

Biomedical Data Science Focus Area –
Upper-Level Engineering Courses – updated January, 2023

EN.520.344	Digital Signal Processing	3
EN.520.385	Signals, Systems and Learning	3
EN.520.412	Machine Learning for Signal Processing	3
EN.520.414	Image Process and Analysis I	3
EN.520.415	Image Process and Analysis II	3
EN.520.432	Medical Imaging Systems	3
EN.520.447	Information Theory	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.540.468	Intro Nonlinear Dynamics and Chaos	3
EN.553.361	Introduction to Optimization	4
EN.553.362	Introduction to Optimization II	4
EN.553.371	Cryptology and Coding	4
EN.553.385	Scientific Computing: Differential Equations	4
EN.553.386	Scientific Computing: Linear Algebra	4
EN.553.391	Dynamical Systems	4
EN.553.400	Mathematical Modeling and Consulting	4
EN.553.401	Introduction to Research	3
EN.553.413	Applied Statistics and Data Analysis	4
EN.553.420	Introduction to Probability	4
EN.553.426	Introduction to Stochastic Processes	4
EN.553.430	Introduction to Statistics	4
EN.553.433	Monte Carlo Methods	3
EN.553.436	Intro Data Science	4
EN.553.450	Computational Molecular Medicine	4
EN.553.463	Network Models in Operations Research	4
EN.553.467	Deep Learning in Discrete Optimization	3
EN.553.472	Graph Theory	4
EN.553.488	Computing for Applied Mathematics	3
EN.553.492	Mathematical Biology	3
EN.553.493	Mathematical Image Analysis	3
En.553.630	Introduction to Statistics	4
EN.553.720	Probability Theory I	4
EN.553.721	Probability Theory II	4
EN.553.730	Statistical Theory	4
EN.553.731	Statistical Theory II	4
EN.580.431	Introduction to Computational Medicine: Imaging	2
EN.580.433	Introduction to Computational Medicine: The Physiome	2
EN.580.437	Neuro Data Design I	4
EN.580.438	Neuro Data Design II	4
EN.580.439	Models of the Neuron	4

EN.580.446	Physical Epigenetics	3
EN.580.447	Computational Stem Cell Biology	3
EN.580.460	Epigenetics at the Crossroads of Genes and the Environment	1.5
EN.580.462	Representations of Choice	3
EN.580.464	Advanced Data Science	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	4
EN.580.491	Learning Theory	3
EN.580.709	Sparse Representations in Computer Vision and Machine Learning	3
EN.601.315	Databases (or EN.601.415)	3
EN.601.318	Operating Systems	3
EN.601.320	Parallel Programming	3
EN.601.350	Introduction to Genomic Research	3
EN.601.402	Digital Health and Biomedical Informatics	1
EN.580.425	Radiology for Engineers	3
EN.601.433	Introduction to Algorithms	3
EN.601.434	Randomized and Big Data Analysis	3
EN.601.443	Security and Privacy Computing	3
EN.601.446	Sketching and Indexing for Sequences	3
EN.601.447	Computational Genomics: Sequences	3
EN.601.448	Computational Genomics: Data Analysis	3
EN.601.454	Augmented Reality	3
EN.601.455	Computer Integrated Surgery I	4
EN.601.456	Computer Integrated Surgery II (or EN.601.496)	3
EN.601.457	Computer Graphics	3
EN.601.461	Computer Vision	3
EN.601.463	Algorithms for Sensor-Based Robotics	3
EN.601.464	Artificial Intelligence	3
EN.601.465	Natural Language Processing	3
EN.601.466	Information Retrieval and Web Agents	3
EN.601.468	Machine Translation	3
EN.601.474	Machine Learning Theory	3
EN.601.475	Introduction to Machine Learning	3
EN.601.476	Machine Learning: Data to Models	3
EN.601.477	Casual Inference	3
EN.601.482	Machine Learning: Deep Learning	3
EN.601.491	Human Robot Interaction	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.580.298	Advanced Design Team	3
EN.601.226	Data Structures	3/4

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.110.311	Methods of Complex Analysis	3/4
AS.110.405	Introduction to Real Analysis	3/4
AS.110.421	Dynamical Systems	3/4
AS.110.443	Fourier Analysis	3/4
EN.580.112	BME Design Group	3
EN.601.231	Automata & Computation Theory	3

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