The Richard and Loan Hill Department of Biomedical Engineering offers a program leading to degrees in Bioinformatics at both the master’s and doctoral levels.

**Admission and Degree Requirements**

- MS in Bioinformatics
- PhD in Bioinformatics

**BIOE 430. Bioinstrumentation and Measurements I. 3 or 4 hours.**
Theory and application of instrumentation used for physiological and medical measurements. Characteristics of physiological variables, signal conditioning devices and transducers. Course Information: 3 undergraduate hours. 4 graduate hours. Prerequisite(s): BIOS 100 and ECE 115 or ECE 210; and BIOE 310.

**BIOE 431. Bioinstrumentation and Measurement Laboratory. 2 hours.**
Practical experience in the use of biomedical instrumentation for physiological measurements. Course Information: Prerequisite(s): Credit or concurrent registration in BIOE 430.

**BIOE 450. Molecular Biophysics of the Cell. 4 hours.**
Introduction to force, time energies at nanometer scales; Boltzmann distribution; hydrodynamic drag; Brownian motions; DNA, RNA protein structure and function; sedimentation; chemical kinetics; general aspects of flexible polymers. Course Information: Same as PHYS 450. Prerequisite(s): PHYS 245 or the equivalent; or approval of the department.

**BIOE 500. Interfacial Biosystems Engineering. 4 hours.**
Advanced and detailed exposition of the fundamentals of biological systems using quantitative approaches. Areas of concentration include bioinformatics, cell and tissue engineering, and neuroengineering. Course Information: Prerequisite(s): BIOS 442.

**BIOE 518. Advanced Drug Delivery Systems. 2 or 3 hours.**
Controlled drug delivery systems utilizing polymers, synthesis of different types of devices, and the delivery expected from these devices, and mathematical modeling of delivery systems. Course Information: Same as BPS 518. Prerequisite(s): Consent of the instructor.

**BIOE 521. Imaging Systems for Biological Tissues. 4 hours.**
Examination of major imaging systems using ionizing and nonionizing energy for characterization of biological tissues and physiological lesions. Course Information: Prerequisite(s): BIOE 420.

**BIOE 522. Principles of Polymeric Science and Engineering. 3 hours.**
Intermediate polymer science, thermodynamics of polymer solutions, phase separations, MW determination, crystallization, elasticity, kinetics and processing. Course Information: Same as BPS 522. Prerequisite(s): MATH 220 or consent of the instructor.

**BIOE 523. Haptics. 4 hours.**
Hands-on course on fundamental concepts of haptics technology applied to medical visualization, simulation, and training. Course Information: Same as BVIS 523. Extensive computer use required. Recommended Background: Basic computer programming experience. Class Schedule Information: To be properly registered, students must enroll in one Lecture-Discussion and one Laboratory.

**BIOE 560. Processing and Properties of Structural Biomaterials. 4 hours.**
Considers the inter-relationships between atomic bonding, atomic/molecular structure and material processing to provide a fundamental understanding of the properties and performance of advanced biomaterials. Course Information: Prerequisite(s): CEMM 260. Recommended background: Credit in BIOE 460.

**BIOE 579. Neural and Neuromuscular Prostheses. 4 hours.**
Neuromuscular electrical stimulation for ambulation by paraplegics, of upper limb in tetraplegics, of vocal cord and breathing functions, stimulation of bladder, cochlea, retina, and visual cortex. Course Information: Prerequisite(s): Consent of the instructor.