CHEM 4331/5331: Biochemistry

Instructor: Edith Osborne, Ph.D.
Email: eosborne@angelo.edu
Phone: 325-486-6629
Office: CAV 204A

Office Hours: M 11:00-noon and 1:00-2:00, W-F 11-noon, or by appointment


Calculator: Bring a nonprogrammable scientific calculator to class every day and to all exams. You may not use a graphing calculator or cell phone on any quiz or exam.

Blackboard: This course will use Blackboard. Be sure to check Blackboard for postings frequently.

Course Description: The chemistry of living organisms. Carbohydrates, lipids, proteins, vitamins, and related cellular constituents are considered.

Prerequisite Courses: CHEM 3452

Course Objectives:
- Gaining factual knowledge (terminology, classifications, methods, trends)
- Learning fundamental principles, generalizations, or theories
- Learning to apply course materials (to improve rational thinking, problem solving and decisions)

Student Learning Outcomes:
After completion of this course students will be able to:
- Demonstrate technical and analytical skills in the area of biochemistry.
- Employ mathematics in the analysis of biochemical problems.
- Apply scientific reasoning to solve biochemical problems.

Evaluation of Student Learning Outcomes
Student learning outcomes will be evaluated by test questions.

Communication: All email communication will be done through your ASU email address or Blackboard. In your emails to faculty, include the course name and section number in your subject line. If multiple questions are received about the same topic, a Blackboard
announcement may be issued to help clarify to the whole class, so check Blackboard frequently for announcements. Please communicate with your instructor early about any situation, such as a prolonged illness, that might affect your performance in the class so that accommodations may be made if needed.

**Exams:** There will be three 100 point regular exams during the semester and a comprehensive final exam of 150 points during the final exam period. Exam questions may be multiple choice, short answer, or matching and may require application of the covered material. Due to the cumulative nature of the course, some concepts from previous chapters may be necessary to solve problems in later chapters. During exams, all items except your nonprogrammable calculator and pencil will be placed at the front of the room. You may not wear hats during the exam. When I give you back the exam, I will briefly review important points regarding the test and answer any questions regarding the test. During this discussion time, you will need to decide if you would like a regrade of any test question and return your exam to the instructor if you would like a regrade. Make-up exams will only be given in limited circumstances. Please contact the instructor as soon as possible to discuss. If you miss an exam for an accepted excuse, i.e. a death in your family, personal illness, or a university-sponsored event, the final exam score will be used to replace the missed exam. Only one exam can be replaced in this fashion. If you miss two exams, you will not pass the course. If you miss the final, you will not pass the course. If you have taken all three hour exams, you may use the percentage of points earned on the final exam to replace your lowest exam score. Example: your exams are 60 pts, 70 pts, and 80 pts and your final is 100 pts. The final exam is out of 150 points, so 100 points is 100/150*100 = 67%, so you can replace the 40 pt exam with 67 pts.

**Quizzes:** Quizzes will be given approximately once a week. No reference materials (notes, worked problems or text) may be used on paper quizzes. The questions will be similar to but will not be exactly like the problem sets posted on BlackBoard. In calculating your grade, I will use your 10 best quizzes, at least two quizzes will be dropped. There are 100 points possible for this category. No credit will be given for quizzes missed for any reason, including tardiness. Consideration of absences for some university activities will be given if advanced notice and documentation are given.

**Homework and in-class activities:** Online homework from Sapling Learning will be used. There will also be some in-class activities and homework provided through BlackBoard. Preparation material for in-class activities will be announced in class or on Blackboard. Deductions will be given for late homework. No credit will be given for missed in-class assignments. In calculating your grade for this category of points, I will divide your earned points by 90% of the possible points and normalize to 75 points for the category. For example, if there were 100 possible homework/in-class activity points, I would multiply .9*100= 90. If you earned 85 points, I would normalize as follows: 85/90*75=70.8 points.
**Lecture Notes:** Lecture outlines will be posted on Blackboard, but you will still need to take notes in class. You are strongly encouraged to print the lecture outlines, review them before class, and then take notes on the outline during class.

**Review sessions:** Review sessions will be given before the exams. As these help sessions are directed by student’s questions, what is covered in the review sessions may or may not be covered on the exam.

**Grading corrections:** Any discussion of corrections must be made within three weekdays of the returned work.

**Grade Determination:** Your grade will be based on the total point accumulation (not percentages) you earn on assignments, quizzes, and exams. Please note that you should not expect grades to be curved. If bonus point opportunities are given and not completed, no adjustment will be made to a student’s grade at the end of the semester.

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<tr>
<th>Grades:</th>
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<tr>
<td><strong>Point cutoff</strong></td>
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<tr>
<td>562</td>
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<td>500</td>
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<td>437</td>
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<td>375</td>
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<td>&lt;375</td>
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**Point Category** | **Points Possible**
--- | ---
Regular Exam (100 points each per regular exam) | 300
Quizzes | 100
Homework and assignments | 75
Comprehensive final exam | 150
Total points | 625

**Classroom Courtesy:** Please help create a positive, focused learning environment for yourself and your classmates. Some students are easily distracted, so please help limit distracting situations by being on time, refraining from eating, not working on or reading material for other courses, and turning off cell phones (i.e. please refrain from texting). You may not use keyboards to type in class as this can be distracting to your classmates. You may not take photographs or record class lectures unless given permission by your professor. Please be respectful of your instructor and your classmates. No credit will be given for any assignment or exam that contains drawings or writings that are inappropriate or disrespectful.

**Attendance:** You are expected to attend all class meetings. You are expected to arrive on time and to stay until you are dismissed. In-classroom activities, such as worksheets and quizzes, cannot be made up. If you leave after a quiz or in-class assignment without being excused, you will receive 0 points for the quiz or assignment. You will not be automatically
dropped if you stop attending class. Daily attendance will be taken. If you are tardy, you will be counted absent.

**Flu:** If you have the flu, please stay home. Do not help spread the flu to everyone else. Please keep me informed as to your status by email or telephone.

**General Policies Related to This Course**

All students are required to follow the policies and procedures presented in these documents:

- [Angelo State University Student Handbook](#)²
- [Angelo State University Catalog](#)³

**Academic Integrity**

Students are expected to maintain complete honesty and integrity in all work. Any student found guilty of any form of dishonesty in academic work is subject of disciplinary action and possible expulsion from ASU.

The College of Science and Engineering adheres to the university’s [Statement of Academic Integrity](#)⁴.

The penalty for ANY sort of dishonesty, including cheating or plagiarism is: 1) a grade of zero on the assignment and 2) disciplinary action as warranted in accordance with university guidelines. Unless otherwise stated, any homework/bonus work assigned should be your own work. Any Excel graph made should be your own graph.

**Accommodations for Students with Disabilities**

ASU is committed to the principle that no qualified individual with a disability shall, on the basis of disability, be excluded from participation in or be denied the benefits of the services, programs or activities of the university, or be subjected to discrimination by the university, as provided by the Americans with Disabilities Act of 1990 (ADA), the Americans with Disabilities Act Amendments of 2008 (ADAAA) and subsequent legislation.

Student Disability Services is located in the Office of Student Affairs, and is the designated campus department charged with the responsibility of reviewing and authorizing requests for reasonable accommodations based on a disability. It is the student’s responsibility to initiate such a request by contacting an employee of the Office of Student Affairs, in the Houston Harte University Center, Room 112, or contacting the department via email at [ADA@angelo.edu](mailto:ADA@angelo.edu). For more information about the application process and requirements, visit the [Student Disability Services website](#).⁵ The employee charged with the responsibility of reviewing and authorizing accommodation requests is:

Dallas Swafford
Director of Student Disability Services
Office of Student Affairs
325-942-2047
dallas.swafford@angelo.edu
Houston Harte University Center, Room 112

You are encouraged to make this request early in the semester so that appropriate arrangements can be made. You must make arrangements with me at a minimum of 48 hours in advance if you need accommodations made for a test or quiz.

**Student Absence for Observance of Religious Holy Days**
A student who intends to observe a religious holy day should make that intention known in writing to the instructor prior to the absence. See ASU Operating Policy 10.19 Student Absence for Observance of Religious Holy Day for more information.

**Title IX Statement**
Angelo State University is committed to the safety and security of all students. If you or someone you know experience sexual harassment, sexual assault, domestic or dating violence, stalking, or discrimination, you may contact ASU’s Title IX Coordinator:

Michelle Boone
Director of Title IX Compliance
Office of Student Affairs
325-486-6357
michelle.boone@angelo.edu

**Course Schedule:**

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<thead>
<tr>
<th>Week of</th>
<th>Topic or Module</th>
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<tr>
<td>8/26</td>
<td>Chapter 1 The Foundations of Biochemistry</td>
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<tr>
<td>9/2</td>
<td>Chapter 2 Water</td>
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<tr>
<td>9/9</td>
<td>Chapter 2 continued and Chapter 3 Amino Acids, Peptides, and Proteins</td>
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<tr>
<td>9/16</td>
<td>Chapter 3 continued</td>
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<td>9/23</td>
<td>Chapter 4 The Three-Dimensional Structure of Proteins</td>
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<td><strong>Test #1 September 23 or 24 – Approximate composition Chapters 1-3</strong></td>
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<tr>
<td>9/30</td>
<td>Chapter 5 Protein Function</td>
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<td>10/7</td>
<td>Chapter 5 and Chapter 6 Enzymes</td>
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<td>10/14</td>
<td>Chapter 6 continued</td>
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<tr>
<td>10/21</td>
<td>Chapter 6 Enzyme Kinetics</td>
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<td><strong>Test #2 October 21 or 22 – Approximate composition Chapters 4-6a</strong></td>
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<tr>
<td>10/28</td>
<td>Chapter 6 kinetics and Chapter 7 Carbohydrates and Glycobiology</td>
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<td><strong>Last Day to Drop Thursday, October 31</strong></td>
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<td>Week of</td>
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<td>11/4</td>
<td>Chapter 7 and Chapter 8 Nucleotides and Nucleic Acids</td>
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<td>11/11</td>
<td>Chapter 9 DNA-Based Information Technologies</td>
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<td>11/18</td>
<td>Chapter 10 Lipids</td>
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<td><strong>Test #3 November 20 or 21 – Approximate composition Chapters 6b-9</strong></td>
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<tr>
<td>11/25</td>
<td>Chapter 10</td>
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<tr>
<td>12/2</td>
<td>Chapter 11 section 1</td>
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<tr>
<td>12/9</td>
<td>Final Exams</td>
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Comprehensive final exam: approximate composition Chapters 1-11
- Monday, December 9 10:30 a.m. – 12:30 p.m.
- Thursday, December 12 8:00 a.m. – 10:00 a.m.
**Honors and Graduate Students**

In addition to the work described above, you are expected to choose a human protein of your choice. You will write a paper that explains the structure and function of that protein and a discussion of the affects caused by the absence or mutation of the protein. Your paper should include an abstract, introduction, main body, discussion, figures (including crystal or NMR structure), and be fully referenced using CSE formatting. The report should be 1800-2000 words including the abstract, introduction, main body, and discussion. Title page, references and figure legends are not included in the word count. More information is found below. Also, a series of 4 case studies relating to the course material will be given periodically during the semester.

**Paper requirements**

- Topic submitted for approval: September 12
- Outline due: October 2
- Paper due date: November 14
- Points: 50 points

**Case studies**

- Points: 4 @ 10 points for 40 points

**Additional Paper Information:**

Submissions should be electronic. A final printed copy of your paper should also be submitted. The outline should provide enough information, including references, that the professor can clearly see the intended direction of your paper. Pay attention to the structures of the journal articles that you are reading. Your paper should be structured like a journal review article.

This is a biochemistry paper. Please make sure that a vast majority of your paper speaks of the biochemistry of your topic. Broader impact statements are useful for drawing in your readers, but make sure that you don’t dwell on them too long. You should reference scientific journal articles and texts. You should not reference websites like Wikipedia. Reputable websites like NIST, NIH, or manufacturers are allowable. You will end up with many references. The only sentences that you will not reference are statements that are general knowledge, such as DNA is translated to RNA. If your paper continually mentions a particular chemical/biochemical technique, you should briefly describe this technique.

The paper should be 1800-2000 words in length (not including references or title page), 1.5 inch line spacing, 1 inch margins, 12 point Arial font. Please include page numbers at the top right of each page. The references (required) and any figures are not included in the page count. Use endnotes for referencing your work. Endnotes are listed at the end of a paper, and the list of endnotes will serve as your bibliography/works cited/references. The endnotes should be inserted in the text body as superscript numbers in order of appearance. For example, if you use the same reference more than once, use the number that it was first assigned. The references should be in the CSE style. Grammar and spelling count. You should expect that your paper will be returned to you for one chance at revising the paper. During the first read through, I will stop grading after encountering five major misspellings or typos.
TITLE PAGE: The title page should include the following items in a 12 point, Arial: title, author’s name, course name, institution name, and date. These items should be centered both vertically and horizontally. The title page does not count in the page total of the document. No page number is required on the title page.

ABSTRACT: The abstract should be a referenced paragraph of 150-200 words aimed at a general chemistry audience. Begin with a 2-3 sentence introduction, followed by a one-sentence statement of the primary conclusion. Conclude with 2-3 sentences putting the findings into context.

INTRODUCTION: Provide sufficient detail concerning the background of the topic. End with a few sentences stating the purpose, problem, or goal of the review article.

MAIN BODY: The main body should review recent research findings about the topic. Relevant themes and/or research should be referenced and discussed in depth with supporting evidence, data, and analysis. Use headers to demarcate content-specific sections.

DISCUSSION: The discussion section should summarize the work, state an opinion about where the work stands in the context of the broader field, and suggest future directions.

ACKNOWLEDGEMENTS: This is an optional section. Acknowledge anyone that gave you advice or critical feedback, e.g. The author would like to thank Dana Rerio for critical reading of the manuscript. Anonymous reviewers are not acknowledged.

REFERENCES AND IN-TEXT CITATIONS: Reference should be in CSE style. Direct quotations are rarely used in scientific writing. Please paraphrase sources. The Reference page contains all of the references used in the report, including five required primary literature articles. The primary literature articles should be no more than 10 years old. The primary sources should be in bold font. Sources are listed in order that they appear in the body of the report. Please single space the Reference page. You can use the citation engine found at Citation Machine.8

TABLES AND FIGURES: Tables and figures should be embedded in the text of the report. Figures should be imported as .jpeg, .png, .tiff, or .gif files. Use separate numbering for tables and figures. Legends must accompany figures. Creation of your own summary figure(s) is encouraged.

ORDER OF REPORT
1. Title page
2. New page: Abstract
3. Introduction
4. Main Body with embedded tables and/or figures and legends
5. Discussion
6. Acknowledgements (optional)
7. New page: References

1 www.saplinglearning.com/login
2 https://www.angelo.edu/student-handbook/