Course Profile: Biomedical Engineering Program

COURSE #: BIOMEDE 419	**COURSE TITLE:** QUANTITATIVE PHYSIOLOGY
TERMS OFFERED: Fall	**PREREQUISITES:** Biochemistry 310
TEXTBOOK/REQUIRED MATERIAL: Human Physiology, 8th edition, Vander, Sherman, Luciano	**COGNIZANT FACULTY:** J. B. Grotberg and S. V. Brooks **DATE OF PREPARATION:** 2/22/01
INSTRUCTOR(S): J. B. Grotberg and S. V. Brooks	**SCIENCE/DESIGN:** 3/1
CATALOG DESCRIPTION: Quantitative Physiology provides learning opportunities for senior undergraduate and graduate students to understand and develop competencies in a quantitative, research oriented, systems approach to physiology. Systems examined include cellular; musculoskeletal; cardiovascular; respiratory; endocrine; gastrointestinal; and renal. Mathematical models and engineering analyses are used to describe system performance where applicable. Lectures and problem sessions are used for instruction, and performance is evaluated based on homework problem sets and examinations.	**COURSE TOPICS:** Systems examined include cellular; musculoskeletal; cardiovascular; respiratory; endocrine; gastrointestinal; and renal.

COURSE OBJECTIVES*	1. Introduce students to systems approach to physiology. 2. Learn to integrate engineering analysis and physiological data. 3. Learn to develop quantitative models of human organ systems. 4. Learn physiology of the cellular, musculoskeletal, cardiovascular, respiratory, endocrine, gastrointestinal and renal systems. 5. Formulate mathematical models of physiological systems, and learn their uses and limitations. 6. Identify and investigate common aspects of different physiological systems such as bio-sensing, control, transport, and feedback. 7. Develop understanding of basic metabolic needs and specialized functions of physiological systems. 8. Solve problems at interface of engineering and biology with respect to quantitative physiology.

COURSE OUTCOMES*	1. Examine techniques of physiological measurement and the role of engineering to obtain physiological data. 2. Develop ability to analyze and interpret physiological data using engineering principles. 3. Apply concepts of mechanical, chemical, electrical, and systems engineering to physiological function and dysfunction. 4. Learn relationships between biological structure and physiological function. 5. Formulate mathematical models of physiology. 6. Use updated BME skills and tools. 7. Provides breadth and depth in quantitative physiology. 8. Solves problems at interface of engineering and biology with respect to quantitative physiology. 9. Measure and interpret living systems data, address problems in quantitative physiology.
ASSESSMENT TOOLS	1. Homework assignments. 2. Exams. 3. Student discussion and questions.