



1. Course number and name

BME 321: Advanced Mechanics for Biomedical Engineers

2. Credit and contact hours

Credits: 3

Contact hours: 3

Lectures: 2:30PM-3:50PM, Monday and Friday, Central King Building 310, Sep 07-Dec 14.

3. Instructor's or course coordinator's name

Instructor: Dr. Xianlian Alex Zhou

Office: 622 Fenster Hall

Email: alexzhou@njit.edu

Phone: 973-596-6940

Web: web.njit.edu/~alexzhou

Office Hours: Monday, 4:00-5:00PM; Friday 1:15PM-2:15PM, or by appointment.

TA: Ms. Shruti Ray

Email: sr992@njit.edu

Office: 650 Fenster Hall

Office Hours: Tuesday, 1:30pm - 3:00pm; Wednesday, 3:30pm - 5:00pm.

4. Text book

Statics and Mechanics of Materials, 5th Edition, Hibbeler, R.C., PEARSON, ISBN-13: 978-0-13-438259-3

5. Specific course information

This course provides an understanding of engineering mechanics, especially as applied to biomechanical systems. Students should be familiar with static equilibrium analysis and concepts of stress and strain. Course topics include method of sections, area moment of inertia, mechanical properties of materials, torsion, bending, stress transformation, Mohr's circle, and deflection of beams.

Prerequisites: Grade of C or higher in BME 302: Mechanical Fundamentals of Biomedical Engineering

6. Specific goals for the course

- Learn about force, moment, and equilibrium of a rigid body.
- Learn how to solve static problems of equilibrium and deformation for frames, trusses, shafts, and beams under different mechanical loadings.
- Gain knowledge on stress and strain, and their transformation.

7. Brief list of topics to be covered:

- Force & moment resultant and equilibrium of a rigid body.
- Truss and frame, method of joints and method of sections.
- Center of gravity, centroids.
- Moments of inertia for areas, parallel-axis theorem.
- Stress and strain.
- Axial load, torsion, bending & combined loadings.
- Stress & strain transformation, Mohr's circle.
- Beam deflection: integration method.
- Beam deflection: superposition method.
- Buckling of columns.