

Syllabus for
CHE 456—Inorganic Chemistry
3 Credit Hours
Spring 2003

I. COURSE DESCRIPTION

Examines bonding, structure, and reactions of coordination complexes. Discusses acid-base theories, homogeneous catalysis, and heterogeneous catalysis.

Prerequisites: CHE 212 Lecture and Lab or permission of instructor.

This special topics course is an advanced undergraduate study in inorganic chemistry. The course focuses on the electronic and structural aspects of atoms and molecules; coordination chemistry; acid/base behavior; periodic trends in atomic properties; and chemical properties and reactions of inorganic systems. The environmental, industrial and biochemical applications of inorganic molecules are discussed.

II. COURSE GOALS

The primary purpose of this course is to enable the student to strengthen, broaden, and extend the principles of atomic and molecular theory begun in general and organic chemistry courses. The student will develop understanding in the areas of: coordination complexes, the applications of group theory and symmetry to molecular bonding models, organometallic complexes, and the mechanisms of inorganic reactions.

III. COURSE OBJECTIVES

Terminal Objectives

As a result of successfully completing this course, the student will be able to do the following:

1. Write Lewis structures for selected molecules and ions.
2. Discuss periodic trends using the concepts of shielding, ionization potential and electron affinity.
3. Utilize hard/soft acid/base theory to explain selected reactions.
4. Use proper nomenclature for inorganic complexes and ligands.
5. Apply symmetry techniques in molecular orbital theory.
6. List industrial applications of organometallic complexes and discuss their bonding.

IV. TEXTBOOK

Required Textbook

Glen E. Rodgers, Introduction to Coordination, Solid State, and Descriptive Inorganic Chemistry.
Boston, Massachusetts: WBC McGraw-Hill, 1994.

V. POLICIES AND PROCEDURES

A. University Policies and Procedures

1. Attendance at each class or laboratory is mandatory at Oral Roberts University.
2. Double cuts will be assessed for absences immediately preceding or following holidays.
3. Excessive absences can reduce a student's grade or deny credit for the course.
4. Students taking a late exam because of an unauthorized absence will be charged a late exam fee.
5. Students and faculty at Oral Roberts University adhere to all laws addressing the

ethical use of others' materials, whether it is in the form of print, video, multimedia, or computer software.

6. Final exams cannot be given before their scheduled times. Students need to check the final exam schedule before planning return flights or other events at the end of the semester.

B. School and /or Department Policies and Procedures

1. The Department of Chemistry adheres to the Assessment policy concerning plagiarism as described in the 2002-2004 University Catalog p. 32, "Written assignments using sources must demonstrate ethical and accurate use of source material. Plagiarism and any unethical or inappropriate use of sources will not be tolerated."
2. The following assessment actions will be taken in the event of documented instances of plagiarism on written assignments, copying of homework assignments, or cheating during examinations:
 - a. An automatic zero will be given for the assignment or exam.
 - b. The original assignment or exam will be kept in the student file and a copy will be given to the student. This could have a negative impact on letters of reference and admission to graduate schools and other postgraduate programs.
 - c. The Department will take repeated offenses as grounds for further action.

C Course Policies and Procedures

1. Evaluation Procedures
 - a. The semester grade is calculated according to the following:

2 Hourly Exams	400 pts
Term Paper	200
Homework/Quizzes	200
Final Exam	<u>200</u>
Total	1000
 - b. Grades are based on the percentage of the earned points according to: A=90% and above, B=80-90%, C=70-80%, D=60-70%, F=59% or below.
 - c. Incompletes are given as defined in the ORU Catalog.
2. Other Policies and/or Procedures
 - a. Attendance

Missing 4 class periods will result in a grade reduction of one letter grade. Missing 6 classes will result in a grade reduction of two letter grades. Missing 8 periods will result in an automatic F. The absences allowed prior to a grade reduction are designed to allow for emergencies, illnesses, etc., and are not designed for indiscriminate use. Many students incorrectly assume that they may use these allowable absences as unexcused cuts from class. Any illnesses, emergencies, and trips are included in these allowable absences in each course. Only those absences documented with an administrative excuse will be exempt. Administrative excuses are granted only when a student is on official University business and has received approval in advance from the University's administration.
 - b. Students are expected to be prompt for class. Two tardies equal one absence. Homework is due one week after being assigned. Grades are reduced by 10% for each period the work is late.

VI. COURSE CALENDAR

Week	Topic Discussed
1	Introduction to Coordination Chemistry
2	Structures of Coordination Compounds
3	Bonding Theories of Coordination Compounds
4	Rates and Mechanisms of Coordination Compounds
5	Applications of Coordination Compounds
6	Solid State Structures
7	Periodicity Concepts
8	Hydrogen and Hydrides
9	Oxygen and Acid-Base Concepts
10	Alkaline-Earth Metals
11	Group 3A Elements
12	The Pnicogens
13	Sulfur and Acid Rain
14	Halogens and Chlorofluorocarbons
15	The Nobel Gases

VII. ASSESSMENT SUMMARY

<u>Stewart, Robert C.</u> Name of Instructor	<u>CHE 456</u> Course #	<u>Quantitative Analysis Lecture</u> Title of Course	<u>Chemistry</u> Name of Department
<p><u>MISSION</u> The lifestyle at ORU is rooted in the word "Wholeness." ORU seeks to educate the whole person, with a balanced emphasis placed on the development of the mind, spirit, and body.</p> <p><u>General Outcomes</u> 1. Spiritual Development 2. Physical Development 3. Communication 4. Analysis 5. Problem Solving 6. Valuing in Decision-Making 7. Social Interaction 8. Global Perspectives 9. Effective Citizenship 10. Aesthetic Responsiveness</p>	<p><u>MAJOR OUTCOMES</u> 1. <u>Global Perspective</u> Graduate globally minded pre-medical and pre-dental students who choose to use their profession to heal the sick around the world. Participates in summer mission team to work outside US. 2. <u>Valuing in Decision-Making</u> <u>Spiritual Development</u> Make sound scientific decisions in line with Biblical principles 3. <u>Critical Thinking Problem Solving</u> Graduate students with working knowledge concepts of chemical and marketable skills. Analyze chemical problems and offer solutions. 4. <u>Communication</u> Communicate effectively and scientifically using the language, concepts and models of chemistry. 5. <u>Analysis</u> Exhibit competency in researching the literature and use of the information to effectively analyze and interpret data and strategies.</p>	<p><u>COURSE OUTCOME</u> 1. Develop a body of inorganic chemical knowledge that can be used to analyze a given compound. 2. Solve basic inorganic chemistry problems using established concepts. 3. Acquire a vocabulary for discussion of the above areas. 4. Correlate theory with empirical data.</p>	<p><u>ASSESSMENT OF COURSE OUTCOME</u> <u>STIMULI</u> 1. 3 hourly exams 2. Graded problem sets 3. Comprehensive final exam 4. Response of students to in class teacher questioning <u>CRITERIA</u> 1. Faculty evaluation 2. Student performance on tests and future related class work 3. Student responses to teacher initiated discussion</p>