



**CHE 252 Inorganic Chemistry I (3)
Winter 2013**

COURSE DESCRIPTION:

CHE 252 Inorganic Chemistry I: Main Group Elements (3–3) A

This course presents the chemistry of inorganic compounds of the main group elements – their structure and bonding, symmetry elements and groups, coordination compounds and complexes, as well as extension of concepts covered in general chemistry such as the concept of hard and soft acids.

Prerequisites: CHE 101 and CHE 103

LECTURE AND LABORATORY INSTRUCTOR: Dr. Ross Gilmore

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Moodle access : <http://moodle.ambrose.edu/course/index.php>
Office: room: G2202, music wing
Office Hours: Wed 11:00 a.m. -12:30 pm or by appointment

LECTURE AND LAB SCHEDULE:

Lecture:

Wednesday and Friday 9:45 am – 11:00 am Room: A2210

Lab:

Monday 2:30 – 5:15 pm Room: A2151

REQUIRED TEXTS:

Inorganic Chemistry, 4/E, Catherine Housecroft, Pearson Education, ISBN-10: 0273742752 • ISBN-13: 9780273742753

Ambrose University Inorganic Chemistry Lab Manual, (see instructor for access)

Other Useful Texts:

Inorganic Chemistry, Miessler and Tarr, 4th Ed. 2011, Prentice Hall
Inorganic Chemistry, House, J., 2nd Ed, Academic Press 2013
Chemistry, Zumdahl and Zumdahl, 8th Ed., Brooks/Cole, Cengage2010

REQUIRED MATERIALS:

Lab coat, lab notebook, lab glasses/goggles, Molecular Model kit.

SUPPLEMENTARY MATERIALS:

- http://chemwiki.ucdavis.edu/Inorganic_Chemistry
- <http://telem.openu.ac.il/symmetry/>
- <http://faculty.otterbein.edu/DJohnston/symmetry/tutorial/index.html>
- <http://www.rsc.org/pdf/tct/df-Chapter.pdf>
- <http://csi.chemie.tu-darmstadt.de/ak/immelscript/redirect.cgi?filename=http://csi.chemie.tu-darmstadt.de/ak/immelscript/tutorials/symmetry/index.html>
- http://www.ch.ic.ac.uk/vchemlib/course/mo_theory/
- <http://bilbo.chm.uri.edu/CHM401/lectures.html>
- http://www.ch.ic.ac.uk/harrison/Teaching/Symmlab/IC_symmlab_0506.pdf
- <http://chemistry.umeche.maine.edu/CHY556/Salcs.html>
- http://depts.washington.edu/chemcrs/bulkdisk/chem162A_sum06/
- <http://www.chem.ualberta.ca/~inorglab/NAirhlp/index.htm>

Mostly the resources above are focused on symmetry and molecular orbital theory. Some general inorganic chemistry is included. These are all excellent links. The [faculty.otterbein](http://faculty.otterbein.edu) link is an absolute supplement to this course. You will need to use this site to prepare for assignments.

PRE-REQUISITES:

Chemistry 101 (General Chem I) and 103 (General Chem II) are required. Organic Chemistry I and Organic Chemistry II are preferred prerequisites but not requirements. Linear Algebra and Calculus I are also useful.

COURSE OVERVIEW:

I Theoretical background

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|---|---------------|
| 1. Bonding, Molecular geometry, LCP theory | Ch. 2 & 5 |
| 2. Symmetry and an introduction to group theory | Ch. 3 |
| 3. Molecular Orbital theory | Ch. 5 & 6 |
| 4. Spectroscopy | Ch 4 |
| 5. Coordination Chemistry and Complexes | Multiple Ch's |

II Survey of the Main-Group Elements

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| 1. Hydrogen and the hydrides | Ch. 10 |
| 2. Redox reactions | Ch. 8 |
| 3. Group 18 | Ch. 18 |
| 4. Group 17 | Ch. 17 |
| 5. Group 13 (mainly discussion of boron chemistry) | Ch. 13 : |
| 6. Main-group metals and main-group organometallic compounds | 13, 14, 15, 16 |

Other chapters and sections may be covered to varying degrees and the above is only a rough guideline.

COURSE OBJECTIVES:

After completion of this course students should have an understanding of Molecular Orbital Theory, Valence Bond Theory, factors affecting molecular reactivity, the importance of molecular geometry with respect to reactivity and the relation of structure to spectroscopic properties. In addition students will acquire a basic background in symmetry theory with some feel for its relevance to molecular orbital theory.

Beyond the theoretical, students will develop a knowledge of basic spectrometric techniques and their practical application. In the latter half of the course the chemistry of specific elements and their compounds will be examined while we explore the concepts of coordination chemistry and

organometallics. This should provide the student with a representative exposure to and understanding of key inorganic chemical reactions and associated processes in biology and industry. Hopefully, we will have time to investigate inorganic catalysis with a focus on practical design of catalysts and emerging branches of inorganic chemistry.

EVALUATION:

Takehome Assignments (four of them)	10% (2.5% each)
Midterm Exam #1 February 15th	15%
Midterm Exam II March 15th	15%
Laboratory Log and Assessments (quizzes)	10% & 10%, respectively
Final Exam	40%

A passing level of performance in the laboratory is a requirement for completion of the course. The lab will be primary demonstration based with subsequent assessment (quizzes). A portion of the lab mark will be for participation and engagement. Some of the lab will be theory based, especially sections pertaining to spectroscopy.

To pass the lecture component of the course a student must attain a minimum of 50% in the lab.

To move on to courses for which this course is a pre-requisite, a C- grade (60%) is required.

LETTER GRADE GUIDELINE

Percentage (%)	Grade	Grade Point
86-100	A	4.0
80-85	A-	3.7
78-79	B+	3.3
74-77	B	3.0
70-73	B-	2.7
68-69	C+	2.5
64-67	C	2.0
60-63	C-	1.7
56-60	D+	1.5
50-55	D	1.0
0-49	F	0

Important Notes/Dates:

Please note that final grades will be available on your student portal. Printed grade sheets are no longer mailed out.

The last day to enter a course without permission and /or voluntary withdrawal from a course without financial penalty	Sunday, January 20th, 2013
Community Day Spiritual Emphasis	Thursday, January 31 st , 2013
Family Day	Monday February 18 th , 2013
Spring break	Feb 19 th to 23 rd , 2013
Global Impact Day	Wednesday Feb 27 th , 2013
The last day to voluntarily withdraw from a course or change to audit without academic penalty	Monday, March 22, 2013 (Fall semester)
Last day to request revised time for a final exam	Monday, March 4 th , 2013
Good Friday	Friday March 29 th , 2013
Last day to apply for time extension for coursework	April 1 st , 2013
Last day of classes	Tuesday, April 9 th , 2013

LAB SAFETY:

Lab coats and goggles are mandatory. You **must** abide by the regulations outlined in your lab manual. Proper handling and disposal of chemicals is important to protect both the environment and your fellow students. Every chemical used in the laboratory comes with a WHMIS sheet. If uncertain regarding risks, ask your lab instructor, and/or refer to the WHMIS information sheet. Be familiar with all safety equipment and emergency exits within the lab. Hair should be tied back, no open shoes/sandals, avoid wearing contact lenses since many organic chemicals are readily absorbed by the gas permeable material of the lenses and are difficult to eradicate. Always be attentive and **think** about the risks associated with the lab procedure in progress.

Instructor's Attendance Policy:

Students are expected to attend all classes and laboratories. Non-excused absence may result in loss of marks or in additional assignments being required. Individual absence from class not satisfactorily validated by the course instructor may lead to a penalty on the final grade. When possible, students should advise their instructor of anticipated absence from class.

A student may be denied permission to write the final examination on the recommendation of the instructor pending approval of the Deans Council. Grounds for such debarment are: failure to complete a substantial part of the written assignments for a course; frequent absence from class; or failure to complete a sufficient amount of the required practical or laboratory work in a course.

Classroom Policies:

Questions are encouraged. Student participation in classroom discussions is expected. If a point requires clarification, always feel free to interject. Exceptions to this open lecture policy will occur when, or if, the time available to cover a topic is limited.

No cell phones or MP3 players are to be turned on during lectures. Phones should also be out of site and off your desk. Use of camera phones, digital cameras, recording devices of any kind, or laptop cameras is prohibited without prior permission from your instructor. Repeat offences may result in expulsion from the class.

Institutional Academic Policies:

It is the responsibility of all students to become familiar with and adhere to academic policies as stated in the Student Handbook and Academic Calendar. Personal information, that is information about an individual that may be used to identify that individual, may be collected as a requirement as part of taking this class. Any information collected will only be used and disclosed for the purpose for which the collection was intended. For further information contact the Privacy Compliance Officer at privacy@ambrose.edu.

Although extensions to coursework in the semester are at the discretion of the instructor, students may not turn in coursework for evaluation after the last day of the scheduled final examination period unless they have received permission for a "Course Extension" from the Registrar's Office. Requests for course extensions or alternative examination time must be submitted to the Registrar's Office by the appropriate deadline (as listed in the Academic Calendar <http://www.ambrose.edu/publications/academiccalendar>). Course extensions are only granted for serious issues that arise "due to circumstances beyond the student's control."

We are committed to fostering personal integrity and will not overlook breaches of integrity such as plagiarism and cheating. Plagiarism and cheating can result in a failing grade for an assignment, for the course, or immediate dismissal from the university college. Students are expected to be familiar with the policies in the current Academic Calendar and the Student Handbook that deal with plagiarism, cheating, and the penalties and procedures for dealing with these matters. All cases of academic dishonesty are reported to the Academic Dean.

Students are advised to retain this syllabus for their records.

Course changes, including adding or dropping a course, may be made during the Registration Revision period, as outlined in the Calendar of Events. All course changes must be recorded on a Registration form, available from the Office of the Registrar. Due to circumstances such as class size, prerequisites or academic policy, the submission of a Registration form does not guarantee that a course will be added or removed from a student's registration. Students may change the designation of any class from credit to audit up to the date specified in the Calendar of Events, although students are not entitled to a tuition adjustment or refund after the Registration Revision period.

Withdrawal from courses after the Registration Revision period will not be eligible for tuition refund. Students intending to withdraw from some or all of their courses must submit a completed Registration form to the Registrar's office. The dates by which students may voluntarily withdraw from a course without penalty are listed in the Calendar of Events. A grade of 'W' will be recorded on the student's transcript for any withdrawals from courses made after the end of the Registration Revision period and before the Withdrawal Deadline (also listed in the Calendar of Events). 'W' grades are not included in grade point average calculations. A limit on the number of courses from which Academic a student is permitted to withdraw may be imposed. Students wishing to withdraw from a course, but who fail to do so by the applicable date, will receive the grade earned in accordance with the course syllabus. A student obliged to withdraw from a course after the Withdrawal Deadline because of health or other reasons may apply to the Registrar for special consideration.

An appeal for change of grade on any course work must be made to the course instructor within one week of receiving notification of the grade. An appeal for change of final grade must be submitted to the Office of the Registrar in writing within 30 days of receiving notification of the final grade, providing the basis for appeal. A review fee of \$50.00 must accompany the appeal to review final grades. If the appeal is sustained, the fee will be refunded.

Academic dishonesty is taken seriously at Ambrose University College as it undermines our academic standards and affects the integrity of each member of our learning community. Any attempt to obtain credit for academic work through fraudulent, deceptive, or dishonest means is academic dishonesty. Plagiarism involves presenting someone else's ideas, words, or work as one's own. Plagiarism is fraud and theft, but plagiarism can also occur by accident when a student fails or forgets to give credit to another person's ideas or words. Plagiarism and cheating can result in a failing grade for an assignment, for the course, or immediate dismissal from Ambrose. Students are expected to be familiar with the policy statements in the current academic calendar and the student handbook that deal with plagiarism, cheating, and the penalties and procedures for dealing with these matters. All cases of academic dishonesty are reported to the Academic Dean and become part of the student's permanent record.