Bioinformatics

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Administration:
Head of the Department: Thomas Royston
Program Chairperson: Jie Liang
Director of Graduate Studies: David Eddington
Alternate Director of Graduate Studies: Yang Dai

Program Codes:
20FS1909MS (MS)
20FS1909PHD (PhD)

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.