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:

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<th>Goal1: Provide mechanical engineering graduates with technical capabilities.</th>
<th>Goal 2: Prepare the mechanical engineering graduates to have effective workplace skills.</th>
<th>Goal 3: Instilling a sense of responsibility as a professional member of society.</th>
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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