
**Bioengineering Related Undergraduate Technical Courses
FALL 2020**

In addition to the courses below, there are many other more general courses not specifically biology-related but that are useful for BIOE training. Please contact Angelina Toporov, Grad Advisor and Emphasis Coordinator for more details via email at atoporov@engineering.ucsb.edu. Please see individual departments for more information about these courses.

CHEM 112A, Biophysical Chemistry Laws of thermodynamics, chemical equilibria and ligand binding, phase equilibria, electrochemistry, nonelectrolyte solutions, applications to biochemical problems. *Instructors: Han Songi, 4 units.*

CMPSC 111, Introduction to Computational Science Introduction to computational science, emphasizing basic numerical algorithms and the informed use of mathematical software. Matrix computation, systems of linear and nonlinear equations, interpolation and zero finding, differential equations, numerical integration. Students learn and use the Matlab language. *Instructors: Matni Z A, 4 units.*

CMPSC 130A, Data Structures and Algorithms I The study of data structures and their applications. Correctness proofs and techniques for the design of correct programs. Internal and external searching. Hashing and height balanced trees. Analysis of sorting algorithms. Memory management. Graph traversal techniques and their applications. *Instructors: Agrawal D, 4 units.*

CMPSC 165A, Artificial Intelligence Introduction to the field of artificial intelligence, which seeks to understand and build intelligent computational systems. Topics include intelligent agents, problem solving and heuristic search, knowledge representation and reasoning, uncertainty, probabilistic reasoning, and applications of AI. *Instructors: Wang Yuxiang, 4 units.*

ECE 179D, Introduction to Robotics: Dynamics and Control Dynamic modeling and control methods for robotic systems. LaGrangian method

for deriving equations of motion, introduction to the Jacobian, and modeling and control of forces and contact dynamics at a robotic end effector. Laboratories encourage a problem-solving approach to control. *Instructors: Byl K A, 4 units.*

ME 128, Design of Biomedical Devices Introductory course addresses the challenges of biomedical device design, prototyping and testing, material considerations, regulatory requirements, design control, human factors and ethics. *Instructors: Laquette, 3 units.*

PSTAT 10, Principles of Data Science with R Offers qualified undergraduates the opportunity to work in research laboratories in biophysics. *Instructors: Staff, 5 units.*

PSTAT 122, Design and Elements of Experiments An Introduction to statistical design and analysis of experiments. Covers: principles of randomization, blocking and replication; fixed, random and mixed effects models; block designs, factorial designs and nested designs; analysis of variance and multiple comparison. *Instructors: Staff, 4 units.*

PSTAT 134, Statistical Data Science Overview and use of data science tools in R and Python for data retrieval, analysis, visualization, reproducible research and automated report generation. Case studies will illustrate practical use of these tools. *Instructors: Staff, 4 units.*