

BIOENGINEERING (BENG)

Course numbers with the # symbol included (e.g. #400) have not been taught in the last 3 years.

BENG 620 - Tissue Engineering Cell Culture Laboratory

Credits: 4

Introduction to culture of mammalian cell lines with applications to bioengineering and biomedical sciences. Techniques and skills include those most relevant to bioengineering and biomedical sciences; basic cell culture, sterile technique, growth and maintenance of cell lines, growth curves, transfection, cryopreservation, and cytotoxicity assays. Inquiry-based final project. Preference given to Bioengineering majors. Also listed as BMS 620.

BENG 755 - Computational Molecular Bioengineering

Credits: 4

Introduction to fundamental concepts in bioengineering with primary emphasis on understanding details of biomolecular structures integrated with molecular modeling, simulation, and visualization techniques. The course will introduce structural details of various biomolecules (proteins, nucleic-acids, sugars, and lipids), followed by concepts in thermodynamics and physical chemistry (such as intermolecular forces, energy, entropy, chemical potential, and Boltzmann's distribution), the applications of which will be discussed in the context of drug-receptor interactions, molecular recognition, biomolecular folding, enzyme catalysis, allosteric communication, diffusion, and transport. The laboratory will include training and learning about advanced simulation and visualization software engines. Preference will be given to bioengineering majors.

BENG 762 - Biomedical Engineering

Credits: 4

Overview of the biomedical engineering through topical studies such as drug delivery and sensors. Discussion of modern engineering methods through primary research sources. Prereq: differential equations and statistics. Writing intensive.

Attributes: Writing Intensive Course

BENG 763 - Bioengineering Design I

Credits: 1

One credit design course covering safety, regulations and ethics for development of bioengineering devices and processes. Topics include product design, benchmarks, design team functioning, marketing and finances. Students produce the following documents during the course: preliminary design, materials and supplies list, project schedule and budget.

BENG 764 - Bioengineering Design II

Credits: 4

Team based laboratory course focuses on developing the project planned in BENG 763. Major report is due at mid-semester after first prototype is completed. A second report is due at the end of the semester to indicate improvements on initial design. Writing intensive.

Attributes: Writing Intensive Course

BENG 766 - Biomaterials

Credits: 4

Fundamental principles of biology and material science, along with latest topics in biomaterials research. Topics include cell biology, wound healing, host response to foreign materials, polymers, hydrogels, diffusion and methods of material characterization. Specific medical applications of biomaterials such as orthopedic and dental implants, heart valves, artificial blood vessels, cochlear and ophthalmic implants and tissue engineering. Laboratory. Students are expected to have some background in chemistry, mathematics, and high school biology. Also listed as CHE 766.