

SYLLABUS

- SEMESTER:** Fall 2003
- COURSE:** CH 565/605 Advances in Bioinorganic Chemistry/Special Topics in Inorganic Chemistry
- ROOM:** LY 331 MWF 11:00-11:50 a.m.
- INSTRUCTOR:** John B. Vincent, Lloyd Hall 251A, (205) 348-9203, jvincent@bama.ua.edu
- OFFICE HOURS:** 3:00 – 5:00 p.m. M
- TEXT:** J. A. Cowan, Inorganic Biochemistry: An Introduction, 2nd ed. Wiley-VCH, New York, 1997
- PREREQUISITE:** None

COURSE

- OBJECTIVE:** The course will be concerned with two general areas: (i) the structure, properties, function, and mode of action (where known) of several transition-metal and calcium containing proteins and enzymes (“metallobiomolecules”) and (ii) the synthesis and properties of inorganic complexes which can be considered models (or “analogues”) of the corresponding metallobiomolecule site, i.e. which duplicate the structure, geometry, ligand environment, and, in some cases, the function of the natural system.

COURSE

- CONTENT:** General Coverage

- a. Types of Metal-binding Sites and Ligands
- b. Relevant Properties of Biologically-important Transition Metals
- c. Elements of Protein Structure
- d. Metal Removal and Replacement
- e. Entatic State Hypothesis
- f. Synthetic Analogue Approach

Followed by

Specific Metallobiomolecules

- a. Hydrolases – Carboxypeptidase, Carbonic Anhydrase, Alkaline Phosphatase and Other Dinuclear Phosphatases/Hydrolases
- b. Electron Transfer Proteins – “Blue” Copper, Ferredoxins, and Cytochromes
- c. Dioxygen Transfer Proteins – Hemoglobin/Myoglobin, Hemerythrin, and hemocyanin
- d. Redox Enzymes – Cu,Zn Superoxide Dismutase, Nitrogenase, Catalase and Cytochrome P₄₅₀, “High-valent” Manganese Enzymes, Xanthine Oxidase
- e. Misc. Systems

GRADING

PROCEDURES: Exams - One examination (at around midterm) and one final examination (33% each)

Homework – Will be periodically assigned and checked, but not graded.

Written report – One written report will be assigned during the semester; the report will also be orally defended. (33%)

The student must complete **all** homework and the report and attempt all examinations in order to receive a passing grade.

ATTENDANCE: Attendance is required, but make-ups will be allowed with a valid excuse.

ACADEMIC

MISCONDUCT: All acts of dishonesty in any work will constitute academic misconduct. The Academic Conduct Disciplinary Policy will be followed in the event of academic misconduct.

DISABILITY

ACCOMMODATION: If you require disability accommodations, please contact Disability Services in the Center for Teaching and Learning (348-4285).

RELATED LITERATURE SOURCES:

“The Biological Chemistry of the Elements,” daSilva and Williams, Clarendon Press, 1991.

“Principles of Bioinorganic Chemistry,” Lippard and Berg, University Science Books, 1994.

“Bioinorganic Chemistry: Inorganic Elements in the Chemistry of Life: An Introduction and Guide,” Kaim and Schwederski, John Wiley & Sons, 1994

Special issue of “Chemical Reviews” devoted to bioinorganic enzymology, Chem. Rev. 1996, 96(7).

Articles (including reviews) in “The Journal of Biological Inorganic Chemistry”.