

EBME - Biomedical Engineering

EBME 100 Introduction to Biomedical Engineering: 2 Credits (2 Lec)

PREREQUISITE: Math Level III. (F) This course series serves as the introduction to the Biomedical Engineering major. Students will be introduced to the Biomedical Engineering major, career paths in biomedical engineering, biomedical engineering ethics (including the appropriate use of animal models), and current topics in faculty biomedical engineering research. Students will then present a poster about a biomedical research topic at a final symposium

EBME 102 Introduction to Biomedical Engineering Research: 1 Credits (1 Lec)

PREREQUISITE: AT Math Level 4. Students will learn about current topics in faculty biomedical engineering research and will learn to critically read research articles. Students will then present a poster about a biomedical research topic at a final symposium

EBME 301 Engineering Analysis of Physiological Systems: 3 Credits (3 Lec)

PREREQUISITE: M 274, ECHM 201. Engineering analysis of human physiology. Physiologic systems are treated as engineering systems with emphasis on input-output considerations, system interrelationships and engineering analogs. Differential equations, Laplace transform, and computer-aided tools will be introduced and used for modeling, simulation, statistical analysis, and error analysis purposes. Topics will cover mass and electrolyte transfer, nervous system, cardiovascular mechanics, respiratory system, renal system, and muscles

EBME 410 Fundamentals of Bioelectronics for Bioinstrumentation: 4 Credits (3 Lec, 1 Lab)

PREREQUISITE: CHMY 143 or CHMY 153; and PHSX 222 or PHSX 242. (F) This course teaches key topics in biology, electrochemistry, biophysics, biosensors and bioimplants aiming at developing bio instruments using bioelectronic fundamentals. Bioelectronics utilizes the basic concepts of electronic engineering and biophysical principles to biology and medicine. Important aspects of developing bioinstruments for the health care sector are its easy accessibility, easy operability, its interface with soft living structures, such as cells and tissues and ethics. This course will review basic electronic concepts and then introduce spectroscopy techniques, review electrochemical principles and then guide the students into electrode, sensor and sensor interface design

EBME 440 Biomedical Engineering Laboratory: 3 Credits (1 Lec, 2 Lab)

PREREQUISITE: EBME 410 and EIND 354. (F) This course provides students with hands-on experience with experimental design along with measuring and interpreting data from living systems and cell cultures. Students will be gain experience with engineering concepts of sensor calibration; statistical and uncertainty analysis; sampling; signal conditioning; computerized data acquisition. An overview of sensors for measuring various physical quantities (e.g., temperature, pressure, acceleration, load) will be provided along with discussion on measurement uncertainty and appropriate statistical methods to draw conclusions

EBME 480 Biomedical Engineering Design: 4 Credits (4 Lec)

PREREQUISITE: EBME 301, EBME 410, EMAT 464, EBIO 461. This is the capstone design course that requires students to combine knowledge from many of their previous courses and then to apply that knowledge to the design of useful and safe biomedical products. The design projects are based on open-ended challenges associated with biomedical product needs. Students are will learn to work effectively on a design team and to communicate with a wide range of audiences in both written and verbal form

EBME 480R Biomedical Engineering Design: 4 Credits (4 Lec)

PREREQUISITE: EBME 301, EBME 410, EMAT 464, EBIO 461.

(Su) This is the capstone design course that requires students to combine knowledge from many of their previous courses and then to apply that knowledge to the design of useful and safe biomedical products. The design projects are based on open-ended challenges associated with biomedical product needs. Students are will learn to work effectively on a design team and to communicate with a wide range of audiences in both written and verbal form