

## BMED 3400 Introduction to Biomechanics (Required)

**Catalog Description:** BMED 3400 Intro to Biomechanics (4-0-4)  
Prerequisite(s): [MATH 2552 (w/ concurrency) OR MATH 2562 (w/ concurrency)] and COE 2001 (w/ minimum grade of “C”) An introduction to the basic concepts and methods in biomechanics, including statistics and the mechanics of biomaterials. The biomedical applications of mechanics will be illustrated.

**Textbook:** None

**Prepared by:** Cheng Zhu

### Topics Covered:

1. Statics review
2. Mechanics of materials
3. Dynamics of rigid bodies

### Course outcomes:

Students who complete this course will be able to:

Outcome 1: Draw free body diagrams and solve for forces and moments in a muscular skeletal system (Student Outcomes a and e)

Outcome 2: Obtain stress and strain distributions in bone and other simple structures under tension, compression, torsion, and bending (Student Outcomes a and e)

Outcome 3: Describe the mechanical properties of biological tissues (Student Outcomes a and e)

Outcome 4: Apply Newton’s laws to predict the motion of rigid particles (Student Outcomes a and e)

Outcome 5: Analyze the dynamics of rigid bodies and solve for velocities, acceleration, or forces (Student Outcomes a and e)

Outcome 6: Apply basic mechanics to biomedical engineering problems (Student Outcomes a and e)

### Correlation between course outcomes and student outcomes:

BMED 3400											
Course outcomes	Biomedical Engineering Student Outcomes										
	a	b	c	d	e	f	g	h	i	j	k
1	X				X						
2	X				X						
3	X				X						
4	X				X						
5	X				X						
6	X				X						

**The Wallace H. Coulter Department of Biomedical Engineering Student Outcomes:**

- a. an ability to apply knowledge of mathematics, science, and engineering;
- b. an ability to design and conduct experiments, as well as to analyze and interpret data;
- c. an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, societal, political, ethical, health and safety, manufacturability, and sustainability;
- d. an ability to function on multidisciplinary teams;
- e. an ability to identify, formulate, and solve engineering problems;
- f. an understanding of professional and ethical responsibility;
- g. an ability to communicate effectively;
- h. the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context;
- i. a recognition of the need for, and an ability to engage in lifelong learning;
- j. a knowledge of contemporary issues;
- k. an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice;