Syllabus
MS 431 (34.431)
Nano-Biomaterials

Major Elective / English
Class Room: Applied Engineering B/D (W1), Rm 2427

Instructor
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Description
This class introduces the physical principles involved in the interactions between biomolecules and synthetic materials.

Grading
The term grade will be a weighted average of lecture and paper summaries. The weighting distribution will be:
- Problem sets: 30%
- Mid-term examination: 30%
- Attendance: 10%
- Final examination: 30%

Course Outline

1. The Origin of Life
- Definition of life
- Protocells
- Artificial life

2. Understanding Biological Molecules, Materials, and Systems
- Water
- Nucleic acids
- Peptides and proteins
- Lipids
- Carbohydrates

3. DNA Nanotechnology
- DNA structures
- DNA origami
- Nanofabrications

4. Biomolecular Interactions
- Protein-ligand Interactions
- Understanding Binding Curves
- Multivalent Binding
- Antibody-Antigen Interactions

5. Biological Morphogenesis
- Introduction to phage display
- Applications of phage display to materials science and engineering
- Biomineralization
- Bones
- Biomimetic inorganic chemistry