

## **CHE 616: Solid State Chemistry**

Spring 2017, MWF 9:30 am – 10:25 am, Room 100, Life Science Complex (LSC)

**Instructor:** Dr. Weiwei Zheng

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**Office hours:** by appointment

### **Textbooks:**

- Solid State Chemistry and its Applications, 2nd Edition, Student Edition, Anthony R. West, Wiley-Blackwell, 2014
- Solid State Chemistry: An Introduction, 4th Edition. Smart, Lesley E. CRC Press, 2012

### **Texts are relevant to the course:**

- Inorganic Chemistry, 5th edition, Shriver & Atkins, Freeman Press, 2010. (\*other Inorganic textbooks are also suitable)

### **Course goals:**

1. Introduce concepts relating to crystalline structures and bonding.
2. Introduce the synthetic methods for solid state materials.
3. Introduce physical techniques to characterize solids.
4. Introduce electrochemical, conductivity, magnetic, and optical properties of solid state materials.
5. Introduce the properties and applications of solid state materials.

### **Grading policy:**

A-C scale, with 92-100 A; 89-91 A-; 86-88 B+; 82-85 B; 79-81 B-; 76-78 C+; 72-75 C; <72 C-

1. Homework (5 problem sets): 18%
2. Exam I: 25%
3. Exam II: 25%
4. Literature review (written and oral): 15% + 15% = 30%
5. Attendance: 2%

### **Literature review and presentation:**

The final project consists of two components, a written review (5-8 pgs, font size: 12; line spacing: 1.0) and an oral presentation (~15 min in class); each component contributes 15% to the overall course grade, for a total contribution of 30%. The literature review and presentation should be based on 3 to 10 recent papers. It can be any topic related to the “state of the art” of a solid-state material, nanomaterial, or characterization and applications of the material.

### Tentative course outline:

Week	Date	Lecture Topic	Exam
1	1/18 - 1/20	Course overview; Introduction of solid state chemistry	
2	1/23 - 1/27	Chapter 1. Crystal structures	
3	1/30 - 2/3	Chapter 1. Crystal structures	
4	2/6 - 2/10	Chapter 2. Defects and solid solutions	
5	2/13 - 2/17	Chapter 3. Bond in solids: ionic bonding	
6	2/20 - 2/24	Chapter 3. Bond in solids: covalent bonding	
7	2/27 - 3/3	Chapter 3 & 8. Metallic bonding and electric properties	
8	3/6 - 3/10	Chapter 4. Synthesis of solid state materials	
9	3/13 - 3/17	<i>Spring Break (no classes)</i>	
10	3/20		Exam I
10	3/22 - 3/24	Chapter 4. Synthesis of solid state materials	
10	3/24	Literature review topics due	
11	3/27 - 3/31	Chapter 5 & 6. Diffraction and other characterization techniques	
12	4/3 - 4/7	Chapter 7. Phase diagram	
13	4/10 - 4/12	Chapter 9. Magnetic properties	
13	4/14		Exam II
14	4/17	Chapter 10. Optical properties	
14 - 15	4/19 - 4/28	Literature review presentations	

### Rules:

1. Class attendance is required.
2. Students are bound by the rules, regulations, and the honor code of their university in all matters related to this course: attendance, registration, and examinations.

## **Accommodations for Students with Disabilities**

If you believe that you need accommodations for a disability, please contact the Office of Disability Services (ODS), visit the ODS website– <http://disabilityservices.syr.edu>, located in Room 309 of 804 University Avenue, or call (315) 443-4498 or TDD: (315) 443-1371 for an appointment to discuss your needs and the process for requesting accommodations. ODS is responsible for coordinating disability-related accommodations and will issue students with documented Disabilities Accommodation Authorization Letters, as appropriate. Since accommodations may require early planning and generally are not provided retroactively, please contact ODS as soon as possible. For more information, see: <http://disabilityservices.syr.edu/services-accommodations/>

## **Academic Integrity**

Syracuse University's Academic Integrity Policy holds students accountable for the integrity of the work they submit. Students should be familiar with the policy and know that it is their responsibility to learn about course-specific expectations, as well as about university policy. The university policy governs appropriate citation and use of sources, the integrity of work submitted in exams and assignments, and the veracity of signatures on attendance sheets and other verification of participation in class activities. The policy also prohibits students from submitting the same written work in more than one class without receiving written authorization in advance from both instructors. The presumptive penalty for a first offense by an undergraduate student is course failure, accompanied by a transcript notation indicating that the failure resulted from a violation of Academic Integrity Policy. The standard sanction for a first offense by a graduate student is suspension or expulsion. For more information and the complete policy, see <http://academicintegrity.syr.edu>.

## **Religious Observances**

SU's religious observances policy is available at [http://supolicies.syr.edu/emp\\_ben/religious\\_observance.htm](http://supolicies.syr.edu/emp_ben/religious_observance.htm)

Syracuse University recognizes the diversity of faiths represented among the campus community and protects the right of students, faculty, and staff to observe the holy days according to their tradition. Under the policy, students are provided an opportunity to make up any examination, study, or work requirements that may be missed due to a religious observance—provided they notify their instructors before the end of the second week of classes. Students have access to an online notification form through MySlice that they can use to notify their instructors.