Genomics and Systems Biology Focus Area –
Upper-Level Engineering Courses – updated January, 2024

EN.510.311	Structure of Materials	3
EN.510.316	Biomaterials I	3
EN.510.407	Biomaterials II: Host response and biomaterials applications	3
EN.510.436	Biomaterials for Cell Engineering	3
EN.520.315	Introduction to Processing of Audio and Visual Signals	3
EN.520.353	Control Systems	4
EN.520.414	Image Processing & Analysis	3
EN.520.415	Image Process & Analysis II	3
EN.520.432	Medical Imaging Systems	3
EN.520.454	Control Systems Design	3
EN.520.636	Feedback Control of Biological Signaling Pathways	3
EN.530.327	Introduction to Fluid Mechanics	3
EN.530.343	Design and Analysis of Dynamical Systems	4
EN.530.410	Biomechanics of the Cell	3
EN.530.414	Computer-Aided Design	3
EN.530.420	Robot Sensors/Actuators	4
EN.530.436	Bioinspired Science and Technology	3
EN.530.445	Introduction to Biomechanics	3
EN.530.448	Biosolid Mechanics	3
EN.540.303	Transport Phenomena I	3
EN.540.304	Transport Phenomena II	4
EN.540.432	Project in Design: Pharmacokinetics	3
EN.540.409	Dynamic Modeling and Control	4
EN.540.414	Computational Protein Structure Prediction and Design	3
EN.540.421	Project in Design: Pharmacodynamics	3
EN.540.432	Project in Design: Pharmacokinetics	3
EN.553.361	Introduction to Optimization	4
EN.553.362	Introduction to Optimization II	4
EN.553.391	Dynamical Systems	4
EN.553.400	Mathematical Modeling and Consulting	4
EN.553.420	Introduction to Probability (or EN.553.421)	4
EN.553.426	Introduction to Stochastic Processes	4
EN.553.430	Introduction to Statistics	4
EN.553.436	Intro Data Science	4
EN.553.450	Computational Molecular Medicine	4
EN.553.493	Mathematical Image Analysis	4
EN.570.351	Introduction to Fluid Mechanics	3
EN.580.418	Principles of Pulmonary Physiology	3
EN.580.427	Microphysiological Systems and Laboratory	3
EN.580.428	Genomic Data Visualization	3
EN.580.430	Systems Pharmacology and Personalized Medicine	3
EN.580.431	Introduction to Computational Medicine: Imaging	2
EN.580.432	Principles of Genomic Systems Engineering and Synthetic Biology	3
EN.580.433	Introduction to Computational Medicine: The Physiome	2

EN.580.439	Models of the Neuron	4
EN.580.441	Cellular Engineering	3
EN.580.444	Biomedical Applications of Glycoengineering	3
EN.580.446	Physical Epigenetics	3
EN.580.447	Computational Stem Cell Biology	3
EN.580.448	Computational Genomics: Data Analysis	3
EN.580.454	Methods in Nucleic Acid Sequencing	3
EN.580.460	Epigenetics at the Crossroads of Genes and the Environment	2
EN.580.464	Advanced Data Science	3
EN.580.471	Principles of Design: Biomedical Instrumentation	4
EN.580.479	X-Ray Imaging and Computed Tomography	3
EN.580.480	Precision Care Medicine I	4
EN.580.481	Precision Care Medicine II	4
EN.580.488	Foundations of Computational Biology & Bioinformatics	3
EN.580.491	Learning Theory	3
EN.580.571	Honors Biomedical Instrumentation	2
EN.580.625	Structure and Function of the Auditory and Vestibular Systems	3
EN.580.752	Advanced Topics in Regenerative and Immune Engineering	4
EN.601.350	Introduction to Genomic Research	3
EN.601.449	Computational Genomics: Applied Computational Genomics	3
EN.601.465	Natural Language Processing	3
EN.601.475	Machine Learning	3
EN.601.476	Machine Learning: Data to Models	3
EN.601.482	Machine Learning: Deep Learning	3

Contact the department advising office for course additions.

200-Level Engineering Courses

(maximum of 3 credits from this list may count in focus area)

EN.520.214	Signals & Systems I	3/4
EN.520.216	Introduction To VLSI	3
EN.601.226	Data Structures	3/4
EN.520.230	Mastering Electronics	3
EN.520.231	Mastering Electronics Lab	2
EN.580.212	Design Team	3/4
EN.580.298	Advanced Design Team	3

Non Upper-Level Focus Area Courses

(maximum of 3 credits from this list may count in focus area)
(courses used from this category cannot be double-counted)

AS.020.303	Genetics	3
AS.080.305	The Nervous System I	3
EN.580.112	BME Design Group	3

Students may use a maximum of 3 research credits as a non-upper-level engineering course.