Course Syllabus

CH4222 – Bioanalytical Chemistry
College of Science and Arts
Fall 2013

Instructor Information

Instructor: Prof. Lynn R. Mazzoleni, Assistant Professor of Chemistry
Office Location: 402d Chemical Sciences Building
Telephone: (906) 487-1853
E-mail: lrmazzol@mtu.edu
Office Hours: TWR 4:00 – 6:00 pm or by appointment

Graduate Teaching Assistants

Instructors: Ms. Yunzhu (Joyce) Zhao and Ms. Mu (Molly) Yang
Office Location: Zhao in 402g and Yang in 612 both in the Chemical Sciences Building
E-mail: yunzhuz@mtu.edu and muy@mtu.edu
Office Hours: TBA and By Appointment

Course Identification

Course Numbers: CH4222-0A and CH4222-L01 or CH4222-L02
Course Names: Bioanalytical Chemistry and Bioanalytical Chemistry Laboratory
Lecture Location: 106 Chemical Sciences Building
Lecture Times: MWF 12:05 pm – 12:55 pm
Laboratory Location: 708 and 408 (TBA) Chemical Sciences Building
Laboratory Times: TR 3:00 pm – 6:00 pm or 7:00 pm – 10:00 pm
Prerequisites: CH1120, CH3510, and CH3511

Course Description

This course is an overview of modern analytical and instrumental techniques with an emphasis on the approaches relevant to measurements in biochemistry. Topics include: error analysis; statistical treatment of data; advanced equilibrium; di- and poly-protic acids & bases; and theory and methods of chromatographic separations, mass spectrometry and spectrophotometry.

Course Learning Objectives

- Describe the fundamentals of quantitative and instrumental analysis
- Assess the uncertainty in an analytical measurement
- Determine the equilibrium concentrations of polyprotic species
• Describe and demonstrate the use of common analytical apparati and methodologies used in modern chemical analysis
• Develop an ability to work effectively with a team while also being able to learn and work independently
• Recognize and acquire attitudes that are characteristic of the successful worker in scientific fields: initiative, originality, resourcefulness, accuracy, orderliness, open-mindedness, and pride of achievement

Course Resources

Course Website
• Canvas https://mtu.instructure.com

Required Course Textbook

Supplemental Course Textbooks on Reserve in the J.R. Van Pelt Library

Course Supplies
• Bound laboratory notebook with carbonless copies
• Safety glasses
• Scientific calculator
• Computer with MS Excel
• Lab coat (recommended)

Course Schedule

A full course schedule is provided via Canvas (https://mtu.instructure.com); click on ‘Syllabus’ to view. A major effort has been made to utilize Canvas. The course is organized into weekly modules. The modules include the weekly homework and laboratory assignments, quizzes and supplemental materials. Please contact IT Help via ithelp@mtu.edu or 7-1111 for technical assistance with Canvas.

Homework: Weekly assignments will be due on Monday at 11:59 pm of each week.

Quizzes: Pre-lecture and Pre-laboratory warm-up quizzes will be due 1 hour before lectures and at 12:00 pm (noon) before labs as scheduled in Canvas. All quizzes will be administered via Canvas.

Discussion Boards: Students are encouraged to make use of the course discussion board in Canvas. Please post and respond to questions regarding lecture, lab or homework materials.
Each thoughtful post or response is worth up to 1 bonus point. A total of 50 bonus points could be added to your final grade, if you chose to participate in this way.

**Laboratory Experiments:** Post-lab assignments will be due for each of the laboratory experiments at 11:59 pm (midnight) as scheduled. Formal lab reports must be turned in via Canvas as a “.pdf” file.

**Exams:** 3 Midterm Exams and 1 Comprehensive Final Exam will be given.
- Midterm Exam 1: Monday September 30, 2013 at 12 pm (1 hour)
- Midterm Exam 2: Monday October 28, 2013 at 12 pm (1 hour)
- Midterm Exam 3: Monday December 2, 2013 at 12 pm (1 hour)
- Final Exam: Monday Dec. 16, 2012 at 12:45 pm.

**Grading Scheme**

**Grading Policy**

Grades will be based on the following:

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<table>
<thead>
<tr>
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<tbody>
<tr>
<td>Midterm Exams</td>
<td>300</td>
</tr>
<tr>
<td>Final Exam</td>
<td>150</td>
</tr>
<tr>
<td>Homework Assignments &amp; Quizzes</td>
<td>150</td>
</tr>
<tr>
<td>Laboratory Assignments &amp; Quizzes</td>
<td>150</td>
</tr>
<tr>
<td>Laboratory Formal Reports</td>
<td>250</td>
</tr>
<tr>
<td><strong>Total Points</strong></td>
<td><strong>1000</strong></td>
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⚠️ **NO make-up quizzes/exams will be given.** No make-up exams or quizzes will be given for unexcused absences. Official MTU excused absences are granted by the Office of Student Affairs (OSA). If you know that you will have an excusable absence on an exam or quiz day, you are required to make arrangements with me as soon as possible for an alternate exam date.

⚠️ **Homework Assignments:** For partial credit, homework assignments must be received no later than 48 hours beyond the posted deadline. These late assignments will receive a 25% late penalty. Note, no late homework assignments will be accepted beyond the 48 hour window.

**Attendance Policy:** Class participation, initiative, and attendance will be considered in the final course grade. You must keep up with the material as the semester progresses.

**Independent Learning:** Outside work should include reading assigned material, doing assigned questions and problems, reviewing lecture notes, correcting errors made in past work, etc. A general rule of thumb is that for every 1 hour of lecture, 2-3 hours should be spent studying the materials. Note this is a 5 credit course; thus plan to spend 10-15 hours of additional time outside of the lectures and lab.
### MTU Grading System

<table>
<thead>
<tr>
<th>Grade</th>
<th>Course Points</th>
<th>G.P.A.</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>920 - 1000</td>
<td>4.00</td>
<td>Excellent</td>
</tr>
<tr>
<td>AB</td>
<td>880 – 919</td>
<td>3.50</td>
<td>Very good</td>
</tr>
<tr>
<td>B</td>
<td>820 – 879</td>
<td>3.00</td>
<td>Good</td>
</tr>
<tr>
<td>BC</td>
<td>760 – 819</td>
<td>2.50</td>
<td>Above average</td>
</tr>
<tr>
<td>C</td>
<td>700 – 759</td>
<td>2.00</td>
<td>Average</td>
</tr>
<tr>
<td>CD</td>
<td>650 – 699</td>
<td>1.50</td>
<td>Below average</td>
</tr>
<tr>
<td>D</td>
<td>600 – 649</td>
<td>1.00</td>
<td>Inferior</td>
</tr>
<tr>
<td>F</td>
<td>0 - 599</td>
<td>0.00</td>
<td>Failure</td>
</tr>
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### Laboratory Safety

Safety glass, closed toe shoes and full-length pants are required. Many of the chemicals handled in this lab may ruin clothing; therefore a lab coat is highly recommended. Safety glasses must be worn at all times when work is being done by anyone in the lab. Light weight nitrile gloves will be available and should be used when deemed appropriate. Concentrated chemicals (such as concentrated acids/bases) should be handled in the fume hood with heavy weight nitrile glove and full sealed goggles. All volatile solvents should be handled in the fume hood. Violation of any of the above rules will be grounds of dismissal for the remainder of the lab period.

### Collaboration/Plagiarism Rules

Standards of academic conduct are set forth in the MTU Academic Integrity Code\(^1\). When you registered for this course, you acknowledged your awareness of the Academic Integrity Code and you are obliged to become familiar with your rights and responsibilities as defined by this Code. Violations of the Code will result in disciplinary actions. Examples of violations include plagiarism or receiving inappropriate assistance on homework, quizzes, and/or exams.

Cell phones, Blackberries, iPods, PDAs, or any other electronic devices are NOT to be used in the classroom. Please make sure to bring a standard scientific calculator with you to class. Note: graphing calculators are not permitted for use during exams. Calculators on other devices are strictly prohibited. Information exchanges on these devices during class are also prohibited and violate the Academic Integrity Code of Michigan Tech.

Cheating is a very serious academic offense. Therefore, allegations of cheating will be referred to the Dean of Student Affairs for appropriate action. Please see me if you have any questions about academic violations as described in the Code or as they relate to particular requirements in this course.

### University 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

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\(^1\) [http://www.studentaffairs.mtu.edu/dean/judicial/policies/academic_integrity.html](http://www.studentaffairs.mtu.edu/dean/judicial/policies/academic_integrity.html).
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/aaao/

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

Equal Opportunity Statement:
http://www.admin.mtu.edu/admin/boc/policy/ch5/ch5p1.htm