

Inorganic Chemistry II (21:160:413)

Fall 2022, Rutgers University-Newark (Rev.2 8/15/22)

Instructor: Prof. Georgiy Akopov

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Class Time and Location: Monday/Wednesday 4:00 PM – 5:20 PM, Smith 240

Important Dates

Last day to drop without “W” grade: **9/15/22**

Last day to drop course and receive “W” grade: **10/31/22**

FINAL Exam: Wednesday, December 21st, 2022 (12/21/22) 3:00 – 6:00 PM

Office Hours

Tuesday/Thursday 2:00 PM – 3:00 PM, Olson Hall, Room 342. If these time slots do not work, you can arrange additional office hours with a prior notification by email.

(In case we go to remote learning sometime in the Fall Semester, the office hours will be via Rutgers Webex application <https://rutgers.webex.com>)

Overview

This course will cover classical and modern aspects of coordination chemistry, bonding, and reactivity of transition metals and main group elements. Fundamental principles such as metal-ligand bonding, charge, spin state, and orbital analysis will be presented. The coordination of different ligand classes to transition metals will be covered, including reactivity trends. Particular emphasis will be placed on organometallic chemistry, small molecule activation and catalysis.

Textbooks

Catherine E. Housecroft and Alan G. Sharpe. *Inorganic Chemistry*, 5th Edition; Pearson, 2018. (4th Edition is nearly identical and also acceptable).

Tentative Class Schedule

Date	Chapters*	Topics Covered
Sep 7, 12	19	<i>d</i> -Block Chemistry: General Considerations
Sep 14, 19	2, 5	Bonding and MO Theory
Sep 21, 26, 28 Oct 3, 5, 10	20	<i>d</i> -Block Chemistry: Coordination, Bonding, and Electronic Structure
Oct 12, 17	26	<i>d</i> -Block Chemistry: Reaction Mechanisms
Oct 19		Midterm (1 hour 20 minutes)
Oct 24, 26, 31 Nov 2, 7, 9	11, 12, 15, 23	Group 1, 2, 15 elements: selected topics; <i>s</i> - and <i>p</i> -block Organometallics
Nov 14, 16	8, 10	Redox chemistry and Hydrogen
Nov 24 - 27		Thanksgiving Break (no class on Nov 23rd)
Nov 21, 28, 30 Dec 5, 7, 12, 14	24, 25	<i>d</i> -block Organometallic Chemistry and Catalysis
Dec 21		Final Exam (3 hours) 3:00 – 6:00 PM

*Chapter numbers are the same for the 4th Edition.

Lectures and Course Material

Everyone is expected to attend in-person lectures at the scheduled class times. If this is not possible due to situations beyond your control, please notify me as soon as possible. Lectures and all other course material (assignments, exams, grades) will be managed through Canvas or in class handouts.

Grading and Evaluation

Weighted Distribution (%)		Grade Breakdown (%)	
Homework	30	A	85 - 100
Quizzes	10	B+	80 - 84
Midterm	20	B	75 - 79
Final Exam	40	C+	70 - 74
Total	100	C	65 - 69
Bonus Assignment	5	D	60 - 64
		F	< 60

The final grade will be calculated using (Midterm + Final) OR (1.5 x Final), whichever is greater, allowing you to improve your grade by doing better on the Final over the Midterm.

- **Homework (30%)**
Assignments (6 in total, 5% each) will be related to subjects covered in class and in the relevant textbook chapters. Assignments must be **hand-written** and paper copies must be submitted **at the beginning of class** on the due date.
- **Quizzes (10%)**
Short quizzes (25-30 min, 2 in total, 5% each) will be held during the class period. The upcoming quiz will be announced one week beforehand. Reviewing lecture materials and relevant book chapters will be very beneficial.
- **Midterm (20%)**
The midterm exam will be held during the regular class period. The exam will consist of questions that typically require a detailed written answer and/or some sketching (e.g. MO diagrams, metal complexes, organic and inorganic compounds). A periodic table and any relevant formulas will be provided on the exam handout. **Makeup exams will not be allowed unless there is a legitimate written reason in accordance with University Policy.**
- **Final (40%)**
The final exam (3 hours long) will be held at the end of the semester and cover lecture material from the course. A periodic table and any relevant formulas will be provided on the exam handout.
- **Bonus Assignment (5%)**
You can receive bonus 5% on your final grade by doing one assignment and submitting it on Canvas any time **before the final exam on December 21st**:
 - **Research Article:** For an article on a topic related to transition metal chemistry in the *Inorganic Chemistry* (<https://pubs.acs.org/journal/inocaj>) journal, write a 1 - 2 page summary (can include drawings) of the article and statement of why you chose this particular manuscript. Details are provided on Canvas.

Academic Integrity:

As an academic community dedicated to the creation, dissemination, and application of knowledge, Rutgers University is committed to fostering an intellectual and ethical environment based on the principles of academic integrity. Academic integrity is essential to the success of the University's educational and research missions, and violations of academic integrity constitute serious offenses against the entire academic community. The entire Academic Integrity Policy can be found here: <http://academicintegrity.rutgers.edu/>

Your health and well-being matter, and Rutgers has put in place a number of resources that are intended to help students through the challenges that might emerge during these times. Information on many of these resources appears below. Please let me know immediately if you are experiencing circumstances that are negatively impacting your academic performance. I also strongly encourage you to contact your academic advisor.

Accommodation and Support Statement:

Rutgers University Newark (RU-N) is committed to the creation of an inclusive and safe learning environment for all students. RU-N has identified the following resources to further the mission of access and support:

- **Absences:** All students are responsible for timely notification of their instructor regarding any expected absences. The Division of Student Affairs can provide assistance for absences related to religious observance, emergency or unavoidable conflict (illness, personal or family emergency, etc.) Students should refer to the University's Course Attendance policy (10.2.7), for complete expectations and responsibilities. The office can be contacted at: (973) 353-5063 or deanofstudents@newark.rutgers.edu.
- **Disabilities:** The Office of Disability Services (ODS) works with students with medical, physical, and/or mental conditions who encounter disabling barriers in order to determine reasonable and appropriate accommodations for access. Students who have completed the process with ODS and have approved accommodations are provided a Letter of Accommodation (LOA) specific to each course. To initiate accommodations for their course students must both provide the LOA to and have a conversation with the course instructor about the accommodations. More information can be found at ods.rutgers.edu. Contact ODS: (973) 353-5375 or ods@newark.rutgers.edu.
- **Temporary Conditions/Injuries:** The Division of Student Affairs can assist students who are experiencing a temporary condition or injury (broken or sprained limbs, concussions, or recovery from surgery). Students experiencing a temporary condition or injury should submit a request for assistance at: <https://temporaryconditions.rutgers.edu>.
- **Pregnancy:** The Office of Title IX and ADA Compliance is available to assist students with any concerns or potential accommodations related to pregnancy. Students may contact the office at (973) 353-1906 or TitleIX@newark.rutgers.edu.
- **Gender or Sex-Based Discrimination or Harassment:** The Office of Title IX and ADA Compliance can assist students experiencing any form of gender or sex-based discrimination or harassment, including sexual assault, sexual harassment, relationship violence, or stalking. Students can report an incident to the office at: (973) 353-1906 or TitleIX@newark.rutgers.edu. Incidents may also be reported by using this [RUNReportingForm](#). For more information, students should refer to the University's Title IX Policy and Grievance Procedures located at <https://uec.rutgers.edu/wp-content/uploads/60-1-33-current-1.pdf>.

- **Interpersonal Violence:** The Office for Violence Prevention and Victim Assistance (VPVA) can provide any student with confidential support. The office does **not** have a reporting obligation to Title IX. Students can contact the office by calling (973) 353-1918 or emailing run.vpva@rutgers.edu. There is also a confidential text-based helpline available to students; students can text (973) 339-0734 for support. Students do not need to be a victim/survivor of violence; any student can receive services, information and support.
- **Crisis and Concerns:** The Campus Awareness Response and Education (CARE) Team works with students in crisis to develop a plan of support plan and address personal situations that might impact their academic performance. Connect with the CARE Team by using the following link: [RUNCARE](#) or emailing careteam@rutgers.edu.
- **Stress, Worry, or Concerns about Well-Being:** The Counseling Center has confidential therapists available to support students. Students should reach out to the Counseling Center to schedule an appointment: counseling@newark.rutgers.edu or (973) 353-5805. If students are not quite ready to make an appointment with a therapist but are interested in self-help, check out *Sanvello* for an easy, web-based approach to self-care and support. Visit <https://my.rutgers.edu/>, click on Sanvello: Wellness @ RUN, and log in with your netid to begin your journey toward wellness.
- **Emergencies:** Call 911 or contact Rutgers University Police Department (RUPD) at (973) 353-5111.

Learning Resources:

- Rutgers Learning Center (tutoring services):
Tutoring available in a variety of math, science, technology, and business courses. Contact the Learning Center to determine whether tutoring is available for a specific course.
Room 140, Bradley Hall (973) 353-5608
learning.center@newark.rutgers.edu
<https://sasn.rutgers.edu/student-support/tutoring-academic-support/learning-center>
- Writing Center (tutoring and writing workshops) (973) 353-5847
nwc@rutgers.edu
<https://sasn.rutgers.edu/student-support/tutoring-academic-support/writing-center>

Technology/Internet Resources for Students:

- <https://myrun.newark.rutgers.edu/covid-technology-resources>
- <https://mytech.newark.rutgers.edu/tlp>