Course Syllabus
CH4222 – Bioanalytical Chemistry
College of Science and Arts
Fall 2011

Instructor Information
Instructor: Dr. 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 9:00 – 10:00 am OR by Appointment

Course Identification
Course Numbers: CH4222-0A and CH4222-L01
Course Names: Bioanalytical Chemistry and Bioanalytical Chemistry Laboratory
Lecture Location: 708 Chemical Sciences Building
Lecture Times: MWF 12:05 pm – 12:55 pm
Laboratory Location: 708 and 408 (TBA) Chemical Sciences Building
Laboratory Times: TR 2:00 pm – 5:00 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: theory and methods of chromatographic separation methods, biomolecule quantification and electrophoretic characterization. Error analysis and statistical treatment of data are included.

Course Learning Objectives
- Describe the fundamentals of quantitative and instrumental analysis
- 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 Websites
• Blackboard http://www.courses.mtu.edu

Required Course Textbook

Course Supplies
• Scientific calculator
• Computer with MS Excel

Course Schedule

Homework: Assignments will be due on Monday by 6:00 pm of each week

Quizzes: Quizzes will be given in class on Friday of semester weeks 2, 4, 6, 10 and 12

Exams: Two 2 hour exams will be given.
• Midterm Exam: Monday Oct. 17, 2011 at 6 pm
• Final Exam: According to the Michigan Tech final exam schedule (during the week of December 12, 2011).

Grading Scheme

Grading Policy
Grades will be based on the following:

<table>
<thead>
<tr>
<th></th>
<th>Points</th>
</tr>
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<tbody>
<tr>
<td>Midterm Exams</td>
<td>200</td>
</tr>
<tr>
<td>10 Homework Assignments</td>
<td>100</td>
</tr>
<tr>
<td>5 Lecture Quizzes</td>
<td>200</td>
</tr>
<tr>
<td>Class Participation</td>
<td>20</td>
</tr>
<tr>
<td>Final Exam</td>
<td>200</td>
</tr>
<tr>
<td>Lab Quizzes</td>
<td>80</td>
</tr>
<tr>
<td>Lab Reports</td>
<td>200</td>
</tr>
<tr>
<td>Total Points</td>
<td>1000</td>
</tr>
</tbody>
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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.

Late homework assignments will NOT be accepted.
**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.

**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>930 -1000</td>
<td>4.00</td>
<td>Excellent!</td>
</tr>
<tr>
<td>AB</td>
<td>880 – 929</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>
</tbody>
</table>

**Collaboration/Plagiarism Rules**

Standards of academic conduct are set forth in the MTU Academic Integrity Code [http://www.studentaffairs.mtu.edu/dean/judicial/policies/academic_integrity.html](http://www.studentaffairs.mtu.edu/dean/judicial/policies/academic_integrity.html). 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 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 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:**
Fall 2011 Quantitative Analysis Laboratory

Location: ChemSci building, Room 708/408.

Lab Hours: TR 2:05 - 4:55 PM, ChemSci Building, (Room 708/408)

Instructors:

Position: Lab Supervisor Graduate Teaching Assistant (GTA)
Name: Molly Yang and Yunzhu Zhao
Lab Section: L-02 L-01
Lab/Office: 612 ChemSci/618 ChemSci
Email: muy@mtu.edu and yunzhuz@mtu.edu

Office hours: By arrangement (email works well)


Materials Needed: Bound notebook with carbonless copies
Three ring binder (1”-11/2” wide)
Safety Glasses
Lab coat (recommended, not required)

Prerequisite:
Chemistry CH1120. A firm grounding in ionic equilibria is assumed and will be essential for success in this course. You should review the appropriate material from CH 1120 and Harris, Chapter 6.

Resource materials:
Instructions for all the various exercises and experiments are available as PDFs on the laboratory’s website (indicated above). This site will be updated frequently to accommodate any necessary changes required during the semester.

Safety:
In this lab you will be handling a wide range of materials with a variety of health risk. You are required to be aware of the health risk involved with any of the chemicals handled in this lab by filling out a “Safety Sheet” (available on the handout section of the website).

In general you are required to wear closed toe shoes and full-length pants. Many of the chemicals handled in this lab will ruin clothing immediately; therefore a lab coat is recommended but not
required. Safety glasses need to be worn at all times when work is being done by anyone in the lab (other people’s accidents can cause you harm even if you are not handling chemicals). Also lightweight nitrile gloves will be available and should be used when deemed appropriate. Concentrated chemicals (such a concentrated acids/bases) should be handled in the fume hood with heavy weight nitrile glove and full sealed goggles. Any volatile solvents should also 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.

**Basic Structure of the Lab:**
This lab is composed of a variety of exercises, experiments and group projects. The exercises will used to become familiar with equipment and techniques required later on in experiments. Experiments are used to put the skills developed in the exercises to practical use, obtaining high quality results. There will be a total of three group projects. The first project is to familiarize one with the basic tools of the analytical lab. The last two projects are to develop independent thought and necessary problem solving. Instructions appropriate to the lab experiment or exercise will be provided on the course web page. These instructions will be available on the VEICLE Lab computers; however, the time available for completing these labs are quite limited and in order to complete these labs you will need to be familiar with the procedure prior to coming to class. To insure preparedness you must create your own experiment instructions in your lab notebook before you come to lab.

**Post Lab:**
Results will be submitted in one of two forms: 1) formal report 2) unknown report sheet. Final project need to be submitted as a formal report, and it will be graded upon the quality of a submitted report. The rest of the experiments will be graded on a submitted “Unknown report sheet”. Students will be given a week to complete lab reports. Unknown report sheets are due by the beginning of the second lab period following the normal scheduled end date of the experiment. Exceptions will be made for health and other valid reasons, but must be reported to your TA promptly. **Failure to turn your results in on time will result in a grade of zero for the experiment in question.**

**Grading procedure for “Unknowns”:**
Unknown results will be graded in two parts. The first part will be based on a good-faith effort and completion of the experiment and will yield a grade no lower than 50%. The second half of the grade will be based on the relative error contained in the reported value. That is (Your answer - right answer)/right answer. Failure to complete an experiment will get you a zero. You may report any value you choose which is supported by your experimental results. Results must be submitted to the TA on the report slips provided. Results must be reported in the units (ppm, mg/ml, %, ect.) indicated in the experiment handout and will change depending on the experiment. If you have made a calculation error in your submission, you may re-calculate and submit with a thorough explanation. Two and only two re-calculations will be allowed for the semester.

**Formal Report Grading:**
There will be a few group projects this semester, however students will write individual reports. The lab report will follow the basic ACS style format (abstract, introduction, experimental, discussion, and conclusion). Further instructions will be posted on Blackboard.
**Lab Notebooks:**
One of the goals in this lab is to teach you how to keep a proper analytical notebook. **A bound notebook with carbonless copies is required.** Complete guidelines have been published (“Notebook Format”, see the handout section of the website). A copy of all notebook pages involved with a particular experiment must be attached to the report sheet at the time your results are turned in. These pages will be evaluated (and graded) for adherence to the guidelines. Keep your notebook complete, readable, and up-to-date!

**Absence Policy:**
There is not a lot of extra time in the lab schedule due to the large amount of work to be done in a short time. Making up a lab can be very challenging, however, special arrangements can be made in the case of an excused absence. Excused absences are not given to travel home or to attend a social event and only the Office of Student Affairs may grant an excused absence. If you know that you will have an official university excused absence that will cause you to miss a lab session, you are required to make arrangements as early as possible. Lab reports or unknown report sheets not turned in or turned in late due to an UNEXCUSED absence will be given a grade of zero. No makeup labs will be granted for unexcused absences.

**Academic Integrity:**
Any student caught knowingly submitting work not their own will be referred to the Dean of Student Affairs. It is assumed that in a group project the work is evenly distributed and the final report represents everyone, not just on or two members. Any work that is not the student’s needs to be properly cited.

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