Chemistry 402, Fall Semester 2009 Chemistry of the transition elements

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email: sadow@iastate.edu; please write "re. Chem 402" in email subject line and write your full name at the end for all email communications; messages that are incoherent or inappropriately worded or addressed are automatically filtered into junk mail and you will not receive a response.

Class Hours: Tuesday and Thursday, 9:30 am – 10:50 am
Office Hours: Tuesday and Thursday, 11:00 – 12:00 or by appointment

Textbook: Housecroft, C. E. and Sharpe, A. G. **Inorganic Chemistry, 3nd Edition**; Pearson/Prentice Hall 2008.

Chapter	Subject
20	*d*-Block chemistry: general considerations Week 1: atomic trends, exchange energy, coordination numbers,
20-21	*d*-Block chemistry: Coordination complexes Week 2: electronic bookkeeping (oxidation state, electronic configuration, Effective atomic number), and ligands Week 3,4: crystal field theory, and MO theory, microstates Week 5: Absorption spectroscopy: term symbols, Hunds rules, Orgel diagrams, Tanabe-sugano diagrams; EXAM
24	Organometallic compounds of *d*-block elements Week 6: Ligands - CO, hydride, alkyl, cyclopentadienyl Week 7: Reactions - oxidative addition, migrations, abstractions, eliminations
25	The *f*-block metals: lanthanoids and actinoids Week 8:
26	*d*-Block metal complexes: reaction mechanisms Week 9 – 10: subsitution of octahedral compounds, 4-coordinate compounds, electron transfer
27	Homogeneous and heterogeneous catalysis Week 11 – 13: olefin metathesis, nitrogen fixation, hydrogenation, acetic acid, polymerization
29	The trace metals of life Weeks 14: porphyrins, metal transport, signalling, and enzymes Week 15: catch up, presentations? and descriptive chemistry
22	*d*-Block metal chemistry: descriptive chemistry of the first row metals
23	*d*-Block metal chemistry: descriptive chemistry of the second and third row metals

Grades:
Grading Scale:

A	100 – 90%	D	69 – 60%
B	89 – 80%	F	0 – 59%
C	79 – 70%		

Grading will be weighted as follows:

Exams (3)	25
Final exam	25
In class evaluation	25
Research Papers	25
Total	**100**

Schedule of exams:
Exam 1: 17 September Exam 2: 22 October Exam 3: 19 November
Final: 15 December, 9:45 – 11:45 am

In class evaluation includes: participation in class discussions, problem sets, quizzes
Research Paper includes introductory 'hot topics', an in-depth research paper, and a poster presentation

Dates:
Background paper: 29 September
Full Paper due 10 November 2009
Poster presentation: 10 December 2009

Special Accommodations: Please contact me with any special needs or accommodations at the beginning of the semester. Those seeking assistance based on disabilities should obtain a Student Academic Accommodation Request from the Disability Resources office in 1076 Student Services Building (Ph. 515 294 6624).

Plagiarism and Academic Dishonesty
Plagiarism is the act of representing directly or indirectly another person's work as your own. It can involve presenting someone's speech, wholly or partially, as yours; quoting without acknowledging the true source of the quoted material; copying and handing in another person's work with your name on it; and similar infractions. Even indirect quotations, paraphrasing, etc., can be considered plagiarism unless sources are properly cited. Plagiarism will not be tolerated, and students will receive an F grade on the test/assignment or an F grade for the course. The use of assignments from other course, such as previously prepared term papers is also considered to be plagiarism.

Additional References on reserve in the Physical Sciences Reading Room

Greenwood, N. N. and Earnshaw, A. **Chemistry of the Elements**; Pergamon http://www.netLibrary.com/urlapi.asp?action=summary&v=1&bookid=33994 **Recommended**

Cotton, F. A. and Wilkinson, G. **Advanced Inorganic Chemistry, 5th Edition**; John Wiley & Sons, 1988. **Recommended**

Pauling, Linus **General Chemistry, 3rd Edition;** W. H. Freeman, 1970.

DeKock, R. L. and Gray, H. B. **Chemical Structure and Bonding**; University Science Books, 1989.

Kaltsoyannis, N.; Scott, P. **The f Elements**; Oxford Chemistry Primers, 76, 1999.

Mingo, D. M. P. **Essential Trends in Inorganic Chemistry**, Oxford University Press, 1998. **Recommended**