Ch 112 – Course Information 2017-2018
Tues/Thurs 9:00-10:25am (Noyes 147)
http://agapie.caltech.edu/#classes

Instructor:
Prof. Theodor Agapie
Office: Noyes 314, E-mail: agapie@caltech.edu

Teaching Assistants:
Heui Beom Lee (hlee3@caltech.edu, x3682, Noyes 304)
Dirk Schild (djschild@caltech.edu, x3113, Schlinger 205)

Textbook (recommended, not required):
Inorganic Chemistry, Miessler, Fischer and Tarr. Symmetry and Spectroscopy, Harris and Bertolucci. Lectures will cover all material you are responsible for on exams.

Problem sets (6): 16% of total grade
Weekly problem sets will be available on-line on Friday and will be due on the following Thursday, at the start of class. Each problem set will be graded on a 0-10 scale, in whole point increments. Graded problem sets will not be corrected in detail, so cross-check your worked problems with the solutions that are made available. Note: Late problem sets will receive no credit.

Project: 12%
Written summary on a current topic in inorganic chemistry (~60%) and a section (~40%) on a new direction / proposal of original research if you were to work in the area of the project (4 pages not including references, JACS format). Due on Nov 21. Abstract (1%) due on Oct 12. Topic selection (three choices) due on Oct 5.

Paper critique: 4%
Each student will select a paper from recent literature (2016-2017; from JACS, Angewandte, Science, Nature) focused on an aspect related to your selected project topic. See below on format of critique. Due on Oct 13.

Presentation: 8% (including class participation)
Lecture time in the last two weeks will be reserved for student oral presentations of the projects. Time limit for presentation is 9 minutes; practice being concise! Prepare no more than 6 slides (4 on background, 2 on the proposed new direction). Students in the audience are expected to participate with questions and comments. Turn in the slides to the TAs as a pdf file by 10 pm the day before the presentation.

Exams:
Midterm (30%), final (30%). Closed book, take-home. Consultation of test materials from previous years is not allowed.

Office Hours:
TAs: Tuesday, 9-10 pm (Teaching resource room, Mulliken library 9th floor); Wednesday, 8-9 pm (SFL 326)
Instructor: Flexible, by appointment
Course topics

Experience is assumed with molecular symmetry, assignment of oxidation states, electron counting. Ample opportunities will be provided for practice.

- Molecular symmetry; matrix representations; character tables
- Electronic structure of π systems and their interactions with transition metals; projection operator
- Binding and activation of small molecules: N₂, CO, O₂, CO₂
- Metal-element (nitrides, carbides, oxos) and metal-metal multiple bonding
- Electronic absorption spectroscopy
- Electronic states
- Symmetry in chemical reactivity

Paper Critique: Critical evaluation of a published paper

- Brief summary of major findings and conclusions
- Significance: importance of questions being addressed
- Approach: are the methods appropriate to answer the questions?
- Innovation
- Data: quality and reliability
- Conclusions: do the data adequately support the conclusions; are there reasonable alternative interpretations?
- Do the results challenge existing interpretations or support accepted concepts?
- Do the results develop new concepts, point to new research directions or to new paradigms?

Turn in 0.5-1 page written critique (12 pt Arial, single space)

Due Dates:

- PS1       Oct 5
- Critique/Abstract  Oct 12
- PS2       Oct 19
- PS3       Oct 26
- Midterm   Nov 2
- PS4       Nov 9
- PS5       Nov 16
- Report    Nov 21
- PS6       Nov 30
- Presentations  Nov 21, Nov 28, Nov 30
- Final     Dec 7