MES 604: Chemistry of Materials

Time and Place: 3:30-4:45pm Monday & Friday; 3:30-4:20pm Wednesday; Room EP255

Instructors:
Dr. Zhengtao Zhu, Office: C316, Phone: 394-2447, e-mail: Zhengtao.Zhu@sdsmt.edu
Office Hours: 2:00 – 3:20pm on MWF, or by appointment.

Dr. Hao Fong, Office: C313, Phone: 394-1229, e-mail: Hao.Fong@sdsmt.edu
Office Hours: 9:30 – 11:00pm on MWF or by appointment.

Text Book: None.

Reference Books:
• “Inorganic Chemistry”, Shriver and Atkins, W.H. Freeman and Co., 2006, (Chapters 1, 2, 24)

Course Description: (4-0) 4 credits. MES 604 is a one-semester survey course of chemistry of materials. The first part of the course reviews the principles of chemistry including atomic structures, periodic tables, and chemical bonding. The second part of the course discusses the crystal structure and bonding of solid, synthesis and processing, characterizations of inorganic solid state materials. Selective topics on metal, semiconductor, and ceramics will also be presented if time permits. The last two parts of the course present a survey on organic and polymeric materials. Fundamental classes of organic compounds will be discussed in terms of functional groups, nomenclatures, syntheses, structures, properties, and characterizations. In addition, fundamental concepts and knowledge on polymeric materials will also be introduced.

Prerequisite: Admission to “Materials Engineering and Science (MES)” program or permission of instructor.

Prerequisite Knowledge: College level general chemistry including the properties of matter, atomic structure, bonding, stoichiometry, kinetics, equilibrium, states of matter, solutions, and acid-base concepts

Course Objectives: To acquire fundamental knowledge of materials chemistry.

Expected Outcomes: After successful completion of this course, a student is expected to understand the principles/fundamentals of materials chemistry, including structures, syntheses, processing methods, characterizations, and properties of inorganic, organic and polymeric materials.

Grading Policy:

Quizzes: Quizzes may be given during the first 5-10 minutes of class time and will not be announced. The quiz will cover the material from the prior lectures. The quiz scores will be averaged for the whole semester and be normalized to the value of an exam. The lowest quiz score will be discarded for each student. Quizzes will not be returned to you as the answers
will be reviewed immediately after collection, but the keys will be posted on the course website.

**Exams:** Four exams will be given for the course. First exam will cover the principle of chemistry, including atomic structures, periodic tables, and chemical bonding. The second exam is a comprehensive exam for Dr. Zhu’s part. Besides the contents covered in the first exam, the second exam also covers the crystalline structures of solids, syntheses, characterizations, and properties of inorganic solids/materials. The third exam covers the functional groups, nomenclatures, syntheses, structures, properties, and characterizations of organic materials. The fourth exam will be given during the final week, and will be a comprehensive exam for Dr. Fong’s part. Besides the contents covered in the third exam, the fourth exam also covers the fundamental concepts and knowledge in polymeric materials. The time of the exams will be announced at least one week ahead. No makeup examinations will be given outside of school’s policy.

**Point Assignment**

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<thead>
<tr>
<th>Exams</th>
<th>400</th>
<th>80%</th>
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<tbody>
<tr>
<td>Averaged quiz score</td>
<td>100</td>
<td>20%</td>
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<tr>
<td>Total points</td>
<td>500</td>
<td>100%</td>
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**Grades:** Grades will be assigned according to the following percentiles:

- A: 85—100
- B: 75—84
- C: 65—74
- D: 55—64
- F: 0—54

**ADA Advisory:** Students with special needs or requiring special accommodations should contact the instructor, (Dr. Zhu at 394 2447 or Dr. Fong, at 394-1229) and/or the campus ADA coordinator, Ms. Jolie McCoy, at 394-1924 at the earliest opportunity.

**Freedom in Learning:** Students are responsible for learning the content of any course of study in which they are enrolled. Under Board of Regents and University policy, student academic performance shall be evaluated solely on an academic basis and students should be free to take reasoned exception to the data or views offered in any course of study. Students who believe that an academic evaluation is unrelated to academic standards but is related instead to judgment of their personal opinion or conduct should contact the dean of the college which offers the class to initiate a review of the evaluation.

**Academic Honesty:** Any cheating as defined by the student code of conduct is not tolerated in this course. See http://sdmines.sdsmt.edu/sdsmt/studentconduct/main regarding the student code of conduct. Cases of cheating will be handled on a case-to-case basis as defined in the student code of conduct. Note that according to "Policy Governing Academic Integrity" in the SDSM&T Undergraduate Catalog, the instructor of record for this course has discretion of how acts of academic dishonesty are penalized, subject to the appeal process, and that "Penalties may range from requiring the student to repeat the work in question to failure in the course" (72-73).