ADVANCED INORGANIC CHEMISTRY
CHM 403 (4 credits)
FALL 2018

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Office Hours: TBA and by appointment or drop in.

TEXT: *Inorganic Chemistry*, 5th ed., Gary L. Miessler, Paul J Fischer and Donald A. Tarr, Pearson 2014. ISBN: 978-0-32-181105-9

Course Handouts/Articles/Exercises/ Links are available on the course website. Follow the links from www.lasalle.edu/~prushan

This course covers theoretical and practical aspects of chemical bonding, descriptive periodic trends, and molecular structure and symmetry of molecules. A special emphasis is given to the chemistry of the transition metals, including coordination and organometallic chemistry. This course consists of three hours of lecture and three hours of laboratory. PREREQUISITES: A C- OR BETTER IN CHM 331 AND CHM 332, Quantum Chemistry and Thermodynamics.

WHAT IS INORGANIC CHEMISTRY?, If organic chemistry is defined as the chemistry of hydrocarbon compounds and their derivatives, inorganic chemistry can be described as the chemistry of "everything else". This includes all the remaining elements in the periodic table, as well as carbon, which plays a major role in many inorganic compounds. Inorganic chemistry encompasses a large variety of topics ranging from solid-state chemistry, semiconductor and superconductivity, industrial catalysts to the role of metals in biological systems. We will just skim the surface of inorganic chemistry in this course with introductions to the background necessary for deeper understanding of inorganic chemical topics.

COURSE OBJECTIVES: The course will provide you with the necessary skills to understand the theoretical basis of structure and bonding as well as the physical and chemical properties of inorganic compounds. Through readings and presentations on the current literature, you will develop a knowledge base of current interests in inorganic chemistry. In the end, I hope that you will appreciate this very young, important and growing chemical discipline.

JOURNAL ARTICLE PRESENTATIONS will be held in class weekly on Friday and should be 20 minutes in duration (15 min. presentation, 5 min. for questions). Attendance for all presentations is mandatory since students will also be required to assess the other presentations. Each presentation should begin with general background information on structure, bonding, synthesis, etc. and how it pertains to at least one of the recent example found in the chemistry literature. You should also address why the article advances chemistry, what warranted its publication and what is unique about the study performed. Reading from slides/overheads is not an acceptable seminar format. Be prepared to lecture to the class, slides should summarize the main points but not a script of the entire presentation. Powerpoint format is strongly recommended.

In order to pass the course, you **must** receive a passing grade in **both** the lecture and laboratory parts of the course.

ATTENDENCE: If you are absent from class, you are responsible for learning the material covered. Quizzes and exams are given during class time, and failure to attend a class where a quiz or exam is given will result in a failure on the quiz or exam. If you need to miss a lecture for a valid reason, such as a university sponsored event or severe illness, please contact me immediately and preferably beforehand. You must provide proof of absence, such as a doctor's note for extended absences or absences on quiz or exam days.

ACADEMIC INTEGRITY: All students at La Salle University are responsible for knowing and adhering to the academic integrity policy of this institution. Violations of this policy include: cheating, plagiarism, aid of academic dishonesty, fabrication, lying, bribery, and threatening behavior. Students who are found to be in violation of the academic integrity policy will be subject to both academic sanctions by me and further possible actions outlined under the La Salle Academic Integrity Violation Procedures. Students should carefully review La Salle University's Academic Integrity Policy and Student Rights & Responsibilities in the Student Guide for more information.

GRADING POLICY: The course grade will be based on the grading scale given below:

A 90% B 80% C 70% D 60%

For final grades, the +/- system is used (B+, A-, etc.) and breaks between half letter grades will be within the above grade ranges and made at the discretion of the instructor according to University policy.

Homework problems will help you prepare from the exam, but exam questions will, in most cases, be more involved than the homework. It is therefore important that you UNDERSTAND what you are doing and that you do not just memorize various problem types.

Each examination will be announced at least one week before it is given. Examination questions will be drawn from lecture material, assigned readings and homework problems. The final examination will be given during Final Examination Week and will be comprehensive.

Your overall grade will be determined by computing your numerical grade according to the following

a. Three exams (each worth 13% for a total of 39 %)
b. Final cumulative exam (15 %)
c. A journal article presentation (see below, worth 8 %)
d. Quizzes (13 %) The lowest quiz grade will be dropped.
e. Laboratory (25 %)

STUDENTS WITH DISABILITIES:
Students with disabilities should refer to the student handbook for resources that are available to them as well as compliance with the American Disabilities Act.

SYLLABUS CHANGE POLICY:
This syllabus is a guide and every attempt is made to provide an accurate overview of the course. However, circumstances and events may make it necessary for the instructor to modify the syllabus during the semester and may depend, in part, on the progress, needs, and experiences of the students. The instructor will give notice when changes to the syllabus are made.

TENTATIVE COURSE TOPICS OUTLINE and EXAM SCHEDULE

1. Introduction to Inorganic Chemistry (Chapter 1, sections 1.1 to 1.4)

2. Atomic Structure (Chapter 2, sections 2.1 to 2.3)

3. Simple Bonding Theory (Chapter 3, sections 3.1 and 3.2)

4. Symmetry and Group Theory (Chapter 4, sections 4.1, 4.2 and 4.4)

5. Molecular Orbital Theory (Chapter 5, section 5.1 to 5.4)

Exam 1 - September 29th

6. Acid-Base and Donor-Acceptor Chemistry (Chapter 6, sections 6.1-6.4 and 6.6)

(Skipping Chapters 7 and 8)

7. Coordination Chemistry I: Structure and Isomers (Chapter 9, sections 9.1-9.5)

8. Coordination Chemistry II: bonding (Chapter 10, sections 10.1 to 10.7)

Exam 2 – October 27th

9. Coordination Chemistry III: (Chapter 11, sections 11.1-11.3)

10. Coordination Chemistry IV: reaction mechanisms (Chapter 12, sections 12.1-12.7)

11. Bioinorganic chemistry (Chapter 16)

12. Organometallic Chemistry (Chapter 13 sections, 13.1 to 13.5)

Exam 3 – December 1st

13. Organometallic Reactions and Catalysts (Chapter 14)

Final Exam (Cumulative Final Exam during Finals week)