Syllabus, Course Announcement, and Objectives for Fall

2011

Current Topics in Polymer Chemistry: Nanoparticles and Bio/Nanocomposites

Pre-Requisites: Polymer Chemistry (CH/CM 4620) (waived for 2011) and a strong organic chemistry background are recommended.

Book: The primary resources will be handouts, journal articles, and lecture notes.

This year the course will study the preparation, characterization, function, and environmental implications of nanoparticle uses. Examples will be predominantly organic, but some inorganic and hybrid nanoparticles will also be included. The class will cover synthesis, characterization, analysis, and uses of such nanoparticles. Also, functionalizing nanoparticles for cell targeting will be discussed. The second half of the course will address current methods of working with biomaterials and biocomposite preparation, including bio-based nanocomposites. Syntheses, polymer modifications, and compounding will be described, along with the advantages and disadvantages and uses of these materials. Significant attention will be given to characterization of bio- and nano- materials, with particular focus on surface characterization, which is essential for medical applications. In class activities will include lectures, demonstrations, and videos, but an important part of this course will be class participation in reading, analyzing, critiquing, and discussing recent publications from the professional literature. Assignments and exams will require students to devise syntheses and characterization, predict properties, analyze and organize data and draw conclusions from that data.

Course Objective: At the end of this course a successful student should have knowledge of the synthesis, stabilization, characterization, uses, and environmental implications of nanoparticles. Types of nanoparticles to be described include organic, inorganic and hybrid nanoparticles, including core-shell nanoparticles, multi-functional nanoparticles, controlled release nanoparticles, and cell-specific targeted nanoparticles. Additional objectives include educating students to search the literature, read and understand relevant journal articles, and to analyze publications. Those taking the course at the 6690 level will be expected to write a short review article on a type of nanoparticle preparation. This is a new course still being developed so student feedback and input for improvements are welcome at anytime.

Instructor: Dr. Patricia Heiden (paheiden@mtu.edu)
Office: Chem Sci 415, Ph. 7-3452
Office Hours: By Appointment or Walk-in (Usually unavailable on Thursdays)
Meeting Times and Location: M,W 3-4PM, Chem Sci 607B (Can change on request)
Grading

Quizzes (In class and Take Home). These will include written analyses of publications 25%
2 Written Exams (1 on nanoparticles and 1 on Biocomposites) 25%
1 Formal Presentation with each of the components valued as follows:
   A written summary of the current literature in an approved topic area 10%
   discussing no fewer than 8 recent papers, that is to be emailed to the
   class 1 week before your oral presentation. This written summary
   must not only review these papers but assess them critically.
   Additional guidance on this will be given separately.
   An oral presentation with powerpoint slides (est 30 mins) on this topic. 10%
   Answer questions and lead discussion about the topic. 5%
Written Review/Critique of your Classmates Written Summaries. 5%
In Class Participation (Discussion, Analysis of Papers, Questions and Comments) 20%

Letter Grades will be awarded as follows:

A 92-100% 4.00 Excellent
AB 85-89% 3.50 Very good
B 80-84% 3.00 Good
BC 75-79% 2.50 Above average
C 70-74% 2.00 Average
CD 65-69% 1.50 Below average
D 55-64% 1.00 Inferior
F <55% 0.00 Failure

Rules for Assignments, Quizzes, and Exams

Use word processing for all assignments and Take Home Quizzes. However I will deduct for
illegibility. Handwritten reaction schemes and chemical drawings are permitted, but they must
be neat. All chemical structures must be neat and correct, and all chemical equations must
balance mass, charge, etc.

Unless specifically stated otherwise you are welcome to discuss any and all assignments and take
home quizzes with others, though you must turn in your own work. In class quizzes are individual
work unless otherwise stated, and both exams are to be your individual work.
**Collaboration/Plagiarism Rules**
Cell phones, Blackberries, iPods, PDAs, or any other electronic devices are not to be used in the classroom. Information exchanges on these devices during class are prohibited and violate the Academic Integrity Code of Michigan Tech. Rules

**University Policies**
Academic regulations and procedures are governed by University policy. Academic dishonesty cases will be handled in accordance the University’s policies. If you have a disability that could affect your performance in this class or that requires an accommodation under the Americans with Disabilities Act, please see me as soon as possible so that we can make appropriate arrangements. The Affirmative Action Office has asked that you be made aware of the following:

_Michigan Tech complies with all federal and state laws and regulations regarding discrimination, including the Americans with Disabilities Act of 1990. If you have a disability and need a reasonable accommodation for equal access to education or services at Michigan Tech, please call the Dean of Students Office, at 487-2212. For other concerns about discrimination, you may contact your advisor, department head or the Affirmative Action Office, at 487-3310_

**Academic Integrity:**
http://www.studentaffairs.mtu.edu/dean/judicial/policies/academic_integrity.html

**Affirmative Action:**
http://www.admin.mtu.edu/aae/

**Disability Services:**
http://www.admin.mtu.edu/urel/studenthandbook/student_services.html#disability

**Equal Opportunity Statement:**