Syllabus for NANOMATERIALS: (CHEM:5118:0001)
Fall 2017; Monday, Wednesday, Friday, 10:30-11:20 am in E224 CB

INSTRUCTOR
Instructor: *** Prof. Amanda J. Haes (amanda-haes@uiowa.edu; (319) 384 – 3695)
Office/Office Hours Location: 204 IATL
Office Hours: Mondays 8:30 – 10 am; Wednesdays 1:30 – 3 pm; by appointment
*Please note, I will be traveling periodically throughout the semester and will need to reschedule my office hours. I will post these updates on ICON (under news) at least 48 hours in advance of any planned absence and will announce this in class. I have arranged for alternative activities and/or substitute instructors for lectures on dates when I need to miss class because of planned travel.

**Guidance for communicating with me: Ask me questions! I am here to help you learn the course material but learning is something you will need to do via studying and thinking. Use office hours to help me help you. Please come see me EARLY and OFTEN. Please know that if something is discussed in class, homework, and/or book; it has the potential of being on an exam. I will help you gauge importance throughout the semester.

DEO: Prof. Jim Gloer, Department of Chemistry; Office: E331 CB; Phone: 335-1361/335-1350

DESCRIPTION OF COURSE
Without nanomaterials, there is no nanotechnology. As such, this course covers the basic principles associated with nanoscience and nanotechnology including the fabrication and synthesis, size dependent properties, characterization, and applications of materials at nanometer length scales with an emphasis on recent technological breakthroughs in the field.

OBJECTIVES AND GOALS OF THE COURSE
Learning objectives for this course will focus on developing a fundamental understanding of the following topics as they relate to nanomaterials.

- **Motivation/Vision:** Feynman’s vision, why use/explore new nanomaterials?
- **Synthesis and Fabrication:** Top down vs. bottom up techniques, nucleation theory, surface energy and stabilization
- **Characterization:** Composition, structure, porosity, crystallinity, single vs. ensemble measurements
- **Examples:** General classification (zero – two dimensional and assembled nanostructures), materials composition/function (metals, metal oxides, semiconductors, carbon, biological)
- **Size Dependent Chemical and Physical Properties:** Electrical, optical, catalytic, magnetic, thermodynamics
- **Applications:** Electrical, optical, catalytic, magnetic, thermodynamic, purification, sensing, biology, medicine, solar cells, etc. (literature)
- **Implications:** Environment, health, and safety as well as impacts on policy, society, and education

TEXTBOOK AND OTHER RESOURCES
- See Relevant Reading Sections for detailed textbook and supplemental reading. All supplemental reading is posted on ICON for your convenience.
- If warranted, additional resources may be posted on ICON at least 1 week prior to discussion.

COURSE WEBSITE
http://icon.uiowa.edu Access with your username and password – lectures, homework, and up-to-date point totals will be available here. You will be required to submit assignments on this site.

HEALTH NOTE REGARDING FRAGRANCE, ODOR, SCENTS, AND FOOD ALLERGIES
Due to one or more individuals in this course having significant allergies to both mint and cinnamon, any food, gum, lotions, fragrances, or the like are prohibited from the classroom, discussion, and office hours. Failure to comply with the instructor’s request regarding this issue may be subject to discipline with the Dean of Students Office.
EXAMS, ASSIGNMENTS, AND PERCENTAGE OF FINAL GRADE

Your course grade will be determined from the following elements:

- In class exams (2 x 100 points each) = 200 points (25 %)
- Cumulative final exam = 100 pts (12.5 %)
- Homework (2-4 assignments for a total of 100 points) = 100 points (12.5 %)
- Project (paper = 100 pt, presentation = 100 pt, peer assessment of paper and presentation = 100 pts each) = 300 points (37.5 %)
- Class participation = 100 points (12.5 %)
- **Total = 800 points**

*Plus/minus grades will be appended to letter grades assigned. Exceptional performances will receive an A+.*

CALENDAR OF COURSE ASSIGNMENTS AND EXAMS

**Important Course Deadlines (Due at 10:30 am on the deadline date unless otherwise noted)**

- Early TBD  
  Homework assignments (will be made available at least two weeks in advance)
- October 2  
  Presentation Topic Selection
- October 11  
  Exam 1
- October 23  
  First Draft of Paper
- October 30  
  Peer Evaluations (1st Draft of Paper)
- November 6  
  Final Draft of Paper
- November 13  
  Exam 2
- November 29  
  Presentation
- December 6  
  Peer Evaluations (Presentation)
- TBD  
  Cumulative Final Exam (open book + one page of hand-written notes allowed. The one page must be turned in with your final exam.)

A NOTE ON COLLABORATION

Homework is designed to help you master your knowledge related to the topics covered during lecture and in the textbook. Homework problems are turned in for credit and must represent your work and understanding (collaboration is not allowed on what you turn in for credit). Do not share your completed work with others or ask others to see their completed assignments because both are considered academic misconduct. You are responsible for understanding this policy. Ask questions if you need clarification.

A WORD ABOUT THE DATE AND TIME OF THE FINAL EXAM

The final examination date and time will be announced by the Registrar generally by the tenth day of classes. Do not plan your end of semester travel plans until the final exam schedule is made public. It is your responsibility to know the date, time, and place of the final exam.

COURSE POLICIES

- A 3 hour class typically entails at least 2 hours of outside preparation for the average student for each hour spent in class. You are expected to study an additional 6 hours/week outside of class.
- Attendance on presentation and exam days is required. If you have to miss class on one of these days, please notify me in advance by filling out and electronically submit the form “Explanatory Statement for Absence of Class”.
- Class participation points can only be earned by attending class and are earned through in class activities. ~15 point activities are planned but you only need to complete 10 of these for full credit.
- Make up exams must be scheduled BEFORE the original exam starts and taken within 48 hours of the originally scheduled exam time. Additional accommodations will be provided if warranted.
- 10 pts will be deducted/day for homework and will only be accepted within 48 hours after the due date.
- Re-grade requests will be considered 5 business days after their return. Only electronic or assignments completed in pen will be considered and must be accompanied by a written description of your request.
- Projects (presentations and papers) must be original work but can be related to your research (if relevant). In other words, your project cannot be used to satisfy requirements in another course (past, present, or future). These assignments will be checked for plagiarism.
Please silence all cell phones and refrain from using electronic devices for non-course related purposes during class.

Homework assignments will be posted on ICON and announced in class. Follow instructions carefully.

You may find the Writing Center (http://www.uiowa.edu/~writing/) and the Speaking Center (http://clas.uiowa.edu/rhetoric/for-students/speaking-center) very useful for this course.

Course Topics and Relevant Reading (presented in the following order).

Text book chapters are considered required reading. Unless noted, reading of all other material is optional but has been used to assemble lecture material.

Thanks to the University of Iowa’s excellent electronic book collection and/or Google Books in the area of nanoscience and nanotechnology, all supplementary reading material is available to you for no additional cost. See ICON for details.

Additional material may be added throughout the semester.

1. Motivation & Vision (Lecture Pack 1)
   a. “There’s Plenty of Room at the Bottom: An Invitation to Enter a New Field of Physics,” Richard P. Feynman (required reading)

2. Synthesis, Fabrication, & Surface Energy (Lecture Pack 2)
   a. Chapters 1, 2, 3, 7

3. Characterization (Lecture Pack 3)
   a. Chapter 8

4. Dimensional Classification & Size-Dependent Chemical & Physical Properties (Lecture Pack 4)
   a. Chapters 3, 4, 5, 6, 8.4-8.5, 9

5. Implications, Ethics, & Safety of Nanomaterials (Lecture Pack 5)

6. Applications of Nanomaterials (Your Presentation Slides 6)
   a. Chapter 9
   b. Your projects
University of Iowa and College of Liberal Arts and Sciences (CLAS)  
Teaching Policies & Resources

ADMINISTRATIVE HOME
The College of Liberal Arts and Sciences is the administrative home of this course and governs matters such as the add/drop deadlines, the second-grade-only option, and other related issues. Different colleges may have different policies. Questions may be addressed to 120 Schaeffer Hall, or see the CLAS Academic Policies Handbook at http://clas.uiowa.edu/students/handbook.

ELECTRONIC COMMUNICATION
University policy specifies that students are responsible for all official correspondences sent to their University of Iowa e-mail address (@uiowa.edu). Faculty and students should use this account for correspondences (Operations Manual, III.15.2, k.11).

ACCOMMODATIONS FOR DISABILITIES
A student seeking academic accommodations should first register with Student Disability Services and then meet privately with the course instructor to make particular arrangements. See www.uiowa.edu/sds/ for more information.

ACADEMIC HONESTY
All CLAS students or students taking classes offered by CLAS have, in essence, agreed to the College's Code of Academic Honesty: "I pledge to do my own academic work and to excel to the best of my abilities, upholding the IOWA Challenge. I promise not to lie about my academic work, to cheat, or to steal the words or ideas of others; nor will I help fellow students to violate the Code of Academic Honesty." Any student committing academic misconduct is reported to the College and placed on disciplinary probation or may be suspended or expelled (CLAS Academic Policies Handbook).

CLAS FINAL EXAMINATION POLICIES
The final examination schedule for each class is announced by the Registrar generally by the tenth day of classes. Final exams are offered only during the official final examination period. No exams of any kind are allowed during the last week of classes. All students should plan on being at the UI through the final examination period. Once the Registrar has announced the date, time, and location of each final exam, the complete schedule will be published on the Registrar's web site and will be shared with instructors and students. It is the student's responsibility to know the date, time, and place of a final exam.

MAKING A SUGGESTION OR A COMPLAINT
Students with a suggestion or complaint should first visit with the instructor (and the course supervisor), and then with the departmental DEO. Complaints must be made within six months of the incident (CLAS Academic Policies Handbook).

UNDERSTANDING SEXUAL HARASSMENT
Sexual harassment subverts the mission of the University and threatens the well-being of students, faculty, and staff. All members of the UI community have a responsibility to uphold this mission and to contribute to a safe environment that enhances learning. Incidents of sexual harassment should be reported immediately. See the UI Comprehensive Guide on Sexual Harassment for assistance, definitions, and the full University policy.

REACTING SAFELY TO SEVERE WEATHER
In severe weather, class members should seek appropriate shelter immediately, leaving the classroom if necessary. The class will continue if possible when the event is over. For more information on Hawk Alert and the siren warning system, visit the Department of Public Safety website.

These CLAS policy and procedural statements have been summarized from the web pages of the College of Liberal Arts and Sciences and The University of Iowa Operations Manual.