

## MECHANICAL ENGINEERING PROGRAM

### ABET COURSE SYLLABUS

#### ME 416: Introduction to Biomechanical Engineering (3 credits): Elective Course

#### Course Description (2008-2010 Catalog):

Fundamental engineering principles in several engineering areas to problems in the biological world. Discuss includes biomechanics of solids, biofluid and transport phenomena, biomaterials, cell and tissue engineering, medical imaging and electrophoresis.

#### Prerequisite Course: BIOL 223, ME 314, ME 380

#### Prerequisite by Topic:

- Human Anatomy and Physiology
- Introduction to Heat Transfer
- Fluid Dynamics for Mechanical Engineers

**Textbook:** Introductory Biomechanics from Cells to Organisms by Ethier and Simmons, Cambridge University press.

**Other Reference Material:** N/A

**Course Coordinator:** Hui Zhao, Assistant Professor

#### Course Objectives:

- (a) Understand the cellular biomechanics, circulatory and respiratory systems
- (b) Mathematically model and analyze simplified biological and medical problems

#### Relationship of Course to Mechanical Engineering Program Educational Outcomes:

Goal 1: Provide mechanical engineering graduates with technical capabilities.					Goal 2: Prepare the mechanical engineering graduates to have effective workplace skills.				Goal 3: Instilling a sense of responsibility as a professional member of society.			
1.a	1.b	1.c	1.d	1.e	2.a	2.b	2.c	2.d	3.a	3.b	3.c	3.d
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**Topics Covered:**

1. Fundamentals of solid mechanics
2. Cellular biomechanics
3. Fundamentals of fluid mechanics
4. Hemodynamics
5. The circulatory system
6. The interstitial fluid flow
7. Respiration
8. Fundamentals of mass transfer
9. Mass transfer applications
10. Particle transport in the lung

**Laboratory Projects:** None**Assessment of Student Progress toward Course Objectives**

Two written exams and home-works.

**Class/Laboratory Schedule:** MW 5:30-6:45 PM (Spring Semester)**Contribution of Course for meeting Professional Component:**

- |  |           |
|--|-----------|
| (a) Mathematics and basic sciences:      | 0 credit  |
| (b) Engineering Topics (Design/Science): | 3 credits |
| (c) General Education:                   | 0 credit  |
| (d) Others:                              | 0 credit  |

**Prepared By:**

Hui Zhao

**Date:**

September 24, 2009