Course Profile: Biomedical Engineering Program

COURSE #: BIOMEDE 231	**COURSE TITLE:** INTRODUCTION TO BIOMECHANICS
TERMS OFFERED: Winter	**PREREQUISITES:** Math 216
TEXTBOOKS/REQUIRED MATERIAL: Statics and Dynamics of Materials, Bedford, Fowler, Liechti; Engineering Mechanics Dynamics, Meriam and Kraige	**COGNIZANT FACULTY:** Mycek **DATE OF PREPARATION:** 5/31/2005
INSTRUCTOR(S): Mycek	**SCIENCE/DESIGN:** 4
CATALOG DESCRIPTION: This course will provide students with an introduction to topics in biomechanics, including statics, dynamics, and deformable body mechanics, with applications to biological tissues and systems.	**COURSE TOPICS:** 1. Force, Moment, and Torque Vectors 2. Statics: Systems in Equilibrium and Applications to Biomechanics 3. Deformable Body Mechanics 4. Stress and Strain; Stress Analysis 5. Mechanical Properties of Biological Tissues 6. Dynamics: Linear Kinematics and Kinetics 7. Angular Kinematics and Kinetics

COURSE OBJECTIVES	Links shown in brackets are to the departmental educational objectives. 1. To review methods of vector mathematics [1]. 2. To teach students methods of statics, with applications to biomechanical systems [1,5,12,13]. 3. To introduce students to methods of solid mechanics, including stress and strain, with applications to biomechanical systems [1,5,12,13]. 4. To teach students methods of dynamics, with applications to biomechanical systems [1,5,12,13]. 5. To introduce students to the basic mechanical properties of tissues [13].
COURSE OUTCOMES	Links shown in brackets are to the course objectives. 1. Review important mathematical concepts and methods relating to force, moment, and torque vectors [1,2,3,4]. 2. Learn methods of statics for systems in equilibrium, including Newton's laws, free-body diagrams, constraints, and reactions [2,3,4]. 3. Apply methods of statics to biomechanical systems [2] 4. Learn basic principles and methods of solid mechanics, including stress, strain, stress-strain diagrams, elastic and plastic deformations, models of material behavior, multi-axial deformation, Mohr's circle, torsion, and bending [3] 5. Learn about mechanical properties of biological tissues, including viscoelastic models [3,5]. 6. Learn methods of dynamics, including linear and angular kinematics and kinetics [4].
ASSESSMENT TOOLS	Links shown in brackets are to the course outcomes. 1. Graded homework assignments (biweekly) [1-6]. 2. Three written examinations [1-6]. 3. End of term course evaluations by each student [1-6].