Chem104: General, Organic and Biochemistry II
Spring 2020

Dr. Aimee L. Miller
717-871-7414
aimee.miller@millersville.edu
Office Hours: Caputo 325
Mon: 9:00 - 10:00
Lecture: Brossman 102
Tue: 11:00 – 1:00
Mon & Wed: 8:00 - 8:50
Wed: 9:00 - 10:00
Labs: Caputo 332
Wed: 6:00 - 7:50 (Drager) or Fri: 8:00 - 9:50
Thu: 11:00 - 12:00
Alternate times by appointment

Course Description
Chem104 is the second semester course of General, Organic and Biochemistry (Chem103 is prerequisite) for non-science majors. It serves as a G2 General Education course and satisfies the Lab requirement. Students in Chem104 will be introduced to basic language and theories of organic and biochemistry, including relevant nomenclature, molecular structures, reactions, and pathways. (2 hrs lecture/2 hrs lab)

Necessary Background
Chemistry: Chem103

Course Objectives
The main goal is the introduction of organic and biochemistry basics. Students actively engaging in this course should be able to:

- Apply the fundamental ideas developed in general chemistry of bonding, molecular structure, acid-base theory, equilibrium, and thermodynamics to the systematic study of organic and biochemical molecules.
- Recognize, describe, and name the major functional groups found in organic and biochemical molecules.
- Describe physical and chemical properties related to common functional groups and explain their relevance in biological systems.
- Describe and illustrate chemical and functional group changes in common organic reactions and biochemical pathways.
- Appreciate the relevance of organic and biochemical molecules for life and modern living.
- Work safely in an organic chemical laboratory using common laboratory equipment and materials.
- Accurately record and effectively evaluate lab experimentation and data.

Required Materials and Supplies
- D2L Course Access (Millersville University)
- Sapling access (Macmillan) for required homework
- Access to content topics via online resources, embedded text in Sapling, open resource text, or hard-copy General, Organic, Biochemistry textbook, as preferred
- Calculator: Scientific calculator capable of performing logarithmic (log, ln) and exponential (10^x, e^x, y^x) functions (cell phones may NOT be used)
- Laboratory Notebook: legal pad (dedicated for lab work)
- Laboratory Instructions: available via D2L
- Safety Eyewear for lab work
Course Policies

**Class Attendance:** Students are responsible for material presented in class or distributed via D2L. Only graded work missed for an absence excused based on Millersville’s Approved Guidelines will be made up. Please contact me in advance or as soon as possible to reschedule. Any graded work conducted outside the scheduled time may differ significantly in form and exact content from the in-class exam.

**Academic Honesty:** Students are expected to conduct all course work in an honest and ethical manner, consistent with Millersville’s policy. Cheating on coursework bypasses the learning process and will NOT be tolerated. Anyone caught cheating will be assigned a score of zero on the work.

**Cooperative Environment:** Students are expected to be actively engaged in the classroom, so questions and comments are encouraged. Repeated disruptive behavior (like tardiness, chatting, or electronic noise/use) may be cause for dismissal from class and may affect final grade assignments. Students with special concerns are encouraged to speak with me or take advantage of student resources available on campus, including the Office of Learning Services, the Tutoring Center, or the Counseling Center. The safe and productive educational environment for this class includes compliance with Title IX as outlined in Millersville’s policy.

**Homework & Activities:** Practicing exercises related to the material we discuss in class is essential for mastering concepts and developing critical skills. There will be **graded online assignments** through Sapling Learning that must be completed for credit. Exercises may be worked multiple times if necessary to learn the concept and earn full credit. **Graded in-class activities** will also be used to encourage interaction with concepts. Students are urged to work independently on a broader range of examples, problems, and exercises in any available resources as we cover concepts.

**Molecule Presentation:** Each student will research a pharmaceutical molecule and give a brief oral presentation during their lab **April 8/10.** Information about the structure, functional groups, and biochemical impact will be assembled into a PowerPoint file. Files must be submitted to D2L at least 1 hr **BEFORE** the lab period that day. Deductions may be taken for late submissions. Detailed instructions, a template, and resources are available in D2L.

**Recommendations for Success**

- Read/view reference materials corresponding to class content to find additional explanations and example problems. Use supporting materials in Sapling or D2L to help guide your learning.
- Ask questions in class, by e-mail, or in person. Remember, if you don’t understand something, others probably don’t either.
- As we cover a topic in class, work practice exercises and the related online problems. Starting early gives you time to review, learn, and earn full credit.
- Take advantage of the Peer Learning hours or consider small-group tutoring as soon as you discern a need for help with class material. Getting help early is the most effective approach.
- Attend reviews, office hours, or meet with a group of other students to study with so you can help each other.
- Use Course Objectives available in D2L to check that you are comfortable with all the material for each test.
- Review returned exams and correct any mistakes to make sure you learn all the concepts for future applications.
- Print out and read lab instructions in time to complete the online pre-lab questions before coming to lab. Make a habit of doing this each week at a time well before lab begins.
- Record lab notes and data directly into your notebook, label all information clearly, and complete all post-lab questions before submitting your work.
Lecture Schedule (tentative)

Topic Order:

- Acids, Bases, and Buffers
- Organic Chemistry Structures and Nomenclature
- Functional Group Structures & Reactions
- Carbohydrates
- Lipids
- Amino Acids, Proteins & Enzymes
- Nucleotides & Nucleic Acids
- Energy and Metabolism

Exam Dates:

- Exam 1: Wednesday, Feb 12
- Exam 2: Wednesday, Mar 4
- Exam 3: Wednesday, Apr 1
- Exam 4: Wednesday, Apr 22
- Final Exam: Comprehensive Friday, May 8: 2:45 pm

Grading

<table>
<thead>
<tr>
<th></th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Homework &amp; Activities</td>
<td>15</td>
</tr>
<tr>
<td>Molecule Project</td>
<td>5</td>
</tr>
<tr>
<td>Unit Exams</td>
<td>45</td>
</tr>
<tr>
<td>Final Exam</td>
<td>13</td>
</tr>
<tr>
<td>Lab Work</td>
<td>22</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

NOTE: You must earn at least 60% in the lecture portion to pass Chem104. Your final grade will be assigned based on the combined lecture and lab scores.

Letter Grade Correlation

<table>
<thead>
<tr>
<th>Grade</th>
<th>Total %</th>
<th>Grade</th>
<th>Total %</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>93.0-100</td>
<td>A-</td>
<td>90.0-92.9</td>
</tr>
<tr>
<td>B+</td>
<td>87.0-89.9</td>
<td>B</td>
<td>83.0-86.9</td>
</tr>
<tr>
<td>C+</td>
<td>77.0-79.9</td>
<td>C</td>
<td>73.0-76.9</td>
</tr>
<tr>
<td>D+</td>
<td>67.0-69.9</td>
<td>D</td>
<td>63.0-66.9</td>
</tr>
<tr>
<td>F</td>
<td>&lt;60.0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Laboratory Policies

The laboratory component of Chem104 is designed to give you a hands-on experience with molecules we discuss in class. **Students MUST prepare for, carry out, and report on ALL lab experiments or activities in Chem104.**

**Attendance:** Students must attend and complete **every** lab as scheduled. If an excused absence conflicts with your scheduled lab time, please contact the instructor as soon as possible to make alternate arrangements. Except for unavoidable, approved excuses, a missed lab will earn **NO credit** even though the work and report must still be made up. **Students with repeated lab attendance issues may not be able to make up the work needed to pass Chem104.**

**Safe & Cooperative Environment:** Students are expected to follow all directions regarding safety precautions and lab attire. More complete lab safety rules are posted in D2L and should be taped into your lab notebook for quick reference. You must also keep lab equipment and general lab areas clean and tidy. Failure to follow instructions or clean up may result in a penalty on your lab score. Please notify the instructor about any special concerns (allergies, pregnancy etc.) that might require alternate arrangements for you to work safely in lab.

**Instructions & Pre-Labs:** Students are expected to come to lab each week with an understanding of the planned experiment. You should print out experimental instructions posted on D2L in advance and bring them to lab (lab score penalty for starting work without printed instructions). Use the instructions to complete the **3-pt Pre-Lab Quiz** in D2L. Pre-lab questions must be completed by **noon Wednesday** each week.

**Notebooks & Reports:** Students must record **ALL** lab work directly into their notebook during lab. Calculations or analysis, a brief summary report, and answers to lab questions should also be written directly into the notebook. Failure to properly record data during lab may result in a lab score penalty. Notebooks and reports are due **before leaving lab** unless arrangements are made with the instructor.

<table>
<thead>
<tr>
<th>Laboratory Schedule (tentative)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jan 22/24</td>
</tr>
<tr>
<td>Jan 29/31</td>
</tr>
<tr>
<td>Feb 5/7</td>
</tr>
<tr>
<td>Feb 12/14</td>
</tr>
<tr>
<td>Feb 19/21</td>
</tr>
<tr>
<td>Feb 26/28</td>
</tr>
<tr>
<td>Mar 4/6</td>
</tr>
<tr>
<td>Mar 11/13</td>
</tr>
<tr>
<td>Mar 18/20</td>
</tr>
<tr>
<td>Mar 25/27</td>
</tr>
<tr>
<td>Apr 1/3</td>
</tr>
<tr>
<td>Apr 8/10</td>
</tr>
<tr>
<td>Apr 15/17</td>
</tr>
<tr>
<td>Apr 22/24</td>
</tr>
<tr>
<td>Apr 29/May 1</td>
</tr>
</tbody>
</table>

**Lab Grading**

Weekly Labs 15 pts (x13)

**(generally, 3 pts Pre-Lab Questions & 12 pts Notebook Report)**