CHEMISTRY 342 COURSE SYLLABUS

SPRING 2020

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| Chemistry 342 Advanced Inorganic Chemistry Spring 2020 | Class meeting time:  MWF 2:00 – 2:50  217 Physical Science | Bill Vining  249 Physical Science  436-2698  viningwj@oneonta.edu |

Office Hours: M 10 – 11 am; T 1 – 2 pm, W 3 – 4 pm. Stop in any time or make an appointment

**SUNY Oneonta Undergraduate Catalog Course Description:**

CHEM 342 Theories of Inorganic Chemistry, 3 s.h.

Explores recent developments in molecular orbital theory and symmetry, acid-base theories, structure and bonding in coordination compounds, organometallic chemistry, magnetism, kinetics and mechanisms of inorganic reactions, band theory and semiconductors, nanochemistry, and bioinorganic chemistry.  
*LA*, *Prerequisite(s) or Corequisite(s):* [CHEM 352](http://catalog.oneonta.edu/content.php?filter%5B27%5D=CHEM&filter%5B29%5D=&filter%5Bcourse_type%5D=-1&filter%5Bkeyword%5D=&filter%5B32%5D=1&filter%5Bcpage%5D=1&cur_cat_oid=4&expand=&navoid=170&search_database=Filter#tt5137).

**Student Learning Outcomes**

Students successfully completing this course will demonstrate the following:

* an understanding of the scope of the field of Inorganic Chemistry;
* an understanding of the connections between physical, organic, and inorganic chemistry;
* an understanding of molecular orbital theory and the ability to apply it to bonding, structure, and spectroscopy of inorganic compounds;
* a general understanding of coordination chemistry and the fields of organometallic chemistry (including catalysis) and bioinorganic chemistry; and
* an ability to read and critically analyze papers from the inorganic literature.

**General Information and Policies**

**Textbook***Inorganic Chemistry*; 5th edition, Miessler and Tarr

Bring to all class meetings.

**Attendance**Attendance is expected at every class meeting. If you must miss class due to illness, emergency, or unavoidable circumstances, inform me before class begins. Class participation (including attendance) counts for 5% of your total grade.

**Assessment**Mastery of course content will be assessed by exams, presentations, and homework assignments. Three exams will be given during the term. If an exam due date must be missed due to illness or personal emergency, a written, verifiable explanation must be presented before the exam is due. No late exams will be accepted. There will be a comprehensive take-home final exam with an in-class component during our scheduled final exam time. During the weeks that an exam is not scheduled, homework will be assigned. All homework assignments will be submitted for a grade.

The ability to read and critically analyze literature papers will be assessed by a literature presentation and a literature exam. During the semester, each student will present a paper (of their own choosing from an approved journal) to the class from the inorganic literature. Evaluation criteria will be discussed in class and will include an emphasis on the critical analysis of the research presented in the article. During the last week of classes, there will be a literature exam based on a paper from the current inorganic literature chosen by the course professor.

**Overall grading scheme:**Three exams 45%  
Final exam 15% **Exam Dates:**

Homework 10% **February 14, March 23, April 20;**

Literature presentations 20% **Final Exam 2:00 – 4:30 am Friday, May 1**

Literature exam 10%  
Total 100%

Letter grade ranges on a percentage basis are:

**A**         90.0 – 100%                **C-**        67.0 – 69.9%

**A-**        87.0 – 89.9%               **D+**       64.0 – 66.9%

**B+**       84.0 – 86.9%               **D**         60.0 – 63.9%

**B**         80.0 – 83.9%               **D-**        57.0 – 59.9%

**B-**        77.0 – 79.9%               **E**          Below 57%

**C+**       74.0 – 76.9%

**C**         70.0 – 73.9%

**ADA (AMERICANS WITH DISABILITIES ACT) STATEMENT**

Students Diagnosed with a Disability – All individuals who are diagnosed with a disability are protected under the American with Disabilities Act, and Section 504 of the Rehabilitation Act of 1973. As such, you may be entitled to certain accommodations within this class. If you are diagnosed with a disability, please make an appointment to meet with Accessibility Resources, 133 Milne Library, ext. 2137. All students with the necessary supporting documentation will be provided appropriate accommodations as determined by the SDS Office. It is entirely your responsibility to contact SDS and concurrently supply me with your accommodation plan, which will inform me exactly what accommodations you are entitled to. You will only receive accommodations once you provide me with an SDS accommodation plan. Any previously recorded grades will not be changed.

**Emergency Evacuation/Shelter-in-Place Procedures:**

In the event of an emergency evacuation (i.e., fire or other emergency), our laboratory classes meeting in the Physical Sciences building are directed to reassemble at the Chase Gymnasium so that all persons can be accounted for. Evacuation from our Physical Science classroom is the Chase Gymnasium. Complete details of the emergency evacuation, shelter-in-place, and other emergency procedures can be found at <http://www.oneonta.edu/security>.

**TENTATIVE CLASS SCHEDULE Changes to this schedule will be announced in class.**

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| Week of | **Class Assignment** | **Topic** |  |
| January 15 | Chapter 1 Chapter 2 | Introduction to Inorganic Chemistry Atomic Structure |  |
| January 20 | Chapter 2, cont. Chapter 3 | Atomic Structure Simple Bonding Theory |  |
| January 27 | Chapter 4 | Symmetry and Group Theory |  |
| February 3 | Chapter 4, cont. Chapter 5 | Symmetry and Group Theory Molecular Orbital Theory |  |
| February 10 | Chapter 5, cont. | Molecular Orbital Theory |  |
| February 17 | Chapter 6 | Acid-Base and Donor-Acceptor Chemistry |  |
| February 24 | Chapter 9 | Coordination Chemistry: Structures and Isomers |  |
| March 1 | Chapter 10 | Coordination Chemistry: Bonding |  |
| March 8 | Break | Break |  |
| March 15 | Chapter 10, cont. Chapter 12 | Coordination Chemistry: Bonding  Coordination Chemistry: Reactions & Mechanisms |  |
| March 22 | Chapter 12 | Coordination Chemistry: Reactions & Mechanisms |  |
| March 29 | Chapter 13 | Organometallic Chemistry |  |
| April 5 | Chapter 13, cont. | Organometallic Chemistry |  |
| April 12 | Chapter 14 | Organometallic Reactions and Catalysis |  |
| April 19 | Chapter 16 | Bioinorganic & Environmental Chemistry |  |

**Department of Chemistry and Biochemistry**

**Policy on Course Attendance, Performance, Participation and Behavior**

1. Students are expected to attend all scheduled course sessions and should be prepared by reading in advance any relevant material assigned or provided. Participation (defined by interacting with the instructor, working problems at the board, individually or in groups, using personal response “Clicker” systems and other mechanisms defined in the syllabus) is expected.
2. Students are reminded that instructors are not required to accept assignments submitted late, except in instances allowed according to College policies. College Policies as defined in the Student Code of Conduct apply to lecture, recitation and laboratory portions of all courses.
3. Laboratories are an integral part of education in chemistry courses. As a result, participation in all laboratories scheduled for a course is expected. Unless alternate activities are scheduled, students can expect that their laboratory section will meet each week, and failure to attend laboratories may lead to failure in the course.
4. The minimum acceptable grade for a chemistry course prerequisite is a C-. For example, a student with a D+ in General Chemistry I may not enroll in General Chemistry II. This standard applies to all Chemistry prerequisites for all Chemistry courses.
5. **The laboratory for a course must be passed**, normally by earning 60% of the available score or points for the laboratory, in order to pass the course. Exceptions may be noted in syllabus.
6. Students are expected to bring to laboratory the laboratory manual (or printout of the experiment), a laboratory notebook (if required), a calculator, ruler or other materials as specified by the instructor or in the syllabus.
7. Students are not allowed to work in the laboratory without direct faculty supervision.
8. Unless announced in advance, **SAFETY GOGGLES (WHICH PROVIDE A COMPLETE SEAL AROUND THE EYES AND ARE EQUIPPED WITH INDIRECT VENTS) ARE REQUIRED TO BE WORN AT ALL TIMES IN THE LABORATORY. STUDENTS ARE REQUIRED TO PROVIDE THEIR OWN SAFETY GOGGLES.**
9. Open-toed shoes (e.g. sandals, “Birkenstocks”, flip-flops, etc), unrestrained long hair, excessively loose clothing and other items, which may be easily ignited or snag on apparatus are not allowed.
10. Food, drink, candy, cosmetics, tobacco products, etc. are not allowed in the laboratory.
11. Students are expected to be attentive to the material and any experiments and apparatus in the laboratory. The following must be turned off and stored away from the laboratory bench while in laboratories:

Portable music players (e.g. iPods, MP3 players and the like)

Cellular telephones, pagers, text messaging devices and the like

Other portable electronic devices as defined by the laboratory instructor

1. Horseplay, practical jokes, “goofing around” or interfering with other students’ work is not allowed in the laboratory.
2. Students should not expect to be able to makeup missed laboratory sessions or experiments. If a makeup session is possible, it will be at the discretion of the laboratory instructor and will normally be during the same week as the missed laboratory section.
3. Students will not be permitted to work in any laboratory section other than that they are registered for unless they have the **written approval** of both their regular instructor AND the instructor in the section they wish to enter.

Course instructors may modify these guidelines as necessary to meet the requirements of individual courses or chemical specialties in consultation with the Department Chairperson. Students should expect to receive a copy of these guidelines in their course syllabus or be given a copy by the course instructor (either in paper form or by electronic mail).