BE 7909: Science and Engineering of Nanoparticles and Colloidal Systems

Description: The science and engineering of nanoparticles and colloidal systems are discussed from a fundamental perspective. Topics include properties, synthesis, characterization, interaction, stability and applications of nanoparticles and colloidal systems. The format of the class is a combination of lecture and laboratory. The course will be co-taught by Biological Engineering, Chemistry, and Physics faculty members.

Text books: Shaw, D. J. 1992. Introduction to Colloid and Surface Chemistry. Fourth Edition. Butterworth Heinemann, New York, NY. (available on-line through the LSU library)

Morrison, I.D. and S. Ross. Colloidal Dispersions, Suspensions, Emulsions and Foams.Willey-Interscience, New York, NY.

Fitch, R. M. 1997. Polymer Colloids- A Comprehensive Introduction. Academic Press, New York, NY.

Evans, D. F. and H. Wennerstrom. 1994. The Colloidal Domain where Physics, Chemistry, Biology, and Technology Meet. VCH Publishers, New York, NY.

Instructors: Sabliov, Russo, Cueto, Norwood

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Part I: Lecture provided on the following topics

January 24: Introduction to the topic (Sabliov)
January 31: Kinetic properties (Norwood)
February 7: Optical properties and light scattering lab (Russo and Norwood)
February 14: Interfaces and nanoparticle synthesis lab (Sabliov and Cueto)
February 21: Mardi Gras
February 28: Paper presentations (students)
March 7: Exam I
March 14: Charged interfaces and zeta-potential lab (Russo and Norwood)
March 21: Rheology and capillary viscometry lab (Norwood)
March 28: Colloidal interactions and stability (Russo)
April 4: Spring break
April 11: Polymeric nanoparticles synthesis methods (Russo and Sabliov)
April 18: Colloidal systems applications (Sabliov)
April 25: Exam II
May 2: Laboratory presentations (students)

Course Policies

- You will work on the **project** individually. The project consists of two parts, paper discussion and laboratory project. For part I of the project, you will choose a scientific paper published in the literature relevant to colloidal/nanoparticle science and engineering. You will discuss the contents of the paper with your peers during the midterm week. For part II of the project, you will be asked to develop a laboratory (3h) experiment where you will apply the knowledge gathered in class to accomplish the laboratory objectives.
- **The exams (3)** will be a combination of open/closed book sections.
- **Examinations** and **labs** missed due to an unexcused absence cannot be made up and a grade zero will be given for each one missed.
- Any student requiring **special arrangements** for taking exams, taking-notes and other special arrangements please see or contact the instructor within the first two weeks of class.

Academic Integrity

Students are expected to comply with the Code of Student Conduct throughout this course. For your information, the Code of Student Conduct can be found at **http://appl003.lsu.edu/slas/judicialaffairs.nsf/$Content/Code+of+Student+Conduct?OpenDocument**

Grading policy: Grades will be determined based on the following break down:

Exams (3) 25% each, Project 25%.

Grade Assignments: A (> 90), B (80-89.9), C (70-79.9), D (60-69.9), F (<60)