Course Syllabus for CH3510 Online Summer 2015
Ph Chem I: Thermodynamics, Equilibrium, Kinetics
Department of Chemistry

Instructor Information
Instructor: Loredana Valenzano, PhD, Assistant Professor
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Telephone: (906) 487-1602
E-mail: lvalenza@mtu.edu
Office Hours: By appointment

Course Identification
Course Number: CH3510-0B (CRN 52430)
Course Name: Ph Chem I: Thermodynamics, Equilibrium, Kinetics
Course Location: Online
Class Times: Online

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: XYZ

Required Course Text
Other useful sources:

- 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>

*Note that NO CURVING will be applied!*

Grading Policy

Your grade for this course will be based on the following:

<table>
<thead>
<tr>
<th>Assignment</th>
<th>Max points per type of assignment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weekly Online Quizzes (6 – 10 points each)*</td>
<td>60*</td>
</tr>
<tr>
<td>Homework (3 – 25 points each)</td>
<td>75</td>
</tr>
<tr>
<td>Mid-Term Exams (3 – 30 points)</td>
<td>90</td>
</tr>
<tr>
<td>Final Exam (1 – 50 points)</td>
<td>50</td>
</tr>
<tr>
<td><strong>Total Points</strong></td>
<td><strong>275</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 (see the last page of this document “Excused Absence”).

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 to try not to miss them;

- **3 homeworks;**

- **3 mid-term exams;**

- **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).

**Homeworks** will be assigned every other week starting for week #1 up to week #5 and will be tuned in the same day one week after (example: homework assigned on Monday, 7th will be due on Monday, 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-Terms 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 Absence”).

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/aa/

**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, 0&lt;sup&gt;th&lt;/sup&gt; Law, Equation of State, Mathematical</td>
<td>1, 8</td>
<td>1</td>
</tr>
<tr>
<td>Techniques, Gas Laws, Ideal vs Real Gases.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Work, Heat, Internal Energy, 1&lt;sup&gt;st&lt;/sup&gt; Law of Thermodynamics,</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Enthalpy, Heat Capacities, Joule-Thompson Experiment.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Carnot Cycle, Entropy, 2&lt;sup&gt;nd&lt;/sup&gt; Law of Thermodynamics, Spontaneity</td>
<td>3-4</td>
<td>2</td>
</tr>
<tr>
<td>Conditions, Gibbs and Helmholtz Energies.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Natural Variable Equations, Maxwell Relationships, Chemical Potential,</td>
<td>4-5</td>
<td>3</td>
</tr>
<tr>
<td>Standard Thermodynamic Functions of Reactions, Hess’s Law, Kirchoff’s</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Law, 3&lt;sup&gt;rd&lt;/sup&gt; Law of Thermodynamics.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reaction Equilibrium and Ideal Gases, Equilibrium Constant and Temperature Dependence (van’t Hoff Equation), One-Component Phase Equilibrium: Phase Rule, Phase Diagrams, Clapeyron Equation</td>
<td>6-7</td>
<td>4</td>
</tr>
<tr>
<td>Solutions: Ideal Solutions and Raoul’t Law, Ideally Dilute Solutions and Henry’s Law. Non-Ideal Solutions: Activities, Excess Functions, Gas mixtures and Fugacity.</td>
<td>9-10</td>
<td>5</td>
</tr>
<tr>
<td>Kinetics and Rate Laws, Arrhenius, Reversible, Parallel, and Consecutive Reactions</td>
<td>20</td>
<td>7</td>
</tr>
</tbody>
</table>

The detailed and full list of topics will be listed on Canvas and links will be provided to the videos of the lectures.
More Information about Online Quizzes, Homeworks, 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>Thursday, 14\textsuperscript{th} May 2015</td>
<td>Thursday, 21\textsuperscript{st} May 2015</td>
</tr>
<tr>
<td>Homework #2</td>
<td>Thursday, 28\textsuperscript{th} May 2015</td>
<td>Thursday, 4\textsuperscript{th} June 2015</td>
</tr>
<tr>
<td>Homework #3</td>
<td>Thursday, 11\textsuperscript{th} June 2015</td>
<td>Thursday, 18\textsuperscript{th} June 2015</td>
</tr>
</tbody>
</table>

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

Midterm Exams are scheduled for:

- Thursday, 21\textsuperscript{st} May 2015, 9:30 am - 10:45 am, room to be announced
- Thursday, 4\textsuperscript{th} June 2015, 9:30 am - 10:45 am, room to be announced
- Thursday, 18\textsuperscript{th} June 2015, 9:30 am - 10:45 am, room to be announced

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

Students who are not located on the MTU Campus will need to provide the provided “Proctor Form” to the Instructor. Fill in the form, scan it (pdf format), and send it to lvalenza@mtu.edu.

Students who will fail in providing the “Proctor Form” won’t be eligible to take off-campus exams!
The Final Exam is scheduled for Friday, 26th June 2014, time to be announced. The same procedure as those stated for the Midterm Exams will apply.

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.

Getting Help in Learning

From me, as your Instructor

Please, do not hesitate in contacting me for any problem or for guidance regarding the material covered in the course.

On-campus students can arrange for appointments by sending an email at lvaleen@mtu.edu. Prior to contacting me, I suggest you to check my availability through Gmail calendar.

Off-campus students can send me an email at the same address, and in case of need I will arrange for Skype video conference.

When you contact me by email, please type in the subject CH3510 (or PChem), so that I can classify your message at a higher level of priority and reply to you as soon as possible.

Excused Absences

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.