11. Cells and Molecules
Fall, Spring. 4(3-3)
P: CEM 141 or CEM 151.
Cell structure and function; macromolecular synthesis; energy metabolism; molecular aspects of development; principles of genetics.

BIOMECHANICS

590*. Special Problems in Biomechanics
Fall, Spring, Summer. 1(01-00) May reenroll for a maximum of 22 credits.
R: Not open to freshmen and sophomores.
Approval of department. Each student works under faculty direction on an experimental, theoretical, or applied problem.
QP: DEPT.APP Qk BIM 590

601*. Osteopathic Manipulative Medicine Clerkship
Fall, Spring, Summer. 4 to 12 credits in increments of 2 credits.
P: Units I and II.
R: Open only to graduate professional students in the College of Osteopathic Medicine.
Advanced training in the diagnosis of musculoskeletal dysfunction and application of osteopathic manipulative techniques.
QA: BIM 601

620*. Directed Studies
Fall, Spring, Summer. 2 to 10 credits in increments of 2 credits.
R: Open only to graduate students.
May reenroll for a maximum of 10 credits.
R: Open only to students in the College of Osteopathic Medicine. Approval of department. Individual or group work on special problems related primarily to the biomechanics of the musculoskeletal system.
QA: BIM 620

800*. Special Topics
Fall, Spring, Summer. 1(01-00) May reenroll for a maximum of 3 credits.
R: Open only to graduate students.
Approval of department. Directed study in topics of biomechanics.
QP: DEPT.APP Qk BIM 800

810*. Tissue Biomechanics
Fall. 3(02-02)
R: Open only to Biomechanics graduate students.
Integrates concepts of tissue mechanics and microstructure, develops experimental methods to study connective tissue mechanics using engineering principles.
QA: BIM 810

811*. Biomechanical Analysis
Fall. 2(02-02)
R: Open only to Biomechanics graduate students.
Methods for analysis of biokinematic and biokinetic data.
QA: BIM 811

840*. Therapy of Connective Tissue Mechanics
Fall. 3(03-00)
P: BI M 810.
Mechanical properties, chemical content, and anatomical structure in connective tissues.
QP: BIM 812 Qk BIM 812

841*. Theory of Neuromuscular Mechanics
Fall. 3(03-00)
R: Open only to Biomechanics graduate students.
Neurological control of joint mechanics.
QA: BIM 810 BIM 805

849*. Theory of Joint Mechanics
Fall. 3(03-00)
P: BIM 813.
Motion and force transmission, and their relationship to anatomical structure and tissue function in joints.
QP: BIM 810 Qk BIM 810

860*. Occupational Biomechanics
Fall. 3(03-00)
P: BIM 815.
Applications of biomechanics in ergonomics with emphasis on the whole body.
QP: BIM 810 Qk BIM 810

861*. Clinical Biomechanics
Fall. 3(03-00)
R: Open only to Biomechanics graduate students.
Application of biomechanics to medicine.

880*. Independent Study
Fall, Spring, Summer. 1 to 3 credits.
R: Open only to graduate students in Biomechanics. Approval of department. Individual or group work related to biomechanics and/or neuromuscular system.
QP: P

885*. Experimental Research Methods
Fall. 1(00-02)
R: Open only to Biomechanics graduate students.
Methods of experimental research in biomechanics.
QA: BIM 871 BIM 872 BIM 873

889*. Master's Thesis Research
Fall, Spring, Summer. 1 to 25 credits.
May reenroll for a maximum of 25 credits.
R: Open only to Biomechanics graduate students.
Approval of department.
QP: DEPT.APP Qk BIM 899

BIOMEDICAL ENGINEERING

311*. Introduction to Biomedical Engineering
Fall. 3(03-00)
R: Interdepartmental with the Department(s) of Metallurgy, Mechanics, and Materials Science, Chemical Engineering, Mechanical Engineering, Electrical Engineering, Metallurgy, Mechanics, and Materials Science.
P: MTH 235, PHY 184, BME 211.
QP: MTH 210 PHY 289BS 210

405*. Biomedical Electronics
Fall of even-numbered years. 3(3-0)
R: Interdepartmental with the Department(s) of Electrical Engineering.
P: MTH 135, PHY 184.
Electronic components and circuits. Physiological measurements, transmission of physiological events to electrical signals. Ultrasonic techniques, biomedical applications of lasers, x-ray and magnetic resonance imaging.
QP: MTH 112 PHY 238 Qk BME 410

424*. Biomedical Engineering Design
Fall of odd-numbered years. 3(3-0)
R: Interdepartmental with the Department(s) of Metallurgy, Mechanics, and Materials Science.
P: BME 311.
Biomechanics of human implantable materials. Design requirements imposed by the body's milieu and the need to protect it.
QP: BME 240 BOPSL 430 Qk BME 424

431*. Design of Biomedical Instrumentation
Fall. 3(3-0)
R: Interdepartmental with the Department(s) of Metallurgy, Mechanics, and Materials Science.
P: BME 311.
Design a biomedical instrumentation work related to biomedical measurement of momentum, heat and mass. Application to the mathematical description of transport processes in biological systems and to solution of biomedical problems.
QP: MTH 215 Qk BME 431

441*. Bioprocess Engineering
Fall of odd-numbered years. 3(3-0)
R: Interdepartmental with the Department(s) of Metallurgy, Mechanics, and Materials Science.
P: BME 311.
Application of solid mechanics to understanding biomechanical responses of biological tissues. Microstructure and biological function for soft and hard connective tissues and muscle.
QP: ANT 318 Qk BME 481

491*. Special Topics (MTC)
Fall, Spring. 3 to 12 credits. May reenroll for a maximum of 12 credits.
P: BME 311.
Special topics in biomedical engineering or biomedical engineering such as biochemical design, occupational biomechanics, biological surface science, or low temperature biotechnology.
QP: APPROVAL Qk BME 499

491A*. Biomechanical Design
Fall. 3(3-0)
P: BME 311, MMM 311, MMM 306.
Special topics in biomechanical design or biomechanical engineering of current interest and importance.
QP: APPROVAL Qk BME 499

491B*. Occupational Biomechanics
Fall. 3(3-0)
P: BME 311.
Special topics in biomechanical engineering or biomechanical engineering such as occupational biomechanics, occupational sciences, or low temperature biotechnology.
QP: APPROVAL Qk BME 499

491C*. Biological Surface Science
Fall. 3(3-0)
P: BME 311.
Special topics in biomedical engineering or biomechanical engineering of current interest and importance.
QP: APPROVAL Qk BME 499

Courses with an asterisk (*) have not been approved by the University Committee on Curriculum.

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