



## **WebCT Resources:**

I will use WebCT to deliver supplemental material for the course. In addition, I will use the WebCT utilities to manage e-mail questions, after-class discussions, and to post notes and sample exam materials.

You will be automatically enrolled in the WebCT system at the beginning of the semester. Your WebCT ID is your Banner ID and your password is your Banner password.

### **Learning Objectives for Advanced Inorganic Chemistry Chem 5520**

Students emerging from Chem 5520 should be able to:

1. Use basic aspects of group theory to describe Molecular Orbitals for small molecules and for coordination complexes
2. Use group theory to generate and factor reducible representations for molecular vibrations, rotations, translations.
2. Draw and interpret molecular orbital correlation diagrams for small molecules.
3. Describe the electronic structure of transition metal complexes using ligand field theory.
4. Apply concepts of electronic term symbols to identify the ground states of transition metal complexes.
5. Use Tanabe-Sugano diagrams to predict the number and energy of electronic transitions for metal complexes.
6. Use delocalized bonding models to describe the bonding in metals, semiconductors; describe the fundamental properties of a solid-state diode, transistor, photocell using band theory models.
7. Describe and interpret formation constants, hydration enthalpies, ligand field stabilization energies, Jahn-Teller effects chelate effect; kinetic aspects: ligand substitution and electron transfer mechanisms, fluxionality, tautomerism, and stereochemical nonrigidity.
8. Describe selected industrial catalytic processes and important industrial processes, such as hydrogenation, hydrocyanation, hydrosilylation, hydroformylation, Ziegler-Natta polymerizations, Wacker processes, Fischer-Tropsch reactions.
9. Describe current models of bioinorganic chemistry, including model system approaches, regulation and transport of ions, metalloproteins, iron-sulfur proteins, vitamin B12 and other cobalamins, and metalloenzymes.