Imaging and Medical Devices Focus Area - Upper-Level Engineering Courses – updated January, 2023

EN.510.311	Structure of Materials	3
EN.510.313	Mechanical Properties of Materials	3
EN.510.314	Electronic Properties of Materials	3
EN.510.316	Biomaterials I	3
EN.510.403	Materials Characterization	3
EN.510.407	Biomaterials II: Host response and biomaterials applications	3
EN.510.422	Micro and Nano Structured Materials & Devices	3
EN.510.430	Biomaterials Lab	3
EN.520.315	Introduction to Bio-Inspired Processing of Audio-Visual Signals	3
EN.520.340	Introduction to Mechatronics	3
EN.520.344	Digital Signal Processing	3
EN.520.349	Microprocessor Lab I	3
EN.520.353	Control Systems	4
EN.520.385	Signals, Systems and Machine Learning	3
EN.520.414	Image Processing & Analysis	3
EN.520.415	Image Process & Analysis II	3
EN.520.417	Computation for Engineers	3
EN.520.418	Modern Convex Optimization	3
EN.520.424	FPGA Synthesis Lab	3
EN.520.427	Design of Biomedical Instruments and Systems	3
EN.520.432	Medical Imaging Systems	3
EN.520.433	Medical Image Analysis	3
EN.520.447	Information Theory	3
EN.520.448	Electronics Design Laboratory	3
EN.520.450	Advanced Microprocessor Lab	3
EN.520.453	Advanced ECE Engineering Team Project	3
EN.520.454	Control Systems Design	3
EN.520.483	Bio-Photonics Laboratory	3
EN.520.491	CAD Design of Digital VLSI Systems I	3
EN.520.492	Mixed-Mode VLSI Systems	3
EN.520.495	Microfabrication Laboratory	4
EN.520.631	Ultrasound and Photoacoustic Beamforming	3
EN.520.646	Wavelets & Filter Banks	3
EN.520.651	Random Signal Analysis	3
EN.530.381	Engineering Design Process	3
EN.530.414	Computer-Aided Design	3
EN.530.420	Robot Sensors and Actuators	3
EN.530.421	Mechatronics	3
EN.530.424	Dynamics of Robots and Spacecraft	3
EN.530.441	Introduction to Biophotonics	3
EN.530.445	Biomechanics	3

EN.530.446	Experimental Methods in Biomechanics	3
EN.530.468	Locomotion Mechanics: Fundamentals	3
EN.530.473	Molecular Spectroscopy and Imaging	3
EN.530.474	Effective and Economic Design for Biomedical Instrumentation	3
EN.530.480	Image Processing and Data Visualization	3
EN.530.646	Robot Devices, Kinematics, Dynamics, and Control	3
EN.530.672	Biosensing & BioMEMS	3
EN.530.691	Haptic Interface Design for Human-Robot Interaction	3
EN.540.403	Colloids and Nanoparticles	3
EN.540.440	Micro/Nanotechnology: The Science and Eng of Small Structures	3
EN.553.361	Introduction to Optimization	4
EN.553.362	Optimization II	4
EN.553.391	Dynamical Systems	4
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.553.472	Graph Theory	4
EN.553.493	Mathematical Image Analysis	3
EN.553.630	Statistical Theory	4
EN.553.761	Nonlinear Optimization I	3
EN.553.762	Nonlinear Optimization II	3
EN.580.425	Radiology for Engineers	3
EN.580.435	Applied Bioelectrical Engineering	3
EN.580.464	Advanced Data Science	3
EN.580.456	Introduction to Rehabilitation Engineering	3
EN.580.457	Rehabilitation Engineering Design Lab	3
EN.530.468	Locomotion Mechanics: Fundamentals	3
EN.530.469	Locomotion Mechanics: Recent Advances	3
EN.580.468	Practical Human Neuroengineering	3
EN.580.471	Principles of Design of BME Instrumentation	4
EN.580.479	X-ray Imaging and Computed Tomography	3
EN.580.491	Learning, Estimation, and Control	3
EN.580.493	Imaging Instrumentation	3
EN.580.494	Build an Imager	3
EN.580.571	Honors Instrumentation	2
EN.580.678	Biomedical Photonics	3
EN.580.689	Modern Optical Microscopy: Theory and Practice	3
EN.580.740	Surgery for Engineers	3
EN.580.742	Neural Implants and Interfaces	3
EN.601.315	Databases (or 601.415)	3
EN.601.454	Augmented Reality	3
EN.601.455	Computer Integrated Surgery I	4
EN.601.456	Computer Integrated Surgery II (or EN.580.469)	3

EN.601.461	Computer Vision	3
EN.601.463	Algorithms for Sensor Based Robotics	3
EN.601.475	Introduction to Machine Learning	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 and Systems I	3/4
EN.520.230	Mastering Electronics	2
EN.520.231	Mastering Electronics Lab	2
EN.530.241	Electronics and Instrumentation	3
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.110.405	Introduction to Real Analysis	3/4
AS.110.443	Fourier Analysis	3/4
EN.580.112	BME Design Group	3

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