

Biological Materials

KPO 045 1p3, 7.5p



LEARNING OBJECTIVES

Upon successful completion of this course, the students will be able to:

- Correlate biological structure to relevant physical and/or mechanical properties of the organism/plant
- Identify examples of hierarchical organization in biological structures, and interpret the role and influence this has on the development of the properties of the system
- Describe the role of water in the development of biological structure and properties
- Describe the experimental techniques typically used to study the structure and properties of biological materials
- Describe the basic processes of biosynthesis and biogenesis
- Use the principles of biomimetic design (adaptation of biological-based structure, architecture and fabrication processes) to propose new materials and methods
- Identify common methods used for structural characterization of biological-based materials
- Design new materials based on the principles of biomimetics.

SYLLABUS

1. Biomechanical properties of biological materials
2. Experimental tools for determining structure of biological materials
3. Fracture mechanics, prediction of failure
4. Biopolymers: Proteins
5. Biopolymers: Polysaccharides
6. Biomineralization
7. Biocomposites
8. Biofabrication. Biogenesis, enzymes and cells at work
9. Biomimetic material design
10. Project work

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