Course: A Survey of Organic Chemistry and Biochemistry (CHEM F104X); 4 credits

Prerequisites: CHEM F103X, placement in ENGL F111X or higher, placement in DEVM F105 or higher, or permission of instructor

Locations and meeting times:

  Lecture: REIC 136; TR 11:30 am – 1:00 pm
  Lab: REIC 245
    F01: R 3:00 pm – 6:00 pm
    F02: R 6:30 pm – 9:30 pm

Blackboard link: [http://classes.uaf.edu](http://classes.uaf.edu)

All course information, supporting documents and exam scores for this course will be maintained on the UAF Blackboard website. It is therefore important that you check the site regularly for updates. Moreover, time-sensitive information and reminders will occasionally be sent to all students enrolled in the course, so it is important that you verify that your email address is correct and current.

Instructor: Dr. Brian Edmonds

Office hours: MWF 10:15 am – 12:00 pm (or by appointment)

Office: Department of Chemistry and Biochemistry
  Reichardt Building (REIC)
  Room 180

Research: REIC, Room 145

Phone: (907) 474-6527

E-mail: bwedmonds@alaska.edu

Preferred contact method: e-mail

Required course material:

  Text: General, Organic, and Biological Chemistry (2010)
  Author: Smith, Janice G.
  Publisher: McGraw-Hill
  ISBN: 0-07-302657-3 or 978-0-07-302657-2

  Clicker: A wireless TurningPoint clicker should be purchased from the bookstore or online. For more information on how to use the clicker, visit the following website: [http://www.turningtechnologies.com/studentresponsesystems/studentresources/studentlounge/](http://www.turningtechnologies.com/studentresponsesystems/studentresources/studentlounge/)

  Clickers will not work unless registered. Register by logging on to the Blackboard website and selecting this course (CHEM F104X…). Now click on “course tools” (in the gray “Tools” box) and then scroll down to “TurningPoint Registration Tool”. Click on this and then enter your TurningPoint device ID as requested. The alphanumeric device ID is located on the back of your clicker.

  Be prepared to use the device in class next Tuesday (1/25/10).

  Clicker responses will be used to assess attendance and to provide short-latency feedback of
comprehension of the material discussed in class. You will receive credit (1 point) for each response regardless of your answer (correct or incorrect).

**Sapling Learning Account:**
You must set up an account with Sapling Learning in order to complete the homework assignments.
1. Go to [http://saplinglearning.com](http://saplinglearning.com)
2. If you already have a Sapling Learning account, log in, click “View Available Courses”, then skip to step 6.
3. Otherwise, click “Sign up for new account” located under the Login box.
4. Choose a new username and password, and supply the other requested information. Click “Create my new account”.
5. Check your email (and spam filter) for a message from Sapling Learning and click on the link provided in that email.
6. Find this course in the list (listed by school and instructor) and click on the link.
7. If you have a pre-paid card, enter your Access Card code. Otherwise, click the button that says “Send payment via Paypal or Credit Card” and follow the remaining instructions.
8. Once you have registered and enrolled, you can log in at any time to complete or review your homework assignments.
9. If you have any problems, send an email to support@saplinglearning.com explaining the issue.

**Scientific calculator:**
You must have a calculator capable of scientific notation.

**UAF custom laboratory manual:**
Labs will be made available on Blackboard.

**Course Description:**
Fundamentals of chemistry as applied to biological systems. Bridges the gap between a general chemistry course and biochemical concepts of health-related sciences. Recommended for health-science degree candidates and non-science majors interested in the central role of chemistry in life.

**Specific Coverage:**
I. Structure and Function of Proteins
II. Amines and Neurotransmitters
III. Nucleic Acids and Gene Expression
IV. Carbohydrates
V. Classification and Functional Roles of Lipids
VI. Catabolic Pathways and Energy Production

**Course Goals:**
Students who successfully complete this course will have an understanding of the structure and function of molecules that comprise the building blocks of living systems. Students will develop an appreciation for the relationship between the unique physical and chemical properties of the fundamental classes of biological macromolecules (proteins, lipids, carbohydrates and nucleic acids) and their particular functional roles. Moreover, students will be introduced to examples of errors in metabolism that underlie common disorders and diseases. Armed with an understanding of the fundamental biochemical principles of living systems, students will be better able to contemplate the relationship between public science policy and human health.

**Core Assessment:**
Chemistry 104 is part of the UAF Core Curriculum. “The overall goal of the Natural Sciences component of the Core Curriculum is to prepare students for lifelong learning in the natural sciences…” [Faculty Senate Guidelines, 1990]. To partially fulfill this objective, students will, in addition to the specific course coverage outlined above, receive specific instruction on the scientific method, the set of
practices that scientists must follow to obtain a meaningful interpretation of their results. Student understanding of the scientific method will be assessed toward the end of the course by answering questions about a hypothetical experiment (see “Exercise to assess understanding…”, below). In addition, students will be given examples of the interplay between scientific knowledge and public policy throughout the course. The purpose of these examples is to encourage students to think about and comment on the impact of scientific knowledge on public policy. For example, how does the scientific literature concerning health effects of fluoridated water affect decisions to alter the fluoride content of municipal water? Student understanding of the relationship between policy and science will be assessed via a 2-page essay to be completed toward the end of the course (see “Essay on the relationship…”, below). Details of the assignment will be communicated later.

Course Policies:
  
  **Attendance:**
  Students are expected to attend class and actively participate. Attendance and participation will be assessed by clicker responses.

  **Cell phones/Computers:**
  The use of cell phones during class is not permitted. Notebook computers may be used for taking notes. Any other use is prohibited.

  **Preparation:** Students are expected to read the assigned sections of the textbook (see course calendar, below) prior to class.

  **Exams:**
  Four exams will be given (three midterms and a final). Makeup exams will be allowed only with pre-approval of the instructor or with an acceptable reason. Acceptable reasons for makeup exams include severe illness, family emergencies or other unavoidable events including dangerous weather conditions and car accidents. Exam format for makeup exams may be different from the original exam. Exams dates and times are posted on the course calendar.

  **Lab:**
  A detailed outline of policies pertaining specifically to the lab portion of the course can be found on Blackboard. Students must complete at least 8 of the 11 offered labs to pass the course. Questions concerning the lab should be addressed to the lab TA, Shailesh Khatri, or the laboratory coordinator, Emily Reiter (REIC, 194A; 474-6748; e.reiter@alaska.edu).

**Grading:**
Exam and lab scores will be posted on Blackboard. Sapling homework scores are available on the Sapling site.

Final grades will be calculated as follows:
- Midterms I, II and III: 300 pts (100 points for each exam)
- Final Exam: 100 pts (not cumulative)
- Sapling homework: 100 pts
- Lab write-ups/exercises: 185 pts
- Exercise to assess understanding of the scientific method: 15 pts
- Essay (2 pages) on the relationship between public policy and scientific knowledge: 15 pts
- Completion of Natural Science Core Questionnaire: 15 pts
- Clicker score: 20 pts

Letter grades will be assigned as follows:

<table>
<thead>
<tr>
<th>Grade</th>
<th>Points</th>
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<tbody>
<tr>
<td>A</td>
<td>675 – 750 points</td>
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<tr>
<td>B</td>
<td>600 – 674 points</td>
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<td>C</td>
<td>525 – 599 points</td>
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<td>D</td>
<td>450 – 524 points</td>
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<td>F</td>
<td>Less than 450 points</td>
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<td>I</td>
<td>Failure to complete course requirements</td>
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Support Services:
Support can be obtained through the University of Alaska Library system, online resources, and the instructor. Additional services are available through Student Support Services (http://www.uaf.edu/sssp/) at UAF.

Disabilities Services:
We will work with the Office of Disabilities Services (http://www.uaf.edu/disability/) to provide accommodations for students with disabilities. If you have a disability and require special assistance, please contact the instructor as soon as possible. Students with disabilities must provide a written statement indicating any special requirements that will be necessary as early in the semester as possible (preferably within the first week).

Cheating/Academic Dishonesty:
The Chemistry & Biochemistry Department Policy on Cheating is: “Any student caught cheating will be assigned a course grade of F. The student’s academic advisor will be notified of this failing grade and the student will not be allowed to drop the course.” The Department considers performing unauthorized “dry labs” as cheating. Partnering during the lab is acceptable but lab reports must show your own calculations and ideas. Providing clicker responses for another student or asking another student to provide responses with your clicker are not permitted.

Amending this Syllabus:
The instructor may initiate changes to this syllabus subject to unanimous approval by the students. Any changes will be clearly communicated via email and posted on Blackboard.

The instructor reserves the right to make minor changes to the lecture schedule (attached), and also to make changes to the grading policy that are of benefit to ALL students enrolled in the course. Neither of these two types of changes is subject to student vote/approval.

Important Dates:
- Late registration deadline (last day to add classes) — Friday, Jan. 28
- Last day for 100% refund of tuition and fees — Friday, Jan. 28
- Last day for faculty- and student-initiated drops (course does not appear on academic record) — Friday, Feb. 4
- Last day for 50% refund of tuition — Friday, Feb. 4
- Last day to apply for spring 2011 graduation — Tuesday, Feb. 15
- Freshman progress reports due — Friday, Feb. 25
- Spring break (no classes) — Mar. 14 – 18
- University offices closed — Friday, Mar. 18
- Last day for faculty- and student-initiated withdrawals (W grade appears on transcript) — Friday, Mar. 25
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<thead>
<tr>
<th>Week</th>
<th>Date</th>
<th>Topic/Reading Assignment</th>
<th>Lab</th>
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<tbody>
<tr>
<td>1</td>
<td>20-Jan</td>
<td>Introduction/Syllabus</td>
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<td>2</td>
<td>25-Jan</td>
<td>Organic Molecules (11.1 - 11.5)</td>
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<td>27-Jan</td>
<td>Functional Groups (11.5 - 11.7)</td>
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<td>3</td>
<td>1-Feb</td>
<td>Proteins: Amino Acids (21.1 - 21.3)</td>
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<td>3-Feb</td>
<td>Proteins: Structure (21.4 - 21.6)</td>
<td>Amino Acids</td>
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<td>4</td>
<td>8-Feb</td>
<td>Proteins: Structure (21.7 - 21.8)</td>
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<td>10-Feb</td>
<td>Proteins: Enzymes (21.9 - 21.10)</td>
<td>TLC</td>
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<td>5</td>
<td>15-Feb</td>
<td>Midterm I</td>
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<td>6</td>
<td>17-Feb</td>
<td>Amines (18.1 - 18.2; 18.4)</td>
<td>Urease</td>
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<td>22-Feb</td>
<td>Neurotransmitters (18.8 - 18.10)</td>
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<td>24-Feb</td>
<td>Nucleic Acids (22.1 - 22.2)</td>
<td>Casein</td>
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<td>7</td>
<td>1-Mar</td>
<td>Nucleic Acids: Replication (22.3 - 22.5)</td>
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<td>3-Mar</td>
<td>Nucleic Acids: Transcription (22.6 - 22.7)</td>
<td>ELISA</td>
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<td>8</td>
<td>8-Mar</td>
<td>Nucleic Acids: Translation (22.8 - 22.10)</td>
<td>DNA</td>
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<td>10-Mar</td>
<td>Nucleic Acids: Viruses (22.11)</td>
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<td>9</td>
<td>15-Mar</td>
<td>Spring Break (No Classes)</td>
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<td>10</td>
<td>17-Mar</td>
<td>Spring Break (No Classes)</td>
<td>No Lab</td>
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<td>22-Mar</td>
<td>Carbohydrates: Monosaccharides (20.1 - 20.3)</td>
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<td>24-Mar</td>
<td>Midterm II</td>
<td>Aspirin</td>
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<td>11</td>
<td>29-Mar</td>
<td>Carbohydrates: Polysaccharides (20.5 - 20.8)</td>
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<td>31-Mar</td>
<td>Lipids: Fatty Acids (19.1 - 19.3)</td>
<td>Blood Typing</td>
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<td>5-Apr</td>
<td>Lipids: Triacylglycerols (19.4 - 19.5)</td>
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<td>7-Apr</td>
<td>Lipids: Phospholipids (19.6 - 19.7)</td>
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<td>13</td>
<td>12-Apr</td>
<td>Lipids: Steroids (19.8 - 19.10)</td>
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<td>14</td>
<td>14-Apr</td>
<td>Midterm III</td>
<td>Lipid Analysis</td>
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<td>15</td>
<td>19-Apr</td>
<td>Metabolism (23.1 - 23.3)</td>
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<td>16</td>
<td>21-Apr</td>
<td>Metabolism: Citric Acid Cycle (23.4 - 23.5)</td>
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<td>26-Apr</td>
<td>Metabolism: Electron Transport (23.6 - 23.7)</td>
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<td>17</td>
<td>28-Apr</td>
<td>Metabolism: Glycolysis (24.1 - 24.3)</td>
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<td>3-May</td>
<td>Metabolism: Fate of Pyruvate (24.4 - 24.6)</td>
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<td>5-May</td>
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<td>Overflow and Review</td>
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<td>17</td>
<td>11-May</td>
<td>Final Exam (5:45 - 7:45 pm)</td>
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**Note:** The final exam is in the evening on Wednesday, May 11!!!