CHEM 4164_001
Theory of Biochemical Methods
Fall 2023

Instructor          Dr. Bidisha Sengupta
Department          Chemistry and Biochemistry
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Phone               936-468-2485
Office              Room 112, Bush Mathematical Sciences Building
Class Time/Location Thursday Math 132, 1:00-1:50 PM
Student Office Hours Mon 4:00-5:00 pm; Tues 10:00 am-12 noon; Wed 11:00-12:00 noon
Important Dates for course registration/drop/withdraw     https://www.sfasu.edu/registrar/registration-information/dates-deadlines

COURSE DESCRIPTION: This course provides a study of the principles and applications of biochemistry including proteomics, genomics, lipidomics, enzymology, structural biology, bioinformatics etc. The purpose of the course is to provide students additional information and in-depth problem solving on material covered in the Biochemistry I course.

NUMBER OF CREDIT HOURS: 1 semester hour

PREREQUISITES: CHEM 3030/3130L (CHE 3330/3310) or CHEM 3331/3311 with a ‘C’ or better. Note that both of these courses also have prerequisites of CHEM 1311 and 1312 with a ‘C’ or better in each.

GENERAL EDUCATION CORE CURRICULUM OBJECTIVES: There are no specific general education core curriculum objectives in this course. This course is not a general education core curriculum course.

COURSE OBJECTIVES: Students should achieve the learning outcomes of essential topics in biochemistry including but not limited to: amino acids, protein structure/function, protein techniques, nucleic acid structure/function, nucleic acid techniques, enzymes, enzyme kinetics, cell membranes/transport, carbohydrates, and metabolism. Students should be able to integrate this knowledge with critical thinking to solve integrated and data interpretation problems and be able to present scientific information through written and oral communication.

STUDENT LEARNING OUTCOMES: The student is expected to:

- categorize and connect terminology used in biochemistry especially in relation to proteins, enzymes, DNA/RNA, and other biological molecules, and metabolism (PLO 1)
- integrate and apply biochemical terminology, chemical, biochemical, and mathematical concepts to solving advanced integrated and data interpretation problems in biochemistry (PLO 1, 2)
- effectively communicate biochemical concepts utilizing knowledge gained in the course and from knowledge gained in other courses (PLO 3)

OUTLINE OF TOPICS (APPROXIMATE COURSE TIME): See Course Calendar below.

FORMAT OF DELIVERY: The course will be taught face-to-face 100%.

TEXT AND MATERIALS: Text: Biochemistry 9th ed. by Berg, Tymoczko, Gatto, Stryer. Information and announcements will be posted and/or mailed to students via D2L. Students must check D2L and their emails regularly.
**COURSE CALENDAR**

OUR FOCUS WILL BE ON BIOINFORMATICS. STUDENTS WILL FORM GROUP OF 2 PEOPLE. EACH GROUP WILL HAVE TO WRITE A CASE STUDY REPORT LIKE THE FORMAT GIVEN IN D2L. THEY WILL PRESENT THE REPORT TO THE CLASS (MINI-REPORT, WEEK 7) AND FINAL REPORT AT THE END OF SEMESTER.

<table>
<thead>
<tr>
<th>Week</th>
<th>dates</th>
<th>Class Activities</th>
<th>Approx. Time</th>
<th>Assignments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>8/31</td>
<td>Syllabus, class expectation, etc. Review and Problem solving – general and organic chemistry concepts, thermodynamics water chemistry, buffer, titration etc. – Chapter 1</td>
<td>9%</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>9/07</td>
<td><strong>Lecture</strong> – Introduction to PDB data</td>
<td>9%</td>
<td>Quiz 1 (week 1 concepts)</td>
</tr>
<tr>
<td>3</td>
<td>9/14</td>
<td><strong>Lecture</strong> – Biological Assemblies and the PDB Archive</td>
<td>9%</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>9/21</td>
<td><strong>Lecture</strong> - Hierarchical Structure of Proteins</td>
<td>9%</td>
<td>Quiz 2 (weeks 2 and 3 content)</td>
</tr>
<tr>
<td>5</td>
<td>9/28</td>
<td><strong>Lecture</strong> – Biological Assemblies and the PDB Archive</td>
<td>9%</td>
<td>Quiz 3 (week 4 content)</td>
</tr>
<tr>
<td>6</td>
<td>10/05</td>
<td>Talk about progress on your case study report (The references you selected, importance of your case, your questions you like to address etc.)</td>
<td>9%</td>
<td>Quiz 4 (week 5 content)</td>
</tr>
<tr>
<td>7</td>
<td>10/12</td>
<td><strong>Presentation 1</strong></td>
<td>9%</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>10/19</td>
<td><strong>Lecture</strong> - Exploring Carbohydrates in the PDB Archive</td>
<td>9%</td>
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</tr>
<tr>
<td>9</td>
<td>10/26</td>
<td><strong>Lecture</strong> - Small Molecule Ligands</td>
<td>9%</td>
<td>Quiz 5 (week 8 content)</td>
</tr>
<tr>
<td>10</td>
<td>11/02</td>
<td>Using Pymol to see protein structure</td>
<td>9%</td>
<td>Quiz 6 (week 8 content)</td>
</tr>
<tr>
<td>11</td>
<td>11/09</td>
<td>Using Pymol to see protein structure</td>
<td>9%</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>11/16</td>
<td></td>
<td>9%</td>
<td>Thanksgiving Break</td>
</tr>
<tr>
<td>13</td>
<td>11/30</td>
<td>Getting ready for final write-up</td>
<td>9%</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>12/7</td>
<td><strong>Final presentation</strong></td>
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GRADING POLICY:

6 Quizzes 20 points each, lowest 1 dropped – The dates quizzes will be given are shown on the course calendar.

Exams – Two Presentations (one during week 7 and final on week 14.

Method of Evaluation/Assessment – The final grade will be based upon the number of points obtained in the following:

<table>
<thead>
<tr>
<th>Item</th>
<th>Value Points</th>
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</thead>
<tbody>
<tr>
<td>Quizzes</td>
<td>100</td>
</tr>
<tr>
<td>Exams</td>
<td>100</td>
</tr>
<tr>
<td><strong>TOTAL PTS</strong></td>
<td><strong>200</strong></td>
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</tbody>
</table>

Grading Scale (200 total points)

[A≥90% ; B≥80-89% ; C≥70-79% ; D ≥60-69% ; <60% = F]

The instructor reserves the right to regrade an entire item if the student requests for a regrade on one part.

ATTENDANCE POLICY:

Attendance of class is mandatory. Three (3) or more absences will result in an ‘F’ for the course. Absences may be assigned to anyone that disrupts class, sleeps in class, or consistently comes in late or leaves early. **ATTENDANCE POLICY:**

Attendance of class is mandatory. Three or more absences will result in an ‘F’ for the course. Absences may be assigned to anyone that disrupts class, sleeps in class, or consistently comes in late or leaves early. For ONE **proven** excused absence, arrangements for make up work will be made. Any further absences will count as a zero. The lab is face to face. If circumstances change due to Covid, appropriate adjustments will be made and students will be notified, in writing, of any changes.

CLASSROOM BEHAVIOR POLICY:

➢ The student code of conduct policy is located at: [http://www.sfasu.edu/policies/student-code-of-conduct-10.4.pdf](http://www.sfasu.edu/policies/student-code-of-conduct-10.4.pdf)
➢ Following all university policies.
➢ **Follow ALL Departmental safety policies.**
   ○ Safety glasses/goggles and clothing that completely covers feet, legs torso are required at all times.
➢ Professional behavior is expected at all times and includes coming to lab prepared and on time.
➢ **Learning biochemistry is NOT a spectator sport.** It takes involvement and participation in learning. Preparation for lab should take 1-2 hours per week.
   ○ reviewing material from previous lab & reading material before coming to lab
   ○ practicing active recall, understanding terms, making connection between concepts, quizzing yourself
   ○ completing assignments/virtual labs
   ○ studying for quizzes
   ○ working on formal report
➢ Contribute to discussions and group work.
➢ Absences may be assigned to anyone who disrupts class. See Attendance Policy Section for how this can affect grades.
➢ Bring a scientific calculator.
➢ Silence phones and put away unless we are using them as a part of lab.
➢ Be courteous and respectful of other students and instructor.
➢ Students who violate these rules will be asked to leave and have points deducted from SOP points. Repeat offenders will be subject to disciplinary action in accordance with University policies as described in the Code of Student Conduct.
➢ **PROFESSIONAL Behavior is expected ALWAYS.**
This course meets educator preparation standards for one or more certification programs; a complete listing of all the educator preparation standards this course meets can be found at: https://sfasu.edu/docs/jacksteach/jacksteach-standards-alignment-chart.xlsx

**CODE OF STUDENT CONDUCT AND ACADEMIC INTEGRITY (10.4):**

The Code of Student Conduct and Academic Integrity outlines the prohibited conduct by any student enrolled in a course at SFA. It is the responsibility of all members of all faculty, staff, and students to adhere to and uphold this policy.

Articles IV, VI, and VII of the new Code of Student Conduct and Academic Integrity outline the violations and procedures concerning academic conduct, including cheating, plagiarism, collusion, and misrepresentation. Cheating includes, but is not limited to: (1) Copying from the test paper (or other assignment) of another student, (2) Possession and/or use during a test of materials that are not authorized by the person giving the test, (3) Using, obtaining, or attempting to obtain by any means the whole or any part of a non-administered test, test key, homework solution, or computer program, or using a test that has been administered in prior classes or semesters without permission of the Faculty member, (4) Substituting for another person, or permitting another person to substitute for one’s self, to take a test, (5) Falsifying research data, laboratory reports, and/or other records or academic work offered for credit, (6) Using any sort of unauthorized resources or technology in completion of educational activities.

Plagiarism is the appropriation of material that is attributable in whole or in part to another source or the use of one’s own previous work in another context without citing that it was used previously, without any indication of the original source, including words, ideas, illustrations, structure, computer code, and other expression or media, and presenting that material as one’s own academic work being offered for credit or in conjunction with a program course or degree requirements.

Collusion is the unauthorized collaboration with another person in preparing academic assignments offered for credit or collaboration with another person to commit a violation of any provision of the rules on academic dishonesty, including disclosing and/or distributing the contents of an exam.

Misrepresentation is providing false grades or résumés; providing false or misleading information in an effort to receive a postponement or an extension on a test, quiz, or other assignment for the purpose of obtaining an academic or financial benefit for oneself or another individual or to injure another student academically or financially.

Any student found cheating will be subject to the penalties as stated in the Student Code of Conduct handbook; including but not limited to a score of zero on exam, expulsion from the class or expulsion from the University.

**WITHHELD GRADES SEMESTER GRADES POLICY (5.5):**

Ordinarily, at the discretion of the instructor of record and with the approval of the academic chair/director, a grade of WH will be assigned only if the student cannot complete the course work because of unavoidable circumstances. Students must complete the work within one calendar year from the end of the semester in which they receive a WH, or the grade automatically becomes an F. If students register for the same course in future terms the WH will automatically become an F and will be counted as a repeated course for the purpose of computing the grade point average. For additional information, go to https://www.sfasu.edu/policies/course-grades-5.5.pdf.

The circumstances precipitating the request must have occurred after the last day in which a student could withdraw from a course. Students requesting a WH must be passing the course with a minimum projected grade of C.
STUDENTS WITH DISABILITIES:

To obtain disability related accommodations, alternate formats and/or auxiliary aids, students with disabilities must contact the Office of Disability Services (ODS), Human Services Building, and Room 325, 468-3004 / 468-1004 (TDD) as early as possible in the semester. Once verified, ODS will notify the course instructor and outline the accommodation and/or auxiliary aids to be provided. Failure to request services in a timely manner may delay your accommodations. For additional information, go to http://www.sfasu.edu/disabilityservices/.

STUDENT WELLNESS AND WELL-BEING:

SFA values students’ overall well-being, mental health and the role it plays in academic and overall student success. Students may experience stressors that can impact both their academic experience and their personal well-being. These may include academic pressure and challenges associated with relationships, emotional well-being, alcohol and other drugs, identities, finances, etc.

If you are experiencing concerns, seeking help, SFA provides a variety of resources to support students’ mental health and wellness. Many of these resources are free, and all of them are confidential.

ON-CAMPUS RESOURCES:

The Dean of Students Office (Rusk Building, 3rd floor lobby)
www.sfasu.edu/deanofstudents
936.468.7249
dos@sfasu.edu

SFA Human Services Counseling Clinic Human Services, Room 202
www.sfasu.edu/humanservices/139.asp
936.468.1041

The Health and Wellness Hub “The Hub”
Location: corner of E. College and Raguet St.

To support the health and well-being of every Lumberjack, the Health and Wellness Hub offers comprehensive services that treat the whole person – mind, body and spirit. Services include:

- Health Services
- Counseling Services
- Student Outreach and Support
- Food Pantry
- Wellness Coaching
- Alcohol and Other Drug Education
  www.sfasu.edu/thehub
  936.468.4008
  thehub@sfasu.edu

CRISIS RESOURCES:

- Burke 24-hour crisis line: 1.800.392.8343
- National Suicide Crisis Prevention: 9-8-8
- Suicide Prevention Lifeline: 1.800.273.TALK (8255)
- johCrisis Text Line: Text HELLO to 741-741