General Biochemistry Laboratory  
Chemistry 162

Discussion Section 03:  Monday  1:00 – 1:50 pm  Sequoia 456
Lab Section 04:  M-W   2:00 – 4:55 pm  Sequoia 550

Instructor: Dr. Tom Savage  Phone: 278-3918
Office: Sequoia 510  Email: via WebCT mail or tjsavage@csus.edu
Office Hours: WF 8:30 – 10:00 or by appointment

Prerequisites:  Quantitative Analysis (Chem 031)  
(Strictly Enforced) College Composition II (English 020) or equivalent 
Structure and Function of Biomolecules (Chem 160A)* or 
General Biochemistry (Chem 161)*  
* May be taken concurrently

WebCT:  Class administration and quizzes will occur via WebCT (www.online.csus.edu). 
Students should login weekly (at a minimum) to check for announcements.

Course Description:  Qualitative and quantitative tests for and isolation of 
carbohydrates, lipids, proteins, nucleic acids and enzymes

Course Objectives:

1. Enhance understanding of biochemical principles by hands-on application of 
   biochemical techniques.

2. Introduce and practice fundamental biochemistry lab and research skills.

Required Textbooks and Lab Materials:

- Modern Experimental Biochemistry, 3rd edition, Rodney Boyer
- Biochemistry Laboratory Manual, Chemistry 162, CSUS Chemistry Department
- Safety Goggles
- Minimum 15 pair latex/nitrile gloves
- Two 3.5 in floppy disks
- A Saclink account enabling you to log on to the WebCT Course Homepage

Assignments:

Safety Near Miss Reports (2) - Short (1 paragraph) description of a potential safety 
hazard or “near miss” and preventative actions to prevent reoccurrence.

WebCT Pre-Lab Quizzes – WebCT quizzes to be completed during the week prior to 
each experiment to ensure reading of the assigned readings prior to class.
Notebook Laboratory Reports (7) – A copy of the notebook entries for a particular experiment, including Title, Objective, Experimental, Data and Calculations, and Results and Discussion.

Formal Laboratory Reports (2) – A formal report that simulates the writing of a scientific paper.

Examinations – A mid-term and final examination that covers both the lab techniques and the concept presented in the laboratory exercises.

Grading:

<table>
<thead>
<tr>
<th>Category</th>
<th>Points</th>
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<tbody>
<tr>
<td>Safety Participation</td>
<td>50</td>
</tr>
<tr>
<td>Pre-Laboratory WebCT Quizzes</td>
<td>150</td>
</tr>
<tr>
<td>Notebook Laboratory Reports</td>
<td>300</td>
</tr>
<tr>
<td>Formal Notebook Reports (2)</td>
<td>250</td>
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<tr>
<td>Midterm Examination</td>
<td>100</td>
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<tr>
<td>Final Examination</td>
<td>150</td>
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Attendance:

Attendance in both discussion and laboratory are mandatory. More than two unexcused absences will result in an F grade in the course. Excused absences will require a note from a physician or similar evidence of special circumstances.

Assignment Late Policy:

Late Assignments will be accepted up to 5 days after the due date, with a 10% penalty per day for every day late. After 5 days, no credit (0 points) will be given for the assignment.

1st Week Administrative Action Items:

- Submit to me a copy of transcript with prerequisites highlighted by 1/26.
- If you haven’t completed the prerequisites, drop the class via CasperWeb (this is your responsibility)
## COURSE SCHEDULE

<table>
<thead>
<tr>
<th>Week</th>
<th>Date</th>
<th>Experiment</th>
<th>Reference</th>
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</table>
| 1    | 1/24 | Check-in and lab safety | Syllabus  
Boyer, 3-11 |
| 2    | 1/26 | Manual, Experiment 1 | Boyer, 214-218 |
|      |      | Note: MEET IN ROOM 2024 LIBRARY |           |
|      |      | Lab assignment due 2/2 |           |

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<tr>
<th>Week</th>
<th>Date</th>
<th>Experiment</th>
<th>Reference</th>
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</table>
| 2    | 1/31 | Working with small volumes | Manual, Experiment 2  
Boyer, 13-18 |
|      |      | Pre-Lab Quiz 1/31 |           |
|      |      | Lab assignment due 2/7 |           |

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<tr>
<th>Week</th>
<th>Date</th>
<th>Experiment</th>
<th>Reference</th>
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</table>
| 3    | 2/2  | Separation of Amino Acids in a Mixture: buffer preparation | Manual, Experiment 3  
Boyer, 11, 29-37 |
|      | 2/7  | Separation of Amino Acids in a Mixture: ion-exchange chromatography, check column fractions | Manual, Experiment 3  
Boyer, 59-65, 70-79 |
|      | 2/9  | Separation of Amino Acids in a Mixture: paper chromatography of standards and unknown |           |
|      |      | Pre-Lab Quizzes 2/2, 2/7 |           |
|      |      | Lab assignment due 2/16 |           |

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<tr>
<th>Week</th>
<th>Date</th>
<th>Experiment</th>
<th>Reference</th>
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</table>
| 4    | 2/14 | Protein Determination: Calibration curve and analysis of BSA concentration | Manual, Experiment. 4  
Boyer, 41-45, 141-157 |
|      | 2/16 | Protein Determination: Analysis of protein in a mixture, spectral analysis of BSA and bean sprout mixture |           |
|      |      | Pre-Lab Quiz 2/14 |           |
|      |      | Lab assignment due 2/21 |           |

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<tr>
<th>Week</th>
<th>Date</th>
<th>Experiment</th>
<th>Reference</th>
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</table>
| 5    | 2/21 | Protein purification: set up and run columns | Manual, Expt. 5  
Boyer, 79-87, 257-258 |
|      | 2/23 | Protein purification: analyze column fractions | Manual, Expt 5  
Boyer, 285-289 |
<p>| 6    | 2/28 | Protein purification: analyze column fractions |           |
|      | 3/2  | Science Writing Workshop |           |</p>
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<thead>
<tr>
<th>Week</th>
<th>Date</th>
<th>Experiment</th>
<th>Manual</th>
<th>References</th>
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<tbody>
<tr>
<td>7</td>
<td>3/7</td>
<td>Protein purification: calculate specific activities</td>
<td>Expt 5</td>
<td>Boyer, 111-121, 137-138</td>
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<tr>
<td></td>
<td>3/9</td>
<td>Protein purification: SDS-PAGE</td>
<td>Manual, Experiment 5</td>
<td>Boyer, 87-98</td>
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<tr>
<td>8</td>
<td>3/14</td>
<td>Protein purification: HPLC</td>
<td>Manual, Expt 5</td>
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<td></td>
<td>3/16</td>
<td>No Lab</td>
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<td></td>
<td>3/14</td>
<td>MID-TERM EXAM</td>
<td>1:00pm – 2:00 pm Sequoia 456</td>
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<td>3/21-3/25</td>
<td>SPRING BREAK</td>
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<td></td>
<td>5/9</td>
<td>Check out</td>
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<td>5/11</td>
<td>FINAL EXAM</td>
<td>2:00pm – 4:55pm Sequoia 550</td>
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### EXPERIMENT 6 - WESTERN BLOTTING

- **Date:** 3/28
- **Activity:** Western Blotting
- **Reference:** Boyer, 132, 136, 321-331

### Pre-Lab Quiz
- **Date:** 3/28

### Lab Assignment Due
- **Date:** 4/6

### EXPERIMENT 7 - ENZYME KINETICS

- **Week:** 9
- **Date:** 4/4
- **Activity:** Enzyme Kinetics: Determination of Time and [Enzyme]
- **Reference:** Expt 7

- **Date:** 4/6
- **Activity:** Enzyme Kinetics: Determination of $K_M$ and $V_{max}$
- **Reference:** Boyer, 153-155, 279-289

- **Week:** 10
- **Date:** 4/11
- **Activity:** Enzyme Kinetics: Effect of Temperature and pH
- **Reference:** Expt 7

- **Date:** 4/13
- **Activity:** Enzyme Kinetics: Denaturant effects
- **Reference:** Expt 7

- **Week:** 11
- **Date:** 4/18
- **Activity:** Enzyme Kinetics: Inhibition
- **Reference:** Expt 7

### Pre-Lab Quizzes
- **Date:** 4/4, 4/11

### Formal Lab Report Due
- **Date:** 4/29

### EXPERIMENT 9 - ISOLATION AND RESTRICTION OF BACTERIAL DNA

- **Week:** 12
- **Date:** 4/20
- **Activity:** Isolation of Bacterial DNA
- **Reference:** Expt 9

- **Date:** 4/25
- **Activity:** Restriction Digestion and Electrophoretic Analysis of DNA
- **Reference:** Expt 9

### Pre-Lab Quiz
- **Date:** 4/20

### Lab Assignment Due
- **Date:** 5/9

### EXPERIMENT 8 - COMPUTER ANALYSIS OF MACROMOLECULES

- **Week:** 11
- **Date:** 5/2
- **Activity:** Computer Analysis of Macromolecules
- **Reference:** Expt 8

- **Date:** 5/4
- **Activity:** Computer Analysis of Macromolecules
- **Reference:** Expt 8

### Pre-Lab Quiz
- **Date:** 11/30

### Lab Assignment Due
- **Date:** 12/9

### 5/9
- **Activity:** Check out

### 5/11
- **Activity:** FINAL EXAM
- **Time:** 2:00pm – 4:55pm Sequoia 550