

Chemical Bonding Spring 2017

Syllabus

Course No. 01:160:361

Department of Chemistry and Chemical Biology
Rutgers, The State University of New Jersey

Time: 6.40 pm - 8.00 pm, Tues. & Thur.

Location: HLL 009, Busch Campus

Instructor: Deirdre O'Carroll, CCR 218

Contact: ocarroll@rutgers.edu

Instructor Office Hours: Tue. 3 pm - 4 pm & Thur. 3 pm - 4 pm

Course Credits: 1.5

Course Duration: January 16th 2017 to March 7th 2017

Course Overview: The course primarily covers theories of ionic and covalent bonding. Elementary molecular orbital theory will be covered and applied to simple molecules. This course is intended primarily for students majoring or minoring in Chemistry and is a pre-requisite for Inorganic Chemistry, 01:160:371.

Lectures, Notes, Assigned Readings and Assigned Homework Problems: Classes will consist of lectures in the form of slides and/or notes written on the board as well as sample problems/examples. Students should take written notes during class of any material the instructor covers on the board. Class slides will be made available in the Recourses section of the Sakai site after each class. *Lectures and class slides are not exhaustive* and students should use them *in conjunction* with the pre-assigned textbook readings, notes/examples taken during lectures and assigned homework problems to learn the course topics. Assigned readings from the textbook are associated with each lecture and are listed in the table below. Students should read the assigned section of the textbook *before* the associated lecture. The assigned homework problems are mostly taken from the textbook and will be posted on Sakai. The purpose of the assigned homework problems is to assist students in learning about the course topics and to prepare them for the quizzes and exams, which will contain questions similar to those in the assigned homework problems. The assigned homework problems will not be graded. The lecture slides and notes are copyrighted and may not be posted on any website at or outside of Rutgers without the written permission of the course instructor. Noncompliance with this policy will be treated as a violation of the Code of Student Conduct and will be referred to the Office of Student Conduct for action.

Textbook: *Shriver, Inorganic Chemistry, 5th Edition (Shriver, Atkins, Overton, Rourke, Weller, Armstrong) or 6th Edition (Shriver, Weller, Overton, Rourke, Armstrong).* Either Freeman (US) or Oxford Univ. Press (UK).

Quizzes and Exams: The grade for the course will be based on quizzes and exams. The schedule of quizzes and exams as well as the breakdown of the grading are below. Quizzes will take place at the beginning of the class and will cover the previous two lectures. Two exams will be given: Exam 1 will cover Lectures 1-6 and the associated assigned textbook readings. Exam 2 will cover Lecture 7-12 and the associated textbook assigned readings. The examinations will cover the topics in the assigned textbook readings and lecture slides and notes whether or not they are specifically covered in class. The working problems and the conceptual problems at the end of each chapter of the textbook will help you understand the chemical concepts covered in the course more effectively and will help you prepare for the quizzes and exams. Therefore, it is strongly suggested that you do all the assigned homework problems and some additional problems at the end of the relevant chapter of the textbook. Exams will be given in the same place where the classes are held and will last for the duration of the class period (i.e., 80 min.). No make up exams or quizzes will be allowed unless the absence is authenticated by means of verifiable documentation (e.g., doctors note, hospitable admittance slip, etc.). presented to the instructor at the end of a class or during the instructor's office hours.

Academic Integrity: The university academic integrity rules apply to this course and students taking this course; see <http://academicintegrity.rutgers.edu/academic-integrity-policy/>.

Grading:

Quizzes, 40 points

Exam 1, 100 points

Exam 2, 100 points

Total, 240 points

Tentative Class Schedule (subject to change) & Assigned Textbook Readings:

Class #	Date	Topic	Textbook Reading 5 th Ed. (6 th Ed)
1	Tu., Jan. 17	<u>Lecture 1:</u> Origin of the elements	1.1-1.2 (pg 1-6)
2	Th., Jan. 19	<u>Lecture 2:</u> Hydrogen and hydrogen like atoms	1.3-1.5 (1.1-1.3)
3	Tu., Jan. 24	Quiz 1 <u>Lecture 3:</u> Many-electron atoms	1.6-1.8 (1.4-1.6)
4	Th., Jan. 26	<u>Lecture 4:</u> Electronegativity, Lewis structures	1.9, 2.1 (1.7, 2.1)
5	Tu., Jan. 31	Quiz 2 <u>Lecture 5:</u> Bond energies, VSEPR	2.2-2.3, 2.13-2.16
6	Th., Feb. 2	<u>Lecture 6:</u> VB theory of diatomics	2.4-2.6
7	Tu., Feb. 7	Exam 1	All Topics of Lectures 1-6
8	Th., Feb. 9	<u>Lecture 7:</u> MO theory of diatomics	2.6-2.8
9	Tu., Feb. 14	<u>Lecture 8:</u> Solids; metals and alloys	3.1-3.8
10	Th., Feb. 16	Quiz 3 <u>Lecture 9:</u> Ionic solids; electronic structures of solids	3.9-3.15, 3.18-3.20
11	Th., Feb. 23	<u>Lecture 10:</u> Introduction to symmetry and group theory	6.1-6.2
12	Tu., Feb. 28	Quiz 4 <u>Lecture 11:</u> Heteronuclear diatomic molecules; applications of symmetry	2.9, 2.11, 6.3-6.6
13	Th., Mar. 2	<u>Lecture 12:</u> Construction of MOs and Molecular Vibrations	6.7-6.10
14	Tu., Mar. 7	Exam 2	All Topics of Lectures 7-12