

When you do so, please type in the subject CH3510, so that I can classify your message at a higher level of priority and reply to you as soon as possible.

Exam Review Lectures will be conducted the last class before the Midterm exam and the last two lectures before the Final.

I will constantly remind you about the provided coaching sessions (see below).

*Through the Chemistry Learning Center (CLC)*

Throughout the entire Course, P-Chem coaches will provide you help with tutorial sessions. Note that these meetings are not supposed to be solution giving sessions, but stepping stone sessions to give guidance in the right direction for solving problems and improving your reasoning skills.

Once again, note that the adopted textbook contains problems at the end of each chapter that you may consider to solve even though they will be not assigned as homework. Homework and Exams may be partially based on them and/or related to them.

These sessions will be held on a walk-in format based in the Chemistry Learning Center, located on the 2nd floor of the Chemical Sciences Building in Room 208.

Sessions will run every Monday, Tuesday and Thursday, 10:30 am – 1:00 pm, starting from the first day of Class (Monday, 7th May 2012).

*Additional Information about the Coaching Sessions and the CLC*

The P-Chem sessions are not compulsory. Nevertheless, you are warmly invited to attend them as part of your learning process. They will provide good help in acquiring the knowledge and capabilities needed to master the material covered in class.

In addition, the P-Chem sessions will be useful in getting some guidance in solving the assigned homework and in reviewing the material before Midterm and Final Exams.
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 physical 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 summer are walk-in assistance and informal study groups as well as providing a good place to study with additional resources available.

**Summer walk-in hours for P-Chem:**

**Monday, Tuesday and Thursday**

10:30 am – 1:00 pm

Or by Arrangement

We realize that some of you may have other classes or work that may prevent you from stopping by during our regularly scheduled summer walk-in hours. If you are in that situation, you may contact any of the coaches listed below to set up an appointment at a mutually agreeable time that works better for your schedule.

Nate Green nhgreen@mtu.edu

Jacqueline Walitalo jmwalita@mtu.edu
Excused Absenses

Events beyond your control may cause you to miss a homework deadline or an exam. Whenever possible, contact me prior to your absence to arrange to make-up missed work. If you are unable to notify me concerning an absence or if you need to notify several instructors on short notice, contact the Office of Student Affairs for assistance. The Dean of Students will then inform all your instructors that you face a situation that requires that you miss class, and you are granted an excused absence. It is then your responsibility to contact each of your instructors after you recover from your illness or return to campus.

An absence is excused under the following conditions:

- If you participate in off-campus University-sponsored activities such as field trips, fine arts performances, intercollegiate athletics, job fairs, etc., you are granted an excused absence if your activity conflicts with an exam. Furthermore, I consider plant trips, job interviews requiring travel, and professional society meetings as excusable. It is imperative that for an absence of this type, for which a conflict with an exam is known well ahead of time, that you arrange with me to take the exam earlier than its normally scheduled time.

- If you encounter circumstances beyond your control such as illness, the funeral of any relative or close friend, or other personal emergency, you are granted an excused absence. You must provide verification of the special circumstances that led to your absence. In the event of a missed exam due to an excused absence, it is not possible to make-up the exam. Instead, an excused absence from an exam will receive the score EX. At the end of the semester, exam EX scores will be replaced by a weighted average of all of your non-EX scores on exams (midterms and final exams). If the final exam is missed as a result of an excused absence, you will be awarded the letter grade of I (incomplete) and must take the CH 3510 final exam at the end of any one of the next semesters that you're in residence. Two or more exams missed as a result of excused absences will be handled on an individual basis. If a homework due date is missed as a result of an excused absence, the due date will be extended after you notify me.