

Chem 415: Advanced Biochemistry

Fall 2011

TT 11:00 am – 12:20 pm; Millington 150
Deborah C. Bebout; ISC 2039; 1-2558; dcbebo@wm.edu
Office Hours: Before & after lecture or by appointment

General course overview (from Undergraduate Course Catalog):

415. Advanced Biochemistry.

Fall (3) Bebout. Prerequisite: CHEM414 or BIOL 414.

A continuation of the study of biological processes on a molecular level begun in Chemistry 414. Biosynthesis, metabolism, bioenergetics, enzyme kinetics, metabolic control, transport mechanisms.

Specific course overview

TOPIC: Bioinorganic chemistry

FORMAT: Modified research seminar with mandatory attendance

REQUIRED TEXT: Introduction to Biological Inorganic Chemistry, Crichton, 2008

INSTRUCTOR ROLE:

- Thoughtfully design an engaging interdisciplinary course
- Preliminary lectures on fundamentals
- Select all reading materials
- Provide feedback on visual aids
- Prepare evaluative exercises
- Grading

STUDENT ROLE:

- Be present and engaged in class each day
- Review daily reading assignments *before* class in sufficient detail to complete short quiz
- Present instructor selected research articles to the class in an engaging manner on the assigned days
- Participate in class discussions
- Provide peer review of all class presentations
- Develop a thorough understanding of the methods used to study metalloproteins

Grading Policies

Your grade will be calculated as follows:

• Class participation (includes peer review and discussion contributions):	200 pts (16.7%)
• Quizzes (12 * 25 pts):	300 pts (25.0%)
• Group Presentation:	100 pts (8.3%)
• Duet Presentation:	250 pts (21.1%)
• Final:	<u>350 pts (29.2%)</u>
	Total: 1200 pts
• Extra Credit (Extra quizzes? Extra peer reviews?)	< 60 pts (<5% of total)

Due dates and deadlines in this class are real. Penalties for lateness, absences and late or missing work are as follows:

- *Lateness: 1 point per five minutes after 11:01 am (i.e. 11:03 am = -1 pt; 11:07 am = -2 pts)*
- *Absences: One unexcused absence allowed. Additional absences = -50 pts (ie. one-third letter grade reduction (A- to B+))*
- *Late homework: No credit unless approved documentable excuse. Short term illnesses will not normally be approved.*
- *Late individual presentation: 100 pts*
- *Late submission of Powerpoint draft (due electronically 38 hours before schedule presentation, i.e. 9:00 pm Sun or Tues): 10 points/hour*
- *Late peer preview (due electronically 36 hours before schedule presentation, i.e. 11:00 pm Sun or Tues): 1 point/hour*

Communications Policy: E-mail and Blackboard will be the primary means of communication used by the instructor. Students are required to provide a phone number for urgent matters pertaining to one individual.

Office Hours: All student requests for appointments outside of office hours should be made by e-mail and include three possible meeting times. Proposed meeting times should avoid times I am generally unavailable including M-F before 9:30 am; Monday after 12:30 pm; TWT after 4:30 pm; W 11:00 am to 2:00 pm; F after 3 pm. I often have meetings Tuesday 3:30-5:00 pm and Thursday 2:00-3:00 and/or 3:30-5:00 pm

ASSIGNMENTS:

Attendance & Readings: Come to class on time and prepared by doing all assigned literature and textbook reading in advance.

Excused absences include “circumstances beyond your control” cleared by the instructor beforehand (eg. wedding travel tickets purchased before August 26, 2010) and those accompanied by appropriate written documentation (such as notes from the health center *documenting a serious health issue precluding attending class*, Dean of Students, or athletic coach). Quizzes missed by students with an excused absence missing a quiz must be made up within one week. Quizzes missed for an unexcused absence cannot be made.

Group Presentation: After the introductory lectures, students will be randomly assigned to four groups to each present one research article to the class. Students will get individual feedback on their presentation to help them prepare for their individual presentation.

Duet Presentation: Random pairs of students (one trio if necessary) will be assigned a day to present a research article to the class. Individual students are expected to talk for a total of 20 - 25 minutes per PC Powerpoint presentation. If students choose to prepare their presentation using alternative hardware or software, they are responsible for making sure that the presentation can be reviewed electronically by the instructor using PC Powerpoint or in Acrobat reader (i.e. if you use Powerpoint on a MAC you have to go to a campus computing facility and make sure the presentation transfers correctly or points will be lost).

Preview of presentation expectations: The instructor will present a model of expectations for individual student presentations & discussion leading on September 1 (before the end of add/drop). The remainder of this class period will be spent discussing the strengths and weaknesses of the model presentation.

Schedule: The instructor will assign student pairs a class meeting date to present a literature article and relevant background material. Students have the opportunity to submit two blackout dates (i.e. request that they not be assigned to provide their presentation on two specific days) by 11:00 am on Thursday, September 1. Assigned literature papers will be provided to presenting students 21 days in advance of their scheduled presentation (days added for semester breaks). Electronic copies will be posted on Blackboard at least seven days before the presentation for use by non-presenting students to prepare for quizzes. Volunteer for the first student presentation(s) will be sought during the second class meetings. Remaining students will be given individual presentation date assignments on Tuesday, September 6. Any student wishing to change their presentation date must find another student(s) willing to exchange with them and switching students must each/all send me an individual e-mail indicating who they are switching with and the presentation dates agreed to no later than 5 pm on Monday, September 12. The final presentation schedule will be posted as a Blackboard course document on Tues, Sept. 13.

Optional instructor-student conferences: Student pairs are encouraged to meet with the instructor after they have done their preliminary research to resolve any unanswered questions.

Mandatory previews: Students are required to arrange for their presentations to be previewed at least **38 hours in advance** (9:00 pm Sunday or Wednesday) of scheduled presentation time by two parallel processes:

- 1) Oral & visual preview by assigned peers
- 2) Powerpoint instructor preview by submission to Blackboard File Exchange

Mandatory electronic submission of both preliminary and complete powerpoint presentation: Students must submit a complete (not necessarily final) Powerpoint presentation to the Blackboard digital dropbox at least 38 hours in advance of their scheduled presentation for instructor review. Backup submissions will be accepted by e-mail in the event that Blackboard is down. Students will lose ten points per hour or fraction thereof that submission of their powerpoint presentation is delayed. Students should expect feedback on their presentation materials within 12 hours. Within 24 hours of presentation, students are required to submit their final Powerpoint presentation for evaluation.

Optional instructor-student conferences: Students are encouraged to read their assigned articles shortly after receiving them and to complete their background research in a week. Students with questions after conducting their research should meet with the instructor. Students presenting 15 days after regularly scheduled office hours have priority.

Mandatory presentation components: Polished 20 -25 minute Powerpoint presentation/student including:

- Something unexpected yet “relevant”: Humor, comics, outtakes, poetry, models, quizzes, gimmicks, etc.
- Citations: Mention assigned paper once on title slide. Provide completed sources for any non-general knowledge not from the paper on the slide where mentioned. Use journal citations (author(s), “Title” *journal title*, **year**, *volume*, pages). Substantial content from two additional journal articles must be used (eg. figures from articles cited in the assigned paper).
- Relevant Background Material: For example, what was known about the area of research before this work (emphasizing the metal)? Background on the most important technique(s) used in the paper might be appropriate if not covered recently by another student. Comparison and contrast with systems that are somehow closely related may be appropriate.
- All Figures from the Assigned Paper: These should be obtained directly from the electronic version of the article. Your slide should indicate controlled parameters like temperature and concentration. Your presentation should explain 1) the motivation for collecting the data, 2) how the data was interpreted and, in cases where alternate interpretations were possible, why this is the best interpretation and 3) any assumptions that were made.

Peer Preview & Review:

Previewing & Leading Discussion (60 pts): Students will be assigned a peer presentation to preview. Switching assigned peer previewers requires instructor approval. Previewers must coordinate with presenters to preview the entire presentation at least

38 hours in advance (9:00 pm on Sunday or Tuesday) of its scheduled class and are required to submit the peer preview survey by e-mail to the presenter with a cc: dcbebo@wm.edu at least 36 hours in advance (11:00 pm). Previewers will lose one point per hour their submission is late unless the presenter fails to submit a complete Powerpoint presentation in a timely fashion. Presenters will lose ten points per hour unless their completed presentation is submitted to the digital drop box at least 38 hours in advance. On the day of the presentation, peer previewers will introduce the speaker, will start off the discussion following the presentation by asking a meaningful discussion question and then selecting other students to contribute their questions.

Discussion Questions (40 pts): Students will be called upon to contribute their discussion questions on a volunteer and/or random basis a minimum of four times over the course of the semester. Unprepared students will lose the opportunity to earn 10 points. Students providing questions generating lively discussion will receive full credit (10 points). Students providing questions generating minimal discussion are likely to receive less than full credit.

Feedback (normalized to a maximum of 100 pts; individual values based on number of presentations): Following each student presentation and the discussion period, students are required to thoughtfully complete a brief feedback form. Students with documentable conflicts for a particular class will have their feedback score normalized appropriately. Classes missed for undocumentable reasons will result in forfeiture of the available feedback points.

Quizzes: There will be in-class open-hand-written notes only 15 minute quizzes following each article presentation. Questions integrating the relevant chapter of the book are also planned. Articles will be posted on Blackboard at least one week in advance for review by students. Students should review the the PowerPoints posted on Blackboard before scheduling the make-up quizzes allowed within one week of excused absences.

Final Format: Individual students will select a recent bioinorganic chemistry research article that would be a good candidate for use as an assigned presentation article for CHEM 415/515 in a future year and prepare a compelling, insightful Powerpoint overview due no later than 5:00 pm Friday, December 9.

Chem 415W: Those choosing to complete the upper level writing requirement with this course must meet me before the end of the add/drop period. Students involved in undergraduate research are encouraged to complete their upper level writing requirement. I do not assist in fulfilling the writing requirement for disciplines other than chemistry.

Class Climate, Culture and the Honor System

The College of William and Mary has an Honor System detailing the academic responsibilities of all students. Students are required to work independently on post-presentation assessments. Students are required to obtain feedback from at least one other student in the class on their individual presentation.

Please let me know if you have documented disabilities that might affect your performance in this class.

I support sustainability initiatives on the WM campus. To reduce paper use, most of your course documents (including the syllabus, readings, and most assignments) will be provided on the course Blackboard page. Please try to save paper by printing double-sided and/or with two sheets per page. I will also require you to turn in your assignments electronically. For more information, please see the Sustainability at W&M website: www.wm.edu/sustainability

Valuable Campus Resources for Improving Oral Communication

The Oral Communication Studio (Swem Library, 1st Floor and Phi Beta Kappa Hall 219A): Trained oral communication consultants provide feedback to anyone preparing an oral presentation. Video cameras and instructional materials are available as well as private spaces for practicing and viewing oral presentations. Consultations and studio time should be scheduled in advance (1-3925).

Peers: Members of this class will be required to seek feedback from one another when preparing oral presentations (see below).

TENTATIVE COURSE OUTLINE:

Since this course requires individual student presentations, the course schedule will be finalized and posted on Blackboard at the end of the add/period. The only likely result of differences in course enrollment are (a) the availability of extra homework assignments for extra credit and (b) the availability of make-up presentation slots on December 2. In the event that enrollment drops below thirty students, additional peer reviews will be permitted for extra credit.

<u>Date</u>	<u>Topic</u>	<u>Crichton</u>	<u>Posted Article</u>
Aug 25	Introduction	C1	
Aug 30	Basic Coordination Chemistry	C2 & 3	
Sept 1	Sample Presentation		#1
	<i>Blackout dates due</i>		
Sept 2	<i>End of Add/Drop Period @ Midnight</i>		
Sept 6	Structure & Molecular Biology for Chemists	C4	
	<i>Preliminary student presentation assignments posted on Blackboard – swapping possible by mutual agreement</i>		
Sept 8	Metabolism & Bioenergetics	C5	
	<i>Group assignments (four groups)</i>		
	<i>Distribution of group presentation articles with suggested breakdown</i>		
Sept 13	Methods to Study Metal Ions in Biological Systems	C6	
	<i>Final student presentation assignments posted on Blackboard</i>		
Sept 15	Metal Assimilation, Transport, Storage & Homeostasis	C7-8	
Sept 20	Class time to work on group presentations		
Sept 22	Peer feedback on one slide; More class time to work on group presentations		
Sept 27	Metal Assimilation – Group Presentation		#2
Sept 29	Metal Assimilation – Group Presentation		#3
Oct 4	Transport, Storage & Homeostasis of Metal Ions – Group Presentation		#4
Oct 6	Transport, Storage & Homeostasis of Metal Ions – Group Presentation		#5
Oct 11	<i>Fall Break</i>		
Oct 13	Zinc: Lewis Acid & Gene Regulator & Iron: Essential for Almost All Life	C12 & 13	
Oct 18	Zinc – Duet presentation		#6
Oct 20	Iron – Duet Presentation		#7
Oct 25	Copper: Coping with Dioxygen & Nickel & Cobalt: Evolutionary Roles	C14 & 15	
Oct 27	SERMACS hiatus		
Nov 1	Copper – Duet presentation		#8
Nov 3	Nickel/Cobalt – Duet presentation		#9
Nov 8	Manganese, Molybdenum, Tungsten, Vanadium & Chromium	C16 & 17	
Nov 10	Metals in Brain & Neurodegenerative Diseases; Biomineralization; Medicine & Env.	C18-20	
Nov 15	Mn/Mo/W/V/Cr – Duet presentation		#10
Nov 17	Metal in Brain – Duet presentation		#11
Nov 22	Metals in Medicine – Duet presentation		#12
Nov 24	<i>Thanksgiving</i>		
Nov 29	Metals in the Environment - Duet presentation		#13
Dec 1	Approval of article for final/Make-up day		
Dec 9	Final Powerpoint Project– due electronically no later than 5:00 pm		