Bioengineering Related Graduate Courses Spring 2021

ENGR 220B, Molecular Bioengineering introduces students to structural components of cells with application of engineering principles for analysis. Topics include: biomembrane structure and function, membrane proteins, membrane transport, intracellular compartments, intracellular trafficking, chemotaxis, cell cycle, apoptosis, and stem cells. *4 units. T R 9:30 am - 10:45 am*

ENGR 225, Current Topics in Bioengineering Seminar series highlighting current topics and advances in bioengineering presented by UCSB faculty or visiting scientists providing context and motivation for bioengineering learning, introducing students to concepts outside of their primary research specialty, and promoting interdisciplinary thinking and research collaboration. *1 unit. R 2:00 pm - 3:15 pm*

ENGR 230, Bioengineering Student Seminar Seminar series where students present their original thesis research and also review journal articles that critically analyze contemporary bioengineering research. Three quarters of ENGR 230 are required for the optional BioE graduate emphasis. Presentations will be evaluated and feedback provided. *1 unit. T 2:00 pm - 3:15 pm*

BMSE 204, MCDB 245, Post-translational Protein Processing Structure/function relationships in interesting macromolecules isolated from marine organisms. Focus is on well-characterized pathways from horseshoe crabs, abalones, mussels, and fish as well as others. *4 units. T R 11:00 am - 12:15 pm, F 9:00 am - 9:50 pm*

BMSE 223, Chem 223, MCDB 223, Signal Transduction A cell's growth is controlled by positive and negative cues from its surroundings. A discussion of the cell's signaling mechanisms that recognize these cues and initiate and intracellular set of events that generates a response. *3 units. M W F 9:00 am - 9:50 am*

BMSE 265, BMSE Seminar Discussion Group A weekly seminar discussion group to review, in advance, relevant literature of participating BMSE seminar guests. *1 unit. T 3:00 pm - 4:00 pm*

BMSE 290BP, Group Studies: Bacterial Pathogenesis Presentation and discussion of current research, to be selected from the following list: BP. Bacterial Pathogenesis. *2 units. TBA*

BMSE 290CE, Group Studies: C. elegans Development Presentation and discussion of current research, to be selected from the following list: CE. C. elegans Development. *2 units. TBA*

BMSE 290DN, Group Studies: Development Neurobiology Presentation and discussion of current research, to be selected from the following list: DN. Developmental Neurobiology. *2 units. TBA*

BMSE 595, Biochemistry/Molecular Biology Literature Seminar A critical review of research in selected areas of biochemistry-molecular biology. *2 units. TBA*

BMSE 595BG, Biochemistry/Molecular Biology Literature Seminar A critical review of research in selected areas of biochemistry-molecular biology. *2 units. TBA*

CH E 241, Advanced Science and Engineering of Energy Conversion The course provides a framework for understanding the energy supply issues facing society with a focus on the science, engineering, and economic principles of the major alternatives. Emphasis will be on the physical and chemical fundamentals of energy conversion technologies. *3 units. M W 8:00 am - 9:15 am*

CH E 272, Omics-enabled Biotechnology Integrates genomic, transcriptomic, metabolomic, and proteomic approachesto quantify and understand intricate biological systems. Complementary bioinformatics approaches to curate the large datasets associated with these experiments are also discussed. Recent examples from the literature reinforce core concepts, ranging from applications to human health to the environment. By the end of the course, students should be able to design an integrated experiment that capitalizes on these "omics"-

based approaches to enhance the scope of their research. *3 units. T R 12:30 pm - 1:45 pm*

CHEM 223, BMSE 223, MCDB 223, Signal Transduction See BMSE 223 for course description.

CHEM 239, Selected Topics in Organic Chemistry Selected topics from organic chemistry the contents of this course will vary. *1-4 units. M W 2:00 pm - 3:15 pm*

CHEM 242C, Chemical Aspects of Biological Systems Macromolecular biosynthesis and specialized cellular processes. A survey of nucleic acid and protein biosynthesis, characterization of lipids and membranes; function of membranes in transport, energy transduction, and cellular control; mechanisms of muscle contraction and cell motility; neurochemistry. *3 units. T R 2:00 pm - 3:15 pm*

CHEM 245, Computational Biochemistry Introduction to molecular modeling and molecular dynamics. Discussion of practical considerations of energy minimization, solvent modeling, structure-based drug design. Practical computer graphics experience. *3 units. T R 3:30 pm - 4:45 pm*

CHEM 251, Protein Processing Structure/function relationships in interesting macromolecules isolated from marine organisms. Focus is on well-characterized pathways from horseshoe crabs, abalones, mussels, and fish as well as others. *4 units. T R 11:00 am - 12:15 pm, F 9:00 am - 9:50 pm*

CHEM 259, Selected Topics in Biological Chemistry Selected topics from bio-organic, biophysical, or biological chemistry. The content of this course will vary. *1-4 units. 9:30 am - 10:45 am*

CHEM 262A, Drug Design Sources for new drugs. Biochemistry of diseases. Target validation techniques. Mechanism of action of enzymes and receptors. Enzyme inhibition and receptor binding studies. Structure base drug design: conformational analysis, docking and binding affinity calculations. Course also teaches proposal writing skills. *3 units. M W F 11:00 am - 11:50am*

CHEM 290, Seminar in Chemistry and Biochemistry Presentation of seminar required of all departmental graduate students. *2 units. F 10:00 am - 11:50 am*

EEMB 276, Advanced Biostatistics Accelerated overview of parametric and nonparametric techniques that are used in the biological sciences. The course unifies nearly all traditional statistical tests by expressing them all as a single unified testing protocol. *2 units. M W 10:00 am - 11:50 am, W 1:00 pm- 3:00 pm*

EEMB 276L, Advanced Biostatistics Lab Students use computerized sampling to measure the robustness and power of a wide diversity of parametric vs. nonparametric tests. Students also learn to use computerized software to carry out all the tests described in the lecture class. *2 units. R 4:00 pm - 6:00 pm*

EEMB 511, Writing Science-EEMB Colloquium A hands-on workshop to polish writing skills. Modules focus on "story telling" to make ideas compelling, streamlining to make writing compact and effective, and developing flow of ideas and paragraphs. Students work on a chapter, paper, or proposal. *2 units. M W 1:00 pm - 3:50 pm*

EEMB 595EV, Evolutionary Biology A critical review of research in selected fields of biology. *2 units. R 3:00 pm - 4:50 pm*

EEMB 595TE, Theoretical Ecology and Evolution Focus on Bayesian Methods, featuring special guest instructor Grace DiRenzo. *2 units. R 11:00am-12:15pm*

MATRL 200C, Structure Evolution Study of phenomena underlying the evolution of structure across the relevant length and time scales in Materials. Structural defects. Drving forces, mechanisms and kinetics of structural change. Diffusional transport. Fundamentals of phase transformations. Crystallization. Evolution of microstructural features and patterns. *4 units. M W 10:00 am - 11:50 am, F 9:00 am - 10:50 am*

MATRL 271C, Properties of Macromolecules Fundamentals of the properties of macromolecular solutions, melts, and solids. Viscosity, diffusion and light scattering from dilute solutions. Elements of

macromolecular solid state structure. Thermal properties and processes. Mechanical and transport properties. Introduction to electrical and optical properties of macromolecules. *3 units. T R 9:30 am - 10:45 am*

MATRL 276B, Biomolecular Materials II: Applications Interactions and self assembly in biomolecular materials. Chemical and drug delivery systems. Tissue engineering. Protein synthesis using recombinant nucleic acid methods: advance materials development. Nonviral gene therapy. *3 units. T R 11:00 am - 12:15 pm*

MCDB 223, Ch E 223, BMSE 223, Signal Transduction See BMSE 223 for course description.

MCDB 225, Development The molecular mechanisms of pattern formation and cellular differentiation that underlie developmental processes in a variety of important model systems. *2 units. M W F 9:00 am - 9:50 am, T R 8:00 am - 9:15 am*

MCDB 226C, Basic Pharmacology: Principles and Chemotherapy Fundamental principles of pharmacology, drug-receptor theory, biochemical mechanisms of action of drugs. *4 units. M W F 10:00 am - 10:50 am, F 9:00 am - 9:50 am, W 8:00 am - 8:50 am*

MCDB 245, BMSE 204, Post- Translational Protein Processing See BMSE 204 for Course Description.

MCDB 246, Stem Cell Biology in Health and Disease Basic biology of embryonic and adult stem cells and nuclear transfer, with emphasis on latest findings from the current literature. *4 units. M W 2:00 pm - 3:15 pm*

MCDB 253, Neurobiology III: Developmental Neurobiology This course begins with fertilization and moves through sequential stages in the development of the nervous system, including cell migration and differentiation, axon outgrowth and pathfinding, programmed cell death, synaptogenesis, learning, memory, neurodegenerative conditions and current strategies for neuronal regeneration. *4 units. T R 9:30 am - 10:45 am*

MCDB 263, Progress in Biochemistry and Molecular Biology Research seminars presented by invited speakers on current research topics. *1 unit. R 11:00 am - 12:15 pm*

ME 292, Design Transducer Design issues associated with microscale transduction. Electrodynamics, linear and nonlinear mechanical behavior, sensing methods, MEMS-specific fabrication rules, and layout are all covered. Modeling techniques for electromechanical systems are also discussed. *3 units. M W 8:00 am - 9:15 am*

PSTAT 231, Data Mining Introduction to data mining techniques. Model assessment and performance evaluation. Data preparation. Programming techniques for transforming raw data into a form suitable for predictive modeling. Extracting data to a form that predictive models can utilize. Incorporating non-numeric data in predictive models. Techniques for managing exceptional and extreme data. Building predictive models using SAS Enterprise Miner 5 in SAS 9, including Decision Trees, Neural Networks, and Bayesian Networks. *4 units. T R 5:00 pm - 6:15 pm*

PSTAT 274, Time Series Stationary and non-stationary models, seasonal time series, ARMA models: calculation of ACF, PACF, mean and ACF estimation. Barlett's formula, model estimation: Yule-Walker estimates, ML method. Identification techniques, diagnostic checking, forecasting, spectral analysis, the periodogram. Current software and applications. *4 units. W F 12:30 pm - 1:45 pm*

PSY 221C, Multivariate Analysis in Psychology and Related Social Sciences The use in psychology of the general linear model, multiple regression, discriminant function analysis, factor-analysis, and prinicipal components analysis *4 units. T R 9:30 am - 11:00 am; F 9:00 am-10:50 am*

PSY 269, Neuroanatomy An examination of the organization of the vertebrate nervous system. Topicsinclude neurohistological techniques; neurology and neuropsychology; comparative neuroanatomy; neural degeneration; developmental neuroscience. *4 units. W 9:00 am - 11:50 am*