

BE 7909: Food nanotechnology: a focus on delivery systems

Description: The impact of nanotechnology on the food sector is expected to be tremendous-- better quality and safer foods with enhanced nutritional and health benefits are envisioned and advocated by researchers and industry experts. The first wave of nanotech applications in foods has focused on enhanced uptake and bioavailability of bioactives. Controlled release, targeted delivery, improved bioavailability of active ingredients, and enhanced antimicrobial properties can be achieved with nanoparticles. Synthesis and characterization of polymeric nanoparticles, effect of size on cellular and *in-vivo* interaction and toxicity of nanoparticles, as well as applications of nanoparticles and colloidal systems for improved nutrition and health will be covered in this class. The format of the class is a combination of lectures, and individual projects and presentations.

Text books: none

Instructors: Cristina Sabliov and guest speakers
Guest lectures provided by Astete (BAE), Hayes (BAE) and Morgan (VetSchool)

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Lectures provided on the following topics

Week 1 (Jan 16-20): Introduction to the topic, importance, and applications (Sabliov)

Week 2 (Jan 23-27): Surfactants, micelles, emulsions and colloidal stability (Sabliov)

Week 3 (Jan 30-Feb 3): Nanostructures: types and synthesis techniques (Sabliov)

Week 4 (Feb 6-10): Nanostructures: properties and characterization techniques (Guest: Carlos Astete)

Week 5 (Feb 13-17): Polymeric nanoparticles: applications as delivery systems for improved natural colorant solubility and improved vitamin bioavailability (Sabliov)

Week 6 (Feb 20-24): Mardi Gras

Week 7 (Feb 27-March 2): Polymeric nanoparticles-applications for improved antimicrobial activity (Sabliov)

NOTE: MIDTERM PAPER DUE MARCH 2 at 4:30 pm

Week 8 (March 5-9): Nanoparticle- cell interactions (Sabliov and Guest: Daniel Hayes)

Week 9 (March 12-16): Nanoparticle *in-vivo* studies: a focus on bioavailability and biodistribution (Sabliov and Guest: Tim Morgan)

Week 10 (March 19-23): Nanoparticle *in-vivo* studies: a focus on safety (Sabliov)

Week 11 (March 26-30): Time dedicated to report development

Week 12 (April 2-6): Time dedicated to report development

Week 13 (April 9-13): Spring Break

Week 14 (April 16-20): Student presentations

Week 15 (April 23-27): Student presentations

Week 16 (April 30- May 4): Student presentations

NOTE: FINAL PAPER DUE MAY 5 at 4:30 pm

Projects

- You will write a report on the synthesis, characterization and application of polymeric nanoparticles to improve nutrition and/or health- you are encouraged to pick a topic of relevance to your graduate research.
- You will be responsible for writing a midterm report and a final (accompanied by an in-class presentation).
- The final report (20-pg single space) will provide your methodology and expected results, in addition to the literature review
- The in-class presentation will summarize the findings presented in the report.

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](http://appl003.lsu.edu/slas/judicialaffairs.nsf/$Content/Code+of+Student+Conduct?OpenDocument)

Grading policy: Grades will be determined based on the project and class presentation:

Midterm paper (30%), Final paper (60%), Class presentation (10%)

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