

**CHEM 489: SPECIAL TOPICS – METALS IN BIOLOGY AND  
MEDICINE (MiBM)**

**SPRING 2010**

TUES. & THURS. / 9:35 – 10:50 AM / ROOM – 2101

**INSTRUCTOR:** **Dr. Marcetta Darensbourg** Rm. 408. Phone # 845-5417 or 5-2981

**Office Hours:** Tuesday & Thursday 3:40 - 5 p.m.; or by appointment

**Email:** [marcetta@mail.chem.tamu.edu](mailto:marcetta@mail.chem.tamu.edu)

**WEBPAGE:** <http://www.chem.tamu.edu/rgroup/marcetta/chem489>

**TEXTBOOK:** “**Biocoordination Chemistry**,” David E. Fenton; Oxford University Press, (ISBN: 0-19-855773-6)

“**Inorganic Chemistry in Biology**,” Patricia C. Wilkins and Ralph G. Wilkins; Oxford University Press, UK (1997) (ISBN 0-19-855933-X)

**REFERENCE:** “**Principles of Bioinorganic Chemistry**,” Lippard and Berg; (ISBN: 0-935702-72-5)  
“**Bioinorganic Chemistry**,” Bertini, Gray, Lippard and Valentine; (ISBN: 0-935702-57-1)

“**Bioinorganic Chemistry: Inorganic Elements in the Chemistry of Life**,” Kaim and Schwederski; (ISBN: 0-471-94369-X)

“**Metals in Medicine**,” James C. Dabrowiak; (ISBN: 978-0-470-68197-8)  
(<http://www3.interscience.wiley.com/cgi-bin/bookhome/122688104>)

<b>GRADING:</b>	Hour Exams (2)	40%
	Presentations and homework assignments	30%
	Final Exam	30%

**EXAM SCHEDULE:** **Hour Exams:** Feb. 24, Apr. 8  
**Final Exam:** May 07, 2010; 12:30 – 2:30 PM

**COURSE DESCRIPTION:**

A case study approach will highlight the chemical basis for transition metals in biology and medicine. A foundation of structure and bonding of coordination complexes will be followed by subjects such as cis-platin (chemotherapeutic); oxygen-carriers and storage (hemoglobin and myo-globin); nickel enzymes' active sites; etc. In the following weeks, student presentations on topics of their choice.

**PREREQUISITES:** CHEM 362 – Inorganic Chemistry.



## AMERICANS WITH DISABILITIES ACT (ADA) POLICY STATEMENT

The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact the Department of Student Life, Services for Students with Disabilities, in Cain Hall or call 845-1637.

## AGGIE HONOR CODE

“AN AGGIE DOES NOT LIE, CHEAT, OR STEAL OR TOLERATE THOSE WHO DO.”

Upon accepting admission to Texas A&M University, a student immediately assumes a commitment to uphold the Honor Code, to accept responsibility for learning, and to follow the philosophy and rules of the Honor System. Students will be required to state their commitment on examinations, research papers, and other academic work. Ignorance of the rules does not exclude any member of the TAMU community from the requirements or the processes of the Honor System.

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## READING ASSIGNMENTS AND LECTURE SCHEDULE:

<u>Period</u>	<u>Topic</u>
Weeks 1-3	Overview of Metals in Biology and Medicine. Review of Transition metal complexes: Geometrical and electronic structures ; characterization and analytical tools for detection.
Week 4	Binding sites for metals in biomolecules: proteins, amino acids, DNA, porphyrins, etc.
Weeks 5-13	Case study examples: Metals in Medicine 1: Nutritional requirements; Metal Overload and Toxicity; Remediation through chelate therapy. Metals in Medicine 2: cis-Platin as chemotherapeutic agent Metals in Biology: Oxygen carriers, Oxygen storage, Oxygen control: Hemoglobin, myoglobin, P450, MMO, SODs. Organometallics (species with M-C bonds) in Biology: the Hydrogenases; Vitamin B12; F430, acetylCoA Synthase; Carbon Monoxide Dehydrogenase. CO as biomarker and as signaling agent, CORM's; NORA. Metals in Medicine 3: Ferrocifen (ferrocene-modified tamoxifen for cancer therapy)

**Final Exam: May 7, 2010; 12:30 – 2:30**