BME 100 Introduction to Biomedical Engineering
An introduction to and overview of biomedical engineering. Selected topics review state-of-the-art bioengineering developments in solving medical problems as well as the identification of clinical and health problems and their engineering solutions. Includes the roles of biotechnology and biomedical engineers in supporting global human well-being.

3 credits

BME 201-H Biomedical Engineering and Society
How engineers interact with others in the development of solutions to societal problems, with emphasis on engineering problems arising in the biological realm. In-depth evaluations of both successful and unsuccessful implementations illuminate the role of biomedical engineers in supporting the well-being of urban and rural populations throughout the world, through developments in medical engineering, biotechnology, environmental engineering, and ergonomic design. Not for credit in addition to BME 100.
Prerequisite: One D.E.C. category E course
3 credits

BME 212 Laboratory Methods in Biomedical Engineering
Introduction to data collection and analysis in the context of biophysical measurements commonly used by bioengineers. Statistical measures, hypothesis testing, linear regression, and analysis of variance are introduced in an application-oriented manner. Data collection methods using various instruments, A/D boards, and PCs as well as LabView, a powerful data collection computer package. Not for credit in addition to the discontinued BME 309.
Prerequisites: MAT 125 or 131 or 141; BME 100; BME major
3 credits

BME 300 Writing in Biomedical Engineering
See requirements for the major in Biomedical Engineering, upper-division writing requirement.
Prerequisites: WRT 102; U3 or U4 standing; BME major
Corequisite: Any 300-level BME course
S/U grading

BME 301 Bioelectricity
Theoretical concepts and experimental approaches used to characterize electric phenomena that arise in live cells and tissues. Topics include excitable membranes and action potential generation, cable theory, equivalent dipoles and volume conductor fields, bioelectric measurement, electrodes and electric stimulation of cells and tissues.
Prerequisites: ESE 271; ESG 111 (or ESE 130 or ESE 124 or MEC 111 or MEC 112); BIO 202 or 203
3 credits

BME 303 Biomaterials: Manufacture, Properties, and Applications
The engineering characteristics of materials, including metals, ceramics, polymers, composites, coatings, and adhesives, that are used in the human body. Emphasizes the need of materials that are considered for implants to meet the material requirements specified for the device application (e.g., strength, modulus, fatigue and corrosion resistance, conductivity) and to be compatible with the biological environment (e.g., nontoxic, noncarcinogenic, resistant to blood clotting if in the cardiovascular system). This course is offered as both ESM 353 and BME 353.
Prerequisite: ESG 332
3 credits

BME 381 Nanofabrication in Biomedical Applications
Theory and applications of nanofabrication. Reviews aspects of nanomachines in nature with special attention to the role of self-lubrication, intracellular or intercellular function and movement. Uses of nanofabrication in biology and biotechnology. Applications to medical devices and materials. Focus on principles of nanofabrication.

3 credits
BME 461 BioSystems Analysis
[Effective Fall 2005: title change]
Fundamentals of the linear time series analyses framework for modeling and mining biological data. Applications range from cardiorespiratory; renal blood pressure, flow, and sequence; to gene expression data. Tools of data analysis include Laplace and Z transforms, convolution, correlation, Fourier transform, transfer function, coherence function, various filtering techniques, and time-invariant and time-varying spectral techniques.
Prerequisites: BME 212 and 301
3 credits

BME 475 Undergraduate Teaching Practicum
Students assist the faculty in teaching by conducting recitation or laboratory sections that supplement a lecture course. The student receives regularly scheduled supervision by the faculty instructor. May be used as an open elective and repeated once.
Prerequisites: BME major; U4 standing; a minimum g.p.a. of 3.00 in all Stony Brook courses and a grade of B or better in the course in which the student is to assist; or permission of the department
3 credits

BME 481 Biosensors
A comprehensive introduction to the basic features of biosensors. Discusses types of most common biological agents (e.g. chromophores, fluorescence dyes) and the ways in which they can be connected to a variety of transducers to create complete biosensors for biomedical applications. Focus on optical biosensors and systems (e.g. fluorescence spectroscopy, microscopy), and fiber-optically based biosensing techniques. New technologies such as molecular beacons, Qdots, bioMEMs, confocal microscopy and multiphoton microscopy, and OCT will be referenced.
Prerequisites: BIO 202 or 203; ESE 271
3 credits

BME 499 Research in Biomedical Engineering
An independent research project with faculty supervision.
Prerequisites: B average in all science courses; permission of instructor and department
0-3 credits