

Chemistry and Biochemistry Seminar, CHEM423

Abilene Christian University
Fall 2013

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Office Hours: Monday and Friday 1:00-2:00 pm, 2:30-4:00 pm; Tuesday 9-11 am

University Mission: To educate students for Christian service and leadership throughout the world.

Chemistry and Biochemistry Department mission: The mission of the Department of Chemistry at Abilene Christian University is to prepare students for careers in chemistry, biochemistry, chemical education, and health professions by displaying high professional standards and by modeling Christian values, leadership, and service.

CHEM423 Chemistry and Biochemistry Seminar (3-3). Use of the chemical literature, both paper and electronic, as well as student presentations of one or more seminars to improve technical communication skills. Prerequisite: junior or senior standing. For majors only. **A writing-intensive course.**

Meeting time and Place: MWF 9:00-9:50 am, Foster Science 285; or as determined and announced in class.

Course Materials: Reliable and regular access to OpenClass; *Belief: Readings on the Reason for Faith* by Francis S. Collins

Purpose of Course: The purpose of this course is to challenge the student to critically analyze, reflect, present, and write about their major discipline, and the relationship between their major discipline and their faith.

Course Conduct and Format: This class will be a blend of face-to-face class meetings and online work and discussions. A detailed class schedule will be provided in OpenClass. During the course of this class, we will consider a number of faith and science issues coming from a series of assigned readings. You will occasionally be asked to respond to these readings in a collaborative online setting. During the course of this class, you will encounter topics, opinions, and arguments to which you have not been exposed to, and may disagree with. Throughout, you will be expected to show a considerate spirit of Christian inquiry. As a result, you are expected to demonstrate wisdom in this class. You are also expected to show respect for others. You are expected to listen to others' opinions, and *respectfully* engage in conversation, but not critique or judge each other.

Anticipated Course Outcomes:

- 1- Develop a research question, identify reliable chemical/biochemical literature, critically analyze the literature in order to support or refute a position and produce a research paper of substantial complexity and quality.
- 2- Communicate complicated chemical or biochemical information to a variety of audiences.
- 3- Demonstrate through reflection the development of a sense of self that integrates both science and faith.

Measurement of Course Outcomes (Assignments):

I. Capstone Research Project (2000 word minimum, ~7 pages)

In the course of this class, you will write a 2000-3000 word research paper that **makes a sustained argument** utilizing several scientific sources. The paper needs to demonstrate the following: a) the student's ability to develop a major research question, b) select critical sources (not every source should justify your conclusion), c) use proper citation style, d) cite sources when necessary, e) write with a scientific style, f) critically *synthesize* your sources to make an argument, g) make connections between the chosen topic and former learning experiences (in your science classes and other classes), and h) connect the topic with past experiences or future trends (in society or science).

A) Topic Choice- update the class Google doc entitled "Topics for Capstone Research Project" between Friday, September 6th, and Friday, September 13th. Topics are first come, first served. You must choose one of the topics on the Google doc.

B) Literature search- This is an assignment I will hand out in class. With this assignment you will demonstrate your ability to effectively utilize online resources for scientific literature searches. Due September 27th.

C) Research Proposal

The next step toward writing your research paper is the development of a proposal. The proposal is a brief justification (1-2 pages) of your research question. The proposal is due at the end of the 7th week of the semester. The proposal must satisfy the following:

1. Clearly and concisely state your topic.
2. Clearly state the research question that you seek to answer. In other words, turn your topic into a question. For example, "Olestra in Food Products" is a topic. "How is olestra metabolized in the body?" is a research question, but it is broad and does not easily lend itself to developing an argument. A better question for this assignment would be: "What is the medical effect of ingesting too much olestra, and can these issues be avoided with chemical modification of the molecule?" This question will enable you to present background information about olestra, analyze how it is metabolized in the body, look at how that metabolism affects human health, and discuss modifications of the molecule that would make it less harmful. You can develop an argument with this research question, and need to state that argument in your final paper. For instance, you could argue that "given the potential for chemical modifications to make the commonly used product olestra safer for human consumption, more research dollars need to be focused on this goal" or "olestra does not pose a significant harm to human health, therefore there should be less regulation of this product" etc, etc. **You want to make sure that you can develop an argument from your research question.** However, you do not need to state this argument in the proposal, as it should develop over time as you read the literature.
3. Briefly (1 paragraph) justify that this research question is important and relevant. To do this, demonstrate that you understand the scientific *and* societal context of your question. For instance, for the olestra example you might want to talk about the structure of olestra and how it is metabolized, as well as the relative number of food products that contain olestra.

This is a good resource about writing research questions:

<http://writingcenter.gmu.edu/?p=307>

D) Annotated bibliography- This bibliography needs to contain a minimum of 5 references (at least 3 scientific research articles and 2 review articles).

For each reference:

Use the format from the ACS style guide for the references. Underneath the reference, include a short (~75-200 word) paragraph that includes: the main argument (or thesis) of the reference, a brief description of the methods and results used to support that argument, and a short note on the usefulness of this reference for your topic.

After reading your annotated bibliography, one should be able to understand what your research question is about.

Never written an annotated bibliography before? Check out this resource:

<http://www.writing.utoronto.ca/advice/specific-types-of-writing/annotated-bibliography>

E) Rough Draft #1 and Editing- You will submit the 1st rough draft of your paper on Monday, November 4th. This rough draft will be edited for content and integration (see rubric for details) by one of your peers. Each student will receive a grade based on their editing ability as well as for turning in a rough draft. You will submit your rough draft, and edit your peer's draft in Google Docs. Use 11 pt Arial font.

F) Rough Draft #2 and Editing- You will submit the 2nd rough draft of your paper on Monday, November 18th. This rough draft will be edited for use of sources and mechanics (see rubric for details) by one of your peers. Each student will receive a grade based on their editing ability as well as for turning in a rough draft. This draft will also be a Google Doc. It should be the same document as your first draft- just modified to reflect your edits and your peer's edits. Use 11 pt Arial font.

You will only receive feedback from your peers on your rough drafts.

G) Research Paper- The research paper is due by Monday, December 2nd at class time. The paper should be 2000-3000 words and contain a *minimum* of 8 references (at least 3 scientific research articles and 2 review

articles). Keep in mind that this is a minimum, and you may need more sources to meet the requirements outlined above. Make sure that your research question and position are clearly stated in the paper.

Format of the paper:

Typed, 11 point Arial font. The final Research Paper will be submitted as a Google Doc, you do not need to turn in a hard copy. **The Document should be the SAME document as the initial rough draft.**

Include a title page. The title page should include the title of manuscript, author, author's physical contact information (Abilene Christian University; Department of Chemistry and Biochemistry; ACU Box 28132; Abilene, TX 79699-8132), and keywords).

Referencing should be cited within the paper as per the standard style used by American Chemical Society journals. For detailed instructions see *The ACS Style Guide: A Manual for Authors and Editors* by J. S. Dodd (on reserve in the library, 808.06654 A187 1997). We will also discuss the proper format in class. The bibliography/reference section should be single spaced with a blank line between each reference and should also follow the requirements in *The ACS Style Guide*.

Abstract- (200 word maximum) The abstract concisely states the principal objectives and scope of the paper. It also concisely summarizes the results and main conclusions.

Introduction- The introduction establishes the significance of the work, and thoroughly reviews the current state the field. You also need to pose the research question and convince the reader that this is an important problem that needs investigated. Finally, you need to state the argument that you are attempting to make in the paper.

Body- This is the main part of the work that includes your position towards the research question you are asking. Here, you support your argument with gathered data from your references. You must *critically analyze* the issue at hand, which means you must also present data that doesn't support your argument. Discuss both sides of the issue, but give particular stress to the side you chose.

Discussion- Reiterates the main points and conclusions of your research paper and puts them in context. Connects your findings to the broader scientific community, and the community at large. Integrates the new information you present in the paper with past learning experiences (in your science classes and other classes). The discussion is also a place to speculate on future work.

Bibliography- in proper ACS style, not annotated

H) Capstone Presentation- You will do a presentation about your research question to your peers during the last week of class. The presentation should clearly present your major research question, your argument, and supporting data from references.

II. Scientific Writing

A. Writing an abstract: Write an abstract to the journal article provided in class. The abstract must concisely summarize the results and conclusions (200 words max). Abstracts do not contain references to the literature, abbreviations, or acronyms.

B. Introduction Critique: Choose a scientific research article (not a review article), print the introduction and clearly mark or label the 3 main components (background, problem and goal). Write a ½ page critique of the introduction. Address the following in your critique:

Does the Introduction place the work in context and show its **relevance or importance**?

Is this a good Problem for study? Is it stated clearly?

Is the Goal laid out clearly?

Is the writing style easy to read? (The content may be difficult; that is not the question here.)

Are the sentences and paragraphs structured well and do the ideas follow each other logically?

Does the writing "flow", with clear progression and smooth transitions, or is it "choppy", hard to follow?

C. Write a Conclusion: Write a conclusion for the article provided in class. The Conclusion section of a scientific journal article sums up the authors' findings and helps to rationalize them or place them in context. The authors discuss the results obtained and draw conclusions or meaning from them. Usually the graphs, figures, tables, and other data presented earlier in the paper are discussed and rationalized. It is also common to address sources of error and the reasons for them in the Conclusion. Finally, authors may give suggestions for further work.

III. Presentation at the ACU Homecoming Chemistry Circus

A. Topic Choice- Choose your partner and topic from the list posted in OpenClass.

B. List of required materials- Be sure to include any equipment you will need (stir plates, etc), and the amounts of chemicals for the practice and the show. Include this information in a Google Spreadsheet shared with me.

C. Lecture Notes- You need to plan your demonstration and turn in your notes ("lecture notes") to me by Wednesday, October 16th. As you plan your demonstration, make sure that you identify with the multiple education levels represented in the audience. For instance, include information that will be understandable by children, but also go to a deeper level (high school), and finally, to a college level. Make it clear which person of your team will be speaking each part in your detailed notes.

D. The Presentation- Be sure to connect with a variety of age levels in the audience. Logically organize your presentation and use good vocal quality and enthusiasm.

E. Participation in setup and cleanup- The Chemistry Circus is Friday, October 18th. You are expected to be available from 5 pm to approximately 9:00 pm. You will need to check in with me by 5 pm and participate in any setup that needs done. After the Circus, you are expected to stay until everything is cleaned up and returned to the proper place (I expect we will be finished sometime between 8:00 and 9:00 pm). This includes everything in Walling Auditorium, and in the Chemical Stockrooms or other areas that were used for practice and setup. I know that this is Homecoming weekend and you might have other plans, but you need to make sure you reserve this block of time for completion of this assignment.

IV. Response to assigned readings in *Belief*

A. Response to prompts- Each week, you will be assigned a series of readings from the book *Belief* by Francis S. Collins. You will be given a prompt and are need to respond to this prompt via a Google Doc shared with me by **Sunday at 3 pm**. Your response should be ½-1 page (single spaced), Arial 11 point font. Occasionally, your response might be used to spark a group discussion. I will ask permission prior to sharing any of your responses, and will remove identifying information before sharing.

V. Reflection paper on faith and vocation

You will write a 750-1000 word analytical paper to be submitted to the university as your official writing sample. Use the following prompt:

Read the assigned essays (to be given out later in the semester). **Analyze the implications of holding each of these worldviews, as well as your own worldview, in your future vocation.**

Format:

Typed, 11 point Arial font, 1 inch margins, double-spaced, page numbers

Turn in 2 hard copies

Include a title page with your Banner ID and title of your paper. Do not include your name anywhere on the document. In addition to the grade you will receive from me, this paper will be read and graded by a University committee composed of professors from across campus. Only my grade will affect your course grade.

This paper is due Thursday, December 12th, by 2 pm (final exam time).

VI. Resume/CV

You need to develop a resume/CV with a cover letter. The cover letter should be in an appropriate professional format, and should be addressed to a fictional (or real) person in charge of hiring or accepting people into the

position you desire. The position can be to a company or a university graduate/medical/dental/other recruiting office. Make sure your résumé is formatted for your target audience. Turn in a hard copy of this assignment.

Grading Policies:

Detailed rubrics will be provided for the research paper, edits, presentations and reflection paper.

I. Capstone Research Project (490 pts total, or 49% of the final course grade)

- A. Choose research topic (5 pts)
- B. Literature search assignment (15 pts)
- C. Research Proposal (40 pts)
- D. Annotated Bibliography (30 pts)
- E. Rough Draft #1 and Edits (20 pts)
- F. Rough Draft #2 and Edits (20 pts)
- G. Research Paper (270 pts)
- H. Presentation (90 pts)

II. Scientific Writing (60 pts total, or 6% of the final course grade)

- A. Writing an abstract (20 pts)
- B. Introduction Critique (20 pts)
- C. Write a Conclusion (20 pts)

III. Response to assigned readings in *Belief* (140 pts or 14% of the final course grade)

IV. Reflection paper on faith and vocation (150 pts or 15% of the final course grade)

V. Presentation at ACU Homecoming Chemistry Circus (130 pts total, or 13% of the final course grade)

- A. Topic Choice (5 pts)
- B. List of required materials (20 pts)
- C. Lecture Notes (25 pts)
- D. The Presentation (60 pts)
- E. Participation in setup and cleanup (20 pts)

VI. Resume/CV (30 pts or 3% of the final course grade)

Assigned Grade	Points Accumulated
A	900-1000
B	800-899
C	700-799
D	600-699
F	599 and below

Late Work: Late assignments will only be accepted in cases of verifiable illness or emergency and must be submitted on the first day back from the absence (first *day* back, *not* first class meeting); for official school trips or interview trips, you should turn in your work *before* you leave (i.e., get it in early, not late). **A 20% deduction will be taken for each day late.** For any work not completed, a grade of "0" will be given.

Attendance: Class attendance is essential. Absences will affect your final course grade as follows:

<u># of Unexcused Absences.....</u>	<u>Points Deducted from accumulated points</u>
0 - 2.....	0
3.....	25
4.....	50
5.....	100
7 or more	Dropped from course with a WF

Excused absences include illness, family emergencies, school-sanctioned trips, etc.; be sure to make arrangements with the instructor. (For school-sanctioned trips, arrangements must be made at least two weeks in advance of the absence.)

Academic Integrity: Violations of academic integrity and other forms of cheating, as defined in ACU's Academic Integrity Policy (which includes, but is not limited to, plagiarism), involve the intention to deceive or mislead or misrepresent. Every member of the faculty, staff and student body is responsible for protecting the integrity of learning, scholarship and research. The full Policy is available here:

<http://www.acu.edu/campusoffices/studentlife/judicialDocuments/AcademicIntegrityPolicy.pdf>.

If you are not sure what constitutes plagiarism, check out the links on the bottom of this page:

http://www.acu.edu/academics/library/distance_learning_resources/Online_Researching_T.html

Any form of cheating will result in a zero on the assignment and may be reported to the ACU administration as required by the Academic Integrity Policy. A second incidence of cheating will result in an F in the class.

Abilene Christian University is dedicated to removing barriers and opening access for students with disabilities in compliance with ADA and Section 504 of the Rehabilitation Act. The Alpha Scholars Program facilitates disability accommodations in cooperation with instructors. In order to receive accommodations, you must be registered with Alpha Scholars Program, and you must complete a specific request for each class in which you need accommodations. If you have a documented disability and wish to discuss academic accommodations, please call our office directly at 325-674-2667.