**Inorganic Chemistry- CHM 401 Syllabus**

**Fall Semester, 2018**

**Lecture Meets Mondays & Thursdays, 10:00-11:15 in Science Complex LL04**

**Lab Meets Mondays, 1:30-5:30 in Albertus Magnus 214**

**Instructor: Office Hours:**

Dr. Maria Carroll Tuesday 9:30-10:30

Ruane 224 Wednesday 1:30-2:30

865-2371 Thursday 3:00-4:00

[mcarro17@providence.edu](mailto:mcarro17@providence.edu) Friday 10:00-11:00

Email me to meet at another time.

**Course Purpose:**

This course covers the foundations of one of the five branches of chemistry: inorganic chemistry. According to the ACS website, this field “is concerned with the properties and behavior of inorganic compounds, which include metals, minerals, and organometallic compounds”. Organic chemistry is typically defined as the chemistry of hydrocarbons and their derivatives. It follows that inorganic chemistry is the study of compounds based on the rest of the periodic table. This definition reflects the broadness of the field of inorganic chemistry, and the area bridges a number of other fields. It is also concerned with the chemistry of the various elemental forms of carbon and compounds with metal-carbon bonds (organometallic compounds). Bioinorganic chemistry overlaps with biochemistry, focusing on the role of inorganic species in biological chemistry.

**Required Textbook:**

*Inorganic Chemistry*, 5th edition by Miessler, Fischer, and Tarr, electronic version purchased through Perusall. (For access, register for an account at app.perusall.com, and enter the access code CARROLL-51193 to register for the class. The text will be listed as required and you will be prompted to purchase it within the app.) I also have other textbooks available that you may borrow to use as additional references.

**Overall Course Structure:**

Each class meeting will be a mixture of lecture and in-class activities, all of which will be based on readings assigned through Perusall. My lectures will focus on and expand on important points from the assigned reading. Additionally, with Perusall, I will be able to identify topics and concepts with which students struggled, and I will address these during class. In order to complete the in-class activities, it is necessary that you completed the readings for that particular class. The week before we start a new chapter or topic, I will provide you with an overview consisting of chapter learning goals, reading assignments, and problem sets.

Your final grade in the course will depend on the following: Perusall readings, in-class activities, problem sets, exams, descriptive chemistry activities, and lab. Details on each of the aspects of the course are provided below.

**Perusall Reading Assignments and In-class activities:**

Prior to most class meetings, you will need to complete a reading assignment through Perusall. For each of the assignments, you will annotate the text with questions and comments. These annotations can be viewed by the other members of the class, who have the ability to respond to your annotations. This leads to a dialogue amongst students, while reading the text. Perusall grades your annotations once the due date of the assigned reading has been reached. It will automatically grade your five best annotations for each assignment.

Each Perusall reading assignment is due by 8:00 AM the day of class. This will enable me to review your annotations and the “Student Confusion Report” that is generated by Perusall and address topics of confusion during my lecture. After the due date, you can receive partial credit for annotations and answers to questions posed by classmates.

After I have lectured on the material from the reading assignments, you will complete an in-class activity, which can take the form of a problem set or a discussion of a journal article. On days that the in-class activity is a literature discussion, the reading assignment will be the relevant journal article(s). Completion of these activities will be a collaborative effort, and each group will turn in and be graded on materials from the activities.

**Problem Sets:**

Prior to starting a new chapter or topic, I will provide you with a problem set. The problem sets will typically be due in the class following that in which we completed the chapter or topic. You should try to work through the problems gradually, as we cover the relevant material in class. Some exam questions will be taken directly from the problem sets and all will help you prepare for the exams.

**Exams:**

Three hourly exams will be given over the course of the semester, and they will be given on Monday afternoons, during the usual lab period. The exams will be written such that they require ~75 minutes, but the longer timeframe of the lab period will ensure that everyone has sufficient time to complete the exams. A cumulative final exam will be given during the scheduled final exam period.

If you have an excusable conflict (such as a verifiable College related activity) for an exam, you should consult me **well before the exam** to arrange an alternative time. If some emergency (such as personal illness or death in the family) prevents you from taking an exam at the scheduled time, an opportunity for a make-up exam will be given. If an exam is missed for any reason not considered acceptable by the instructor a **0** will be given for that exam**. The final will be rescheduled only for persons who have three exams in a 24-hour period.**

**Exam Dates:**

**Exam # 1 Monday October 1**

**Exam #2 Monday November 5**

**Exam #3 Monday December 3**

**Final Exam: Saturday December 15, 1:30-3:30 PM**

**Periodic Table and Descriptive Chemistry Assignment:**

Because inorganic chemistry covers the chemistry of all elements on the periodic table, it is important that you have comprehensive knowledge of it. Each student will receive a “Photographic Card Deck of the Elements”. Throughout the semester, we will have Periodic Table Jeopardy during the last 10-15 minutes of class. Each session will focus on a particular section of the periodic table, and the content will be based on the interesting facts on the cards, as well as the relevant chapters in the textbook. Additionally, in conjunction with the ACS Student Affiliates, we will host periodic table trivia. Each student in CHM401 will be responsible for writing questions pertaining to ~12 elements on the periodic table. More details on this will be provided in the coming weeks.

**Lab:** The lab will contribute 20% to your final grade in the course. See the lab syllabus for more details.

**Attendance:**

Although an attendance grade will not be given, you are expected to attend class. Additionally, because you will receive a grade on the in-class activities, failure to attend class and complete these activities will hurt your grade. If you need to miss a lecture, it is your responsibility to review the PowerPoint slides from class and consult with a classmate concerning notes and any handouts that you may not have received. Please arrive to class on time and stay until the end of class. Arriving late or leaving early will not only hurt your success in the class, but is a disturbance for me and your fellow classmates. If you need to leave early or arrive late, notify me of this prior to class.

**Course Grading:**

Your final grade will be weighted as follows:

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| --- | --- |
| **Assignment/ Assessment** | **Total Points** |
| Perusall/ In-class activities | 100 |
| Problem Sets | 175 (normalized from all grades) |
| Descriptive Chem Activities | 75 |
| Hourly Exams | 300 (100 points each) |
| Lab | 200 (normalized from all grades) |
| Final | 150 |
| **Total Possible** | **1000** |

**Electronic Devices:**

Throughout class, students should refrain from using cell phones, which should be set to silent. You may use laptops during in-class activities, in order to access the text and notes, but they should not be used for any other purpose. The use of these devices for non-class related activities is a major distraction to the rest of the class. If there is a situation in which you feel that you must use an electronic device for another purpose, I ask that you discuss it with me ahead of time.

**Academic Integrity:**

All students are expected to conduct themselves with the highest of academic integrity. I will not tolerate acts of academic dishonesty and will report all examples of academic dishonesty to the Dean of Students. Acts of academic dishonesty may lead to a failing grade for the relevant assignment or for the course, depending on the situation. These acts include (but are not limited to) bringing in “cheat sheets” to exams, copying answers from other students, plagiarizing material, and misrepresenting other individuals work as your own.

**Academic Support Services:**

The Office of Academic Services (OAS), located on the upper level of the Philips Memorial Library, offers a wide variety of support services for all PC students, including group and individual tutoring, academic skills mentoring, disability support, and writing assistance. For additional information about the office, go to www.providence.edu/oas or call 865‐2494. Tutorial Services 865‐2855 Writing Center 865‐1286 Academic Skills Mentoring 865‐2667 Disability Support 865‐1121 Note: Students who may require academic accommodations based on a documented disability should make the necessary arrangements as soon as possible. All accommodations must be arranged through the Office of Academic Services.”

**Disclaimer:**

Syllabus and calendar may change over course of the semester at the sole discretion of the instructor. All changes will be communicated to students in a timely manner.

**Tentative Course Schedule:**

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| **Week** | **Dates** | **Chapter/ Topic** |
| 1 | Aug. 27, 31 | **Chapter 2:** *Atomic Structure* |
| 2 | Sept. 6 | **Chapter 2:** *Atomic Structure* |
| 3 | Sept. 10, 13 | **Chapter 2:** *Atomic Structure*  **Chapter 3:** *Simple Bonding Theory*  **Periodic Table Jeopardy: *s*-Block** |
| 4 | Sept. 17, 20 | **Chapter 4:** *Symmetry and Group Theory* |
| 5 | Sept. 24, 27 | **Chapter 4:** *Symmetry and Group Theory*  **Periodic Table Jeopardy: *p*-Block Part I** |
| 6 | Oct. 1,5 | **Exam #1 Monday**  **Chapter 5:** *Molecular Orbitals* |
| 7 | Oct. 9, 11 | **Tuesday October 9: Monday Schedule**  **Chapter 5:** *Molecular Orbitals* |
| 8 | Oct. 15, 18 | **Chapter 6:**  *Acid-Base and Donor-Acceptor Chemistry*  **Periodic Table Jeopardy: *p*-Block Part II** |
| 9 | Oct. 22, 25 | **Chapter 6:**  *Acid-Base and Donor-Acceptor Chemistry*  **Chapter 7:** *The Crystalline Solid State* |
| 10 | Oct. 29  Nov. 1 | **Chapter 7:**  *The Crystalline Solid State*  **Periodic Table Jeopardy: *d*-Block Part I** |
| 11 | Nov. 5, 8 | **Exam #2 Monday**  **Chapter 7:** *The Crystalline Solid State*  **Chapter 10:**  *Coordination Chemistry II: Bonding* |
| 12 | Nov. 12, 15 | **Chapter 10:**  *Coordination Chemistry II: Bonding*  **Periodic Table Jeopardy: *d*-Block Part II** |
| 13 | Nov. 19 | **Chapter 12:**  *Coordination Chemistry IV: Reactions and Mechanisms* |
| 14 | Nov. 26, 30 | **Chapter 13:** *Organometallic Chemistry* |
| 15 | Dec. 3, 6 | **Exam #3 Monday**  **Chapter 14:**  *Organometallic Reactions and Catalysis*  **Chapter 15:**  *Bioinorganic and Environmental Chemistry*  **Periodic Table Jeopardy: *f*-Block** |
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