

BMOLE Graduate Course Descriptions

BMOLE 603 Biotransport Phenomena 3(3,0)

Analysis of single and multidimensional steady-state and transient problems in momentum, mass, and energy transfer in biological systems. Mathematical similarities and differences in these mechanisms are stressed, and mathematical descriptions of physiological and engineering systems are formulated. *Preq:* CH E 330, MTHSC 208.

BMOLE 623 Bioseparations 3(3,0)

Study of principal methods of separation and purification of bioproducts, such as proteins, amino acids, and pharmaceuticals. Topics include analytical bioseparations, membrane separations, sedimentation, cell disruption, extraction, adsorption, chromatography, precipitation, crystallization, and drying. *Preq:* BIOCH 301, 305, or 423; CH E 330; or consent of instructor.

BMOLE 625 Biomolecular Engineering 3(3,0)

Introduction to basic principles of biomolecular engineering: the purposeful manipulation of biological molecules and processes applied to problems and issues in the life sciences, biotechnology, and medicine. Topics include carbohydrates, proteins, nucleic acids, and lipids with emphasis on their structure-property-function relations; molecular recognition; biochemical pathway engineering; and cell growth. *Preq:* CH E 230 and 319 or consent of instructor.

BMOLE 626 Biosensors and Bioelectronic Devices 3(3,0)

Development of methodologies used to design, fabricate, and apply biosensors and bioelectronic devices for the environmental, medical, and chemicals industries. Application of the fundamentals of measurement science to optical, electrochemical, mass, and thermal means of signal transduction. Use of the fundamentals of surface science to interpret bio-immobilization and biomolecule-surface interactions. *Preq:* CH E 330, and BIOCH 301 or 305, or consent of instructor.

BMOLE 627 Membranes for Biotechnology and Biomedicine 3(3,0)

Students learn principles of membrane science and technology and study membrane applications in the biotechnology and biomedical industries. Advanced topics include surface modification of membranes, synthesis of porous membranes for biomedical applications such as tissue engineering, environmentally responsive membranes, and membrane-based biomedical devices. *Preq:* CH E 330 or equivalent, or consent of instructor.

BMOLE 810 Biosensors and Bioelectronic Devices 3(3,0)

Study of methodologies in design, fabrication and application of biosensors and bioelectronic devices for monitoring the environmental, medical and chemical industries. Includes measurement science fundamentals applied to optical, electrochemical, mass and thermal means of signal transduction. Also considers surface science fundamentals to interpret bioimmobilization, biofouling and nonspecific interactions of enzymes, antibodies and DNA at surfaces. *Preq:* Consent of instructor.