Nano717: Nanochemistry

**Time and Place:** Monday, Wednesday, and Friday, 11:00-11:50am, CBEC 113

**Instructors:**
Dr. Zhengtao Zhu, Office: C316, Phone: 394-2447, Email: Zhengtao.Zhu@sdsmt.edu
Office Hours: 10:00-10:50am Monday, Wednesday, and Friday, or by appointment.

Dr. Hao Fong, Office: C313, Phone: 394-1229, Email: Hao.Fong@sdsmt.edu
Office Hours: 9:30 – 11:00am on Tuesday and Thursday or by appointment.

**Text Book:** None.

**Reference Books:**
- “Nanostructures and Nanomaterials”, G. Cao, Imperial College Press, 2004. (available for the library online)

**Course Description:** 3 credits. Nano717 is a one-semester survey course of nanochemistry. The course introduces basic synthesis and fabrication methods to make the nano-scaled structures and assemblies of various sizes, shapes, compositions, and functionalities. The outline of the course includes (1) an introduction to chemistry of nanomaterials, (2) the “bottom-up” and “top-down” methods for the syntheses/fabrications of nanostructures and/or nanomaterials, and (3) the basics in bionanotechnology.

**Prerequisite:** Admission to Nano Ph.D. program or permission of instructor.

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

**Course Objectives:** To acquire the knowledge on both the fundamentals and frontiers of the rapidly developing interdisciplinary field of nanomaterials and nanotechnology from a chemist’s point of view.

**Expected Outcomes:** After successful completion of this course, a student is expected to understand the size-dependent properties of nanomaterials, “top-down” and “bottom-up” approaches to fabricate nanostructures and/or nanomaterials, assembly and manipulation of nanostructure building blocks, and basic bionanotechnology. The student is also expected to be able to follow and understand the new discoveries in the nanochemistry field.

**Grading Policy:**

**Exams:** Two exams will be given for the course. First exam will cover the physical properties and characterizations of nanomaterials, “top-down” and “bottom-up” approaches to synthesize nanostructures. The second exam is a take-home exam, and will cover electrospinning and nanofibers, nanocomposites, self-assembly of nanostructures and/or nanomaterials, and the basics of bionanotechnology. The time of the exams will be announced at least one week ahead. No makeup exams will be given outside of school’s policy.

**Final Exam/Term Paper:** A student is required to write a short proposal to apply the knowledge/methods acquired in the course to his/her own research project. The term paper should include the components of “research objectives”, “background and significance”,...
“experimental design and methods”, and should have at least 10 pages. Necessary references should also be included, and the format of the references should follow the “Thesis/Dissertation Format” at SDSM&T “http://resources.sdsmt.edu/forms/grad-ed/thesis-and-dissertation-instructions.pdf”. The required typesetting is 12 points “Time New Roman” font, double spacing, and 1 inch margins. The paper is due between 11:00am – 12:50 pm on Dec. 15th.

**Point Assignment**

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<th>Points</th>
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<tbody>
<tr>
<td>2 Exams @ 100 each</td>
<td>200</td>
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<tr>
<td>Term Paper @ 100 points</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:** Under Board of Regents and University policy, student academic performance may be evaluated solely on an academic basis, not on opinions or conduct in matters unrelated to academic standards. Students should be free to take reasoned exception to the data or views offered in any course of study and to reserve judgment about matters of opinion, but they are responsible for learning the content of any course of study for which they are enrolled. Students who believe that an academic evaluation reflects prejudiced or capricious consideration of student opinions or conduct unrelated to academic standards 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 regard 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).