

Inorganic Chemistry – CHM 331

Fall 2018 Semester

Instructor: Dr. Gabriel Caruntu
E-mail: carun1g@cmich.edu

Office: Dow 361
Office phone: 989-774-3863

Office Hours: by appointment (or stop by whenever my door is open). I am usually in the office/lab between 9:00 a.m. and 5:00 pm daily.

Class Schedule: 1:00-1:50 pm Tuesdays and Thursdays (Dow 136, class lecture, both sections)

Lab Schedule: **either** 2:00 – 5:50 pm Tuesdays **and** Thursdays → both sections meet in Dow 136 for pre-lab lecture/quiz followed immediately by lab in Dow room 238

Required Class Text: Geoff Rayner-Canham & Tina Overton, *Descriptive Inorganic Chemistry*, 5th or 6th edition, 2014 • ISBN-13: 978-1-4292-9906-0, • ISBN-10: 1-4292-9906-1

Recommended Text: Duward Shriver, Mark Weller, Tina Overton, Jonathan Rourke, Fraser Armstrong, *Inorganic Chemistry*, 6th Edition, W. H. Freeman & Comp. 2014 • ISBN-13: 978-1-4641-2557-7, • ISBN-10: 1-4641-2557-0

Required Laboratory Materials: Approved safety goggles
Laboratory Notebook with carbon copy pages

Other Useful Items: Scientific Calculator
Periodic Table

Grading:	Laboratory Reports	20 %
	Exam 1	15 %
	Exam 2	15 %
	Exam 3	15 %
	Homework	15 %
	Paper Presentation	5 %
	Final Comprehensive Exam	15%

You are responsible for **all** material in an assigned chapter, regardless of what topics are directly addressed in the lectures.

Exams: There will be three exams, each given in class during the regularly scheduled class lecture time. In general, you will be allowed to use calculators, model kits and periodic tables on exams; other resources that you may use will be announced prior to the exam. While the order of topics, and therefore the material covered on the exam, may be altered slightly, each exam will concentrate on the material covered since the previous exam. The final exam will be given during the regularly scheduled exam period (Wednesday, December 14th noon-2 p.m.) in the classroom. All exams will cover both lecture and laboratory material. Only non-graphing calculators are allowed for exams.

Tentative Exam Schedule:

Exam 1	Sept. 20 th	Covers <i>class & laboratory</i> material since the beginning of the semester
Exam 2	Oct. 18 th	Covers <i>class & laboratory</i> material since Exam 1
Exam 3	Dec 6 th	Covers <i>class & laboratory</i> material since Exam 2
Final Exam	Dec. 13 th	Cumulative over the entire course

Extra Credit: You may *not* earn extra credit in this course.

Late work: Late homework assignments will not be accepted, regardless of the excuse. Any homework assignment not handed in by the due date and time will be scored as a 0. You may e-mail assignments to me before the due date for credit if you are going to be absent from class.

Late laboratory reports will be marked down 10 % per day (or part thereof). The period between Friday at 2 p.m. and Monday at 7:30 a.m. counts as a single late “day”. All reports are due at the beginning of the lab period according to the schedule below.

You must give your presentations on the days assigned or it will count as a 0, regardless of the excuse.

Other General Policies:

1. Attendance is expected for all scheduled laboratory and lecture periods.
2. It is expected that you will read the appropriate sections of the text *before* class and that you will come to prelab having read the experiment and any assigned background information.
3. It is strongly recommended that you do the assigned homework problems promptly so that you have time to seek help if needed.
4. It is your responsibility to review, if necessary, some concepts covered in general chemistry and/or math courses. Your own general chemistry textbook or calculus text should be suitable for this purpose. If you have difficulty, please come in and see me as soon as possible. Do not fall behind because of a math or general chemistry difficulty!
5. Academic dishonesty (i.e., cheating in any form either in lecture or in the laboratory, on tests, homework assignments, or laboratory reports) will result in assignment of a 0 for that assignment and an inability to withdraw from the course. Please see https://www.cmich.edu/office_president/ombuds/Documents/ACADEMIC_INTEGRITY_POLICY.pdf#search=academic%20dishonesty for the policy on Academic Integrity at CMU.
6. Make-up and/or late course or laboratory work will be accepted only after obtaining *pre*-approval from the instructor. Since this course has only two scheduled laboratory periods per week, making up labs will be inconvenient for both you and the instructor. As a result, you should not miss a lab except in case of a genuine illness or emergency. Documentation of the illness or emergency will be necessary to gain approval for make-up work. (A death certificate, police report, or doctor’s note are examples of appropriate documentation.)
7. Incompletes (“I”) will not be given except in extreme extenuating circumstances that meet University criteria and not unless we have agreed upon how it will be removed. In the absence of such circumstances and discussion, any piece of work not completed (including homework, exams, or labs) will be counted as a zero in determining the final grade.
8. CMU provides students with disabilities reasonable accommodations to participate in educational programs, activities or services. Students with disabilities requiring accommodation to participate in class activities or meet course requirements should first register with the office of Student Disability Services, and then contact the instructor as soon as possible.

Everything on this syllabus and in this course is subject to change at the discretion of the instructor.

*******Important Note:** If you are or become pregnant during the course of this semester, please notify the instructor immediately! Because certain chemicals may harm a developing fetus, you are urged to discuss with the instructor what accommodations can be made for the laboratory component of the course.*****

CHM331 Fall 2018 Laboratory Schedule

Meet in Dow 136 for pre-lab lecture/quiz followed by lab in Dow room 238
<p><i>Tuesday, August 28 or Thursday, August 30th</i> Lab experiment to be performed: <i>Check-in.</i> EXPERIMENT I: Preparation of Nitrogen Triiodide Ammoniate: (An Explosive).</p>
<p><i>Tuesday, September 4 or Thursday, September 6</i> Lab report due: Experiment I: Preparation of Nitrogen Triiodide Ammoniate: (An Explosive) lab report due at the beginning of your scheduled lab period. Lab experiment to be performed: EXPERIMENT II: Synthesis of 5-Anilino-1,2,3,4-thiatriazole.</p>
<p><i>Tuesday, September 11 or Thursday, September 13</i> Lab report due: EXPERIMENT II: Synthesis of 5-Anilino-1,2,3,4-thiatriazole lab report due at the beginning of your scheduled lab period. Lab experiment to be performed: EXPERIMENT III: Synthesis of Tin (IV) Iodide. Also performing Experiment V, Week 1 lab this week. EXPERIMENT IV: Synthesis of Bis(ethylenediamine)-di-N-thiocyanato-nickel(II) and its Benzene Inclusion Compound.</p>
<p><i>Tuesday, September 18 or Thursday, September 20</i> No lab this week-You have an exam in lecture on Thursday No lab report due this week.</p>
<p><i>Tuesday, September 25 or Thursday, September 27</i> Lab report due: Experiment III: Synthesis of Tin (IV) Iodide lab report due at the beginning of your scheduled lab period. Lab experiment to be performed: EXPERIMENT V: Preparation and Magnetic Properties of Magnetite and Zinc Ferrite. (Week I)</p>
<p><i>Tuesday, October 2 or Thursday, October 4</i> No lab report due this week. Lab experiment to be performed: EXPERIMENT V Continued: Preparation and Magnetic Properties of Magnetite and Zinc Ferrite. (Week II)</p>
<p><i>Tuesday, October 9 or Thursday, October 11</i> Lab report due: Experiment IV: Preparation and Magnetic Properties of Magnetite and Zinc Ferrite lab report due at the beginning of your scheduled lab period. Lab experiment to be performed: EXPERIMENT VI: Determination of Unpaired Electrons in Transition Metal Complexes by Magnetic Susceptibility</p>

Tuesday, October 16 or Thursday, October 18

No lab this week- You have an exam in lecture on Thursday

No lab report due this week.

Tuesday, October 23 or Thursday, October 25

Lab report due: EXPERIMENT VI: Determination of Unpaired Electrons in Transition Metal Complexes by Magnetic Susceptibility lab report due at the beginning of your scheduled lab period.

Lab experiment to be performed: EXPERIMENT VII: Synthesis of *trans*-Dichlorobis(ethylenediamine)-cobalt(III)chloride; Investigation of Aqueous Stability.

Also performing Experiment IV, Week 2 lab this week. EXPERIMENT IV (*continued*): Synthesis of Bis(ethylenediamine)-di-N-thiocyanato-nickel(II) and its Benzene Inclusion Compound.

Tuesday, October 30th or Thursday, November 1

Lab report due: EXPERIMENT VII: Synthesis of *trans*-Dichlorobis(ethylenediamine)-cobalt(III)chloride; Investigation of Aqueous Stability lab report due at the beginning of your scheduled lab period.

Lab experiment to be performed: EXPERIMENT VIII: Preparation of (-)- and (+)-Tris(1,10-phenanthroline)-iron(II) Perchlorate Trihydrate; Determination of Optical Rotation.

Tuesday, November 6 or Thursday, November 8

Lab report due: EXPERIMENT VIII: Preparation of (-)- and (+)-Tris(1,10-phenanthroline)-iron(II) Perchlorate Trihydrate; Determination of Optical Rotation lab report due at the beginning of your scheduled lab period.

Lab experiment to be performed: EXPERIMENT IX: Determination of Crystal Field Splitting in Cr(III) Complexes. Synthesis of Potassium Tris(oxalato)chromate(III) Trihydrate.

Tuesday, November 13 or Thursday, November 15

Lab report due: EXPERIMENT IV: Synthesis of Bis(ethylenediamine)-di-N-thiocyanato-nickel(II) and its Benzene Inclusion Compound lab report due at the beginning of your scheduled lab period.

Lab experiment to be performed: EXPERIMENT IX (*continued*): Determination of Crystal Field Splitting in Cr(III) Complexes. Synthesis of Tris(2,4-pentanedionato)-chromium(III).

Tuesday, November 20 or Thursday, November 22

Thanksgiving recess, no lab this week

No lab report due this week.

Tuesday, November 27 or Thursday, November 29

Lab report due: EXPERIMENT IX: Determination of Crystal Field Splitting in Cr(III) Complexes lab report due at the beginning lecture on Tuesday (those who normally have Tuesday lab) or Thursday (those who normally have Thursday lab). **Lab experiment to be performed:** EXPERIMENT X Preparation of Ferrocene. **Check-out**

Tuesday, December 5 or Thursday, December 7

No lab this week- You have an exam in lecture on Thursday

Thursday, December 13

Final Exam noon – 12:00-1:50 p.m.

CHM331 Fall 2018 Tentative Lecture Schedule

<u>Tuesday</u>	<u>Thursday</u>
August 28 Chapter 1–The Electronic Structure of the Atom: A Review	August 30 Chapter 1–The Electronic Structure of the Atom: A Review Continued
September 4 Chapter 2–The Structure of the Periodic Table	September 6 Chapter 2–The Structure of the Periodic Table <i>Continued</i>
September 11 Chapter 3–Covalent Bonding and Molecular Spectroscopy	September 13 Chapter 3–Covalent Bonding and Molecular Spectroscopy <i>Continued</i>
September 18 Chapter 4–Metallic Bonding, Alloys and Composites	September 20 Exam #1–Covers material since the beginning of the semester!
September 25 Chapter 4–Metallic Bonding, Alloys and Composites <i>Continued</i>	September 27 Chapter 5–Ionic Bonding and Solid State Behavior
October 2 Chapter 5–Ionic Bonding and Solid State Behavior <i>Continued</i>	October 4 Chapter 6–Why Compounds Exist – Inorganic Thermodynamics
October 9 Chapter 6–Why Compounds Exist – Inorganic Thermodynamics <i>Continued</i>	October 11 Chapter 7–Solvent Systems and Acid-Base Behavior
October 16 Chapter 7–Solvent Systems and Acid-Base Behavior <i>Continued</i>	October 18 Test #2 –Covers material since test #1
October 23 Chapter 7–Solvent Systems and Acid-Base Behavior <i>Continued</i>	October 25 Chapter 8–Oxidation and Reduction
October 30 Chapter 8 – Oxidation and Reduction <i>Continued</i>	November 1 Chapter 8–Oxidation and Reduction <i>Continued</i>
November 7 Chapter 9–Periodic Patterns	November 8 Chapter 10–Hydrogen
November 14 Chapter 19 –Transition Metal Complexes	November 15 Chapter 19–Transition Metal Complexes
November 20 Elements of Group Theory and Molecular Symmetry (Chapter 6-Shriver, Weller, Overton)	November 22 Thanksgiving Break –No class
November 27 Elements of Group Theory and Molecular Symmetry (Chapter 6-Shriver, Weller, Overton)	November 29 5-minute paper presentations for Tuesday Lab students
December 4 5-minute paper presentations for Tuesday Lab students	December 6 Exam #3–Covers material since test #2!

Note: Additional materials for the Elements of Group Theory and Molecular Symmetry will be provided by the instructor. You do not need to buy or rent the book!