

# Chem 419/519: Bioinorganic Chemistry

## Fall 2018

TT 11:00 am – 12:20 pm; ISC 1111 (unless officially moved to ISC 2018)  
Deborah C. Bebout; ISC 2039; 1-2558; dcbebo@wm.edu; Office Hours: By appointment

### General course overview (from Undergraduate Course Catalog):

419/519. Bioinorganic Chemistry

Fall (3) Bebout. Prerequisite: CHEM 414 or BIOL 414 or equivalent.

An intensive examination of current research approaches in the field of bioinorganic chemistry. Students will gain experience in reading and critically analyzing articles from the primary literature.

### Specific course overview

TOPIC: Bioinorganic chemistry

FORMAT: Modified research seminar with mandatory attendance

REQUIRED TEXT: Biological Inorganic Chemistry: A New Introduction to Molecular Structure & Function, 2<sup>nd</sup> ed, Crichton, 2012

INSTRUCTOR ROLE:

- Thoughtful design of 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 or participatory exercise
- Present instructor selected research articles to the class in an engaging manner on the assigned days
- Participate in class discussions
- Provide thoughtful peer reviews
- Develop a thorough understanding of the methods used to study metal ions in biological systems

Team skills are an essential part of chemistry. The American Chemical Society (ACS) recommends learning how to interact effectively with a diverse group of peers to solve scientific problems. These team skills are as important as the chemistry content, laboratory techniques, and safety skills that you will be learning in the lab this semester. Lab partners, classmates, teaching assistants, faculty, and staff are expected to create an environment of mutual respect and cooperation. Everyone is expected to practice these team skills, conduct lab procedures safely, and maintain respect for the abilities of others.

### Grading Policies

Grades will be calculated as follows:

Component	Undergraduate (CHEM 419)	Graduate (CHEM 519)
Class participation	200 pts (16.7%)	200 pts (16.7%)
Quizzes (10ish @ 30ish pts)	300 pts (25.0%)	300 pts (25.0%)
Short Paper Group Presentation	100 pts (8.3%)	100 pts (8.3%)
Longer Paper Group Presentation	250 pts (21.1%)	250 pts (21.1%)
Individual Presentation	Not applicable	100 pts
Final	350 pts (29.2%)	250 pts
Total	1200 pts	1200 pts

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 unexcused presentation: 120 pts (ie. Full letter grade reduction)*
- *Late submission of Powerpoint draft (due electronically 38 hours in advance, i.e. 9:00 pm Sun or Tues): 5 points/hour*
- *Incomplete Powerpoint draft: up to 10% for individual at Instructor discretion*
- *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 should be made by e-mail and include three possible meeting times. Proposed meeting times should avoid times I am generally unavailable including MTWF before 9:00 am; R before class; MTWR after 4:30 pm; F after 3 pm. I have irregular meetings Tuesday 3:30-5:00 pm and Thursday 3:30-5:00 pm. Students with imminent presentations have priority.

**PRELIMINARY 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/drop period.*

**KEY:** Instructor content   Student subset content   Inclusive student participation required   Graduate student content

<u>Date</u>	<u>Topic</u>	<u>Crichton</u>	<u>Article Quiz</u>
Aug 30	Lecture: Introduction	C1	
Sept 4	Lecture: Basic Coordination Chemistry	C2 & 4	
Sept 6	Presentation: Instructor sample		#1
	<i>Blackout dates due</i>		
Sept 7	<i>End of Add/Drop Period @ Midnight; Deadline for meeting with me regarding CHEM 419W</i>		
Sept 11	Lecture: Methods to Study Metal Ions in Biological Systems <i>Preliminary trio presentation assignments on Blackboard – swapping by mutual agreement Group assignments (three groups)</i>	C6	
Sept 13	Lecture: Structure & Molecular Biology for Chemists <i>Distribution of group presentation articles with suggested breakdown</i>	C3	
Sept 18	Lecture: Metal Assimilation, Transport, Storage & Homeostasis <i>Sept 26 Discussion Assignments; Final student presentation assignments on Blackboard</i>	C7-8	
Sept 20	<b>In class coordination and questions; Review Activity</b>		
Sept 25	<b>Discussion (CJ) Metal Assimilation, Transport, Storage &amp; Homeostasis</b>		
Sept 27	Lecture: Zinc: Lewis Acid & Gene Regulator & Iron: Essential for Almost All Life	C12 & 13	
Oct 2	Metalloproteome – Group Presentation (performed by Prof. Bebout)		#2
Oct 4	Metal Assimilation – Short paper group presentation		#3
Oct 9	Transport, Storage & Homeostasis of Metal Ions – Short paper group presentation		#4
Oct 11	Transport, Storage & Homeostasis of Metal Ions – Short paper group presentation		#5
Oct 16	<i>Fall Break</i>		
Oct 18	Lecture (Clz): Copper: Coping with Dioxygen/ Nickel & Cobalt: Evolutionary Roles	C14 & 15	
Oct 23	Location dependent metal discrimination – Group Presentation (performed by Prof. Bebout)		#6
Oct 25	<b>Activity (OO): Zinc: Lewis Acid &amp; Gene Regulator &amp; Iron: Essential for Almost All Life</b>		
Oct 30	Zinc or Iron – Group Presentation (performed by Professor Bebout)		#7
Nov 1	Lecture: Metals in Medicine, Environment, Brain & Neurodegenerative Diseases	C19-23	
Nov 6	<b>Activity (CP): Copper: Coping with Dioxygen &amp; Nickel &amp; Cobalt: Evolutionary Roles</b>		
Nov 8	Zinc – Longer paper group presentation		#8
Nov 13	Iron– Longer paper group presentation		#9
Nov 15	Copper, Nickel or Cobalt – Longer paper group presentation		#10
Nov 20	Metals in Brain or Medicine – Longer paper group presentation		#11
Nov 22	<i>– No class meeting – Thanksgiving</i>		
Nov 27	<b>Activity (TB): Metals in Brain, Neurodegeneration, Biomineralization, Medicine &amp; Env.</b>		
Nov 29	Metals in Environment – Longer paper group presentation		#12
Dec 4	Graduate student individual “breakthrough” presentations		
Dec 6	<b>Activity (CTF): Semester in review</b> <i>Approval of article for final</i>		
Dec 13	<b>THURSDAY: Final Powerpoint Project– due electronically no later than 5:00 pm</b>		

*William & Mary accommodates students with disabilities in accordance with federal laws and university policy. Any student who feels they may need an accommodation based on the impact of a learning, psychiatric, physical, or chronic health diagnosis should contact Student Accessibility Services staff at 757-221-2512 or at sas@wm.edu to determine if accommodations are warranted and to obtain an official letter of accommodation. For more information, please visit [www.wm.edu/sas](http://www.wm.edu/sas).*