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ME 264 (JAN) 3:0
Mechanics in Biology

Instructor: Namrata Gundiah
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Course description:
Living tissues are vastly different from engineering solids. Biological tissues are nonlinear, viscoelastic, composite, and generally anisotropic. They also have hierarchical and reinforced microstructures that help resist fracture and fatigue. Finally, biological tissues can heal and adapt to diverse mechanical milieu. Tissue versatility is truly staggering, and hidden in their design are solutions that can inspire the fabrication of new materials and provide solutions for the replacement of diseased tissues and organs. This course develops quantitative methods to analyze cell/ tissue properties to solve biomechanical engineering problems. The course will cover mechanical behavior of structural tissues and biomedical replacement materials.

Prerequisites:
None.

Resources:

- *Mechanics of Biomaterials: Fundamental principles for implant design*. Lisa A Pruitt and Ayyana M Chakravartula. Cambridge University Press.
- *Biomechanics: Mechanical properties of living tissues*. Y. C. Fung. Springer-Verlag.
- *Solid biomechanics*. R. Ennos. Princeton University Press.
- *The mathematics and mechanics of biological growth.* Alain Goriely. Springer-Verlag.

Outcomes:
This course is open to doctoral and master's students interested in a better understanding of biological physics. Undergraduate students with sufficient background can approach the instructor for permission. Students will be able to analyze problems related to design of implants/ prosthesis, and better understand the organization of tissues in comparative systems.

Class Meeting Times and Location
Tu Thu, 2:00-3:30 PM in the Discussion room.