Spring 2022

CHEM 412-002: Inorganic Chemistry

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NJIT New Jersey Institute of Technology

THE COLLEGE OF SCIENCE AND LIBERAL ARTS

THE DEPARTMENT OF CHEMISTRY AND ENVIRONMENTAL SCIENCE

Chemistry 412/610:
Spring 2022 Course Syllabus

COURSE INFORMATION

Instructor: Prof. Michael Eberhart
Email: michael.s.eberhart@njit.edu, Office: 351 Tiernan Hall, Phone: 973-596-6994
Office hours: Thursdays 1:00 PM-2:00 PM, other times are also available by appointment.

Course Description: Chem 412 – Inorganic Chemistry (3 credits)
Chem 610 – Advanced Inorganic Chemistry (3 credits)
The course covers structure, bonding, properties, and reactivity in inorganic chemistry. Topics covered will include inorganic structure/bonding, molecular orbitals, coordination chemistry, organometallic chemistry, catalysis, symmetry, and group theory.

Prerequisite for Chem 412: Organic Chemistry. Many concepts in this course build upon topics from courses that are expected to have been taken earlier in the chemistry curriculum.

Canvas: Important course information including announcements, assignments, exams, quizzes, and details about office hours will be posted.

Google Drive: Answer keys and lecture slides are posted on the class shared drive
https://drive.google.com/drive/folders/0AMuzciUUHHmnUk9PVA

Required Textbook:

Title	Inorganic Chemistry
Authors	Gary L. Miessler, Paul J. Fischer, and Donald A. Tarr
Edition	5th
Publisher	Pearson
ISBN	ISBN-13: 978-0-321-81105-9/ ISBN-10: 0-321-81105-4

Teamwork and Collaboration: Teamwork is an important skill for any scientist and formation of study groups is strongly encouraged. You may work with others on homework/problem sets, however you are responsible for knowing how to solve the problems on your own. Quizzes and exams are to be completed alone without assistance from others.

Grading Policy: The final grade in this course will be determined as follows:

Class Participation, Group Discussion, In Class Questions: 10%
Quizzes: 15%
Homework/Problem Sets: 15%
Midterm 1: 15%
Midterm 2: 15%
Final Exam: 30%

Your letter grade is assigned based on the following tentative curve:

Chemistry 412		Chemistry 610	
A	100-90%	A	100-90%
B+	89-87%	B+	89-87%
B	86-80%	B	86-80%
C+	77-79%	C+	77-79%
C	76-70%	C	76-70%
D	60-69%	F	<70%
F	<60%		

Homework and Problem Sets: Homework is an expectation of the course. Before each exam, a comprehensive problem set will be distributed through Canvas and is intended as exam preparation. Additional smaller homework assignments may be assigned from time to time.

Quizzes: Quizzes will be graded similarly to exams but are shorter, given more frequently, and make up a smaller percentage of your grade. The two lowest quiz scores will be dropped from your grade calculation.

Exams: There will be two midterm exams held during the semester and one comprehensive final exam. The following exam periods are tentative and therefore possibly subject to change:

Midterm Exam I	Monday, February 28th
Midterm Exam II	Monday, April 11th
Final Exam Period	May 6th – May 12th

Exam/Quiz Proctoring: Exams and Quizzes may be administered in person using pencil and paper or online at the instructor's discretion. If there are any online exams or quizzes, they will be proctored using Respondus Monitor/Lockdown Browser within Canvas. Online proctoring will require a computer with a webcam. Drawings may be required for some problems; drawings should be scanned and uploaded to Canvas promptly after finishing the exam. Exams and quizzes must be started on time.

Topics Covered:
Introduction to Inorganic Chemistry (Chapter 1)
Atomic Structure as it pertains to bonding in Inorganic Chemistry (Chapter 2.2, 2.3)
Basic Structure and Bonding (Chapter 3)
Symmetry and Group Theory (Chapter 4)
Molecular Orbitals (Chapter 5)
Acid-Base and Donor-Acceptor Chemistry (Chapter 6)

Main Group Chemistry (Chapter 8)
Coordination Chemistry (Chapters 9-12)
Organometallic Chemistry (Chapters 13,14)
If time permits, additional topics may also be covered.

Learning Outcomes:
-Predict structure, physical properties, and chemistry of coordination compounds
-Predict structure, physical properties, and chemistry of organometallic compounds
-Apply group theory to predict IR and Raman active vibrational modes
-Learn how to apply symmetry and group theory to describe orbital interactions in bonding
-Explain the bonding in inorganic compounds
-Describe common reaction mechanisms of coordination and organometallic complexes
-Explain experimental techniques and strategies to elucidate reaction mechanisms and understand experimental strategies that might be used to control chemical reactions on the basis of mechanistic understanding

POLICIES

All CES students must familiarize themselves with, and adhere to, all official university-wide student policies. CES takes these policies very seriously and enforces them strictly.

Academic Integrity is the cornerstone of higher education and is central to the ideals of this course and the university. Cheating is strictly prohibited and devalues the degree that you are working on. As a member of the NJIT community, it is your responsibility to protect your educational investment by knowing and following the academic code of integrity policy that is found at: http://www5.njit.edu/policies/sites/policies/files/academic-integrity-code.pdf.

It is my professional obligation and responsibility to report any academic misconduct to the Dean of Students Office. Any student found in violation of the code by cheating, plagiarizing or using any online software inappropriately will result in disciplinary action. This may include a failing grade of F, and/or suspension or dismissal from the university. If you have any questions about the code of Academic Integrity, please contact the Dean of Students Office at dos@njit.edu

Makeup Exam Policy: There will normally be NO MAKE-UP QUIZZES OR EXAMS during the semester. In the event that a student has a legitimate reason for missing a quiz or exam, the student should contact the Dean of Students office.

Attendance Policy: Each class is a learning experience that cannot be replicated through simply "getting the notes." Active participation and discussion are expected.

Class Recording Policy: Students are expected to respect their fellow students' privacy and freedom to learn without disruption. Unauthorized recording of class is prohibited and subject to sanctions as outlined by the NJIT Code of Student Conduct.

ADDITIONAL RESOURCES

Accommodation of Disabilities: Office of Accessibility Resources and Services (*formerly known as Disability Support Services*) offers long term and temporary accommodations for undergraduate, graduate and visiting students at NJIT.

If you are in need of accommodations due to a disability please contact Chantonette Lyles, Associate Director at the Office of Accessibility Resources and Services at 973-596-5417 or via email at lyles@njit.edu. The office is located in Fenster Hall Room 260. A Letter of Accommodation Eligibility from the Office of Accessibility Resources Services office authorizing your accommodations will be required.

For further information regarding self-identification, the submission of medical documentation and additional support services provided please visit the Accessibility Resources and Services (OARS) website at:
https://www.njit.edu/studentsuccess/accessibility