Research Area Core Requirements

Computational Anatomy	Computational Molecular Medicine	Computational Physiological Medicine
Cores		
Computational Anatomy *(choose at least 2 below)*	***Mathematical Bioinformatics*** *(choose at least 2 below)*	***Modeling of Biological Systems*** *(choose at least 2 below)*
110.439 Introduction to Differential Geometry (4.5 cr) **Or** 110.646 Riemannian Geometry (3 cr) **Or** 550.480 Shape and Geometry (3 cr)	550.635 Topics in Bioinformatics (3 cr)	530.671 Statistical Mechanics in Biological Systems (3 cr)
	550.435 Bioinformatics and Statistical Genetics (3 cr)	580.682 Computational Modeling of the Cardiac Myocyte (3 cr)
	550.420 Introduction to Probability Theory (4 cr)	580.639 Modeling of Physiological Processes in the Neuron (4 cr)
110.619-620 Lie Groups and Lie Algebras (3 cr)	580.687 Foundations of Mathematical Bioinformatics (3 cr)	580.7XX Modeling Approaches in Cardiac Arrhythmia Research (3 cr)
580.744 Pattern Theory: From Representation to Inference (3 cr)	580.610 Computational Functional Genomics (2 cr)	580.635 Bioelectromagnetic Phenomena (3 cr)
	580.691 Learning Theory I (3 cr)	
Imaging *(choose at least 1 course below)*	***Quantitative Life Sciences*** *(choose at least 1 below)*	***Quantitative Life Sciences*** *(choose 1 or more below)*
600.461 Computer Vision (3 cr)	020.630 Human Genetics (2 cr)	580.690 Systems Biology of Cell Regulation (3 cr)
580.464 Advanced Topics in Computer Vision (3cr)	020.639 Macromolecular Assemblies in Biology (3 cr)	580.636 Feedback Control in Biological Signaling Pathways (3 cr)

520.414 Image Processing and Analysis I (3 cr)	020.642 Proteins: Structure, Folding and Interactions (3 cr)	580.633 Calcium Signals in Biological Systems (3 cr)
520.415 Image Processing and Analysis II (3 cr)	020.676 Functional Interpretation of Biological Structure (3 cr)	580.632 Ionic Channels in Excitable Membranes (3 cr)
520.608 Image Reconstruction and Restoration (3 cr)	020.629 Integrated Signals and Biochemistry of Transcriptional Processes in Eukaryotes (2.5 cr)	580.628 Topics in Systems Neuroscience (1 cr)
550.493 Mathematical Image Analysis (3 cr)	020.638 Regulation and Mechanisms of the Cell Cycle (2 cr)	580.630 Theoretical Neuroscience (2 cr)
580.472 Medical Imaging Systems (3 cr)	250.685 Proteins and Nucleic Acids (3 cr)	530.445 Introduction to Biomechanics (3 cr)
580.748 Magnetic Resonance in Medicine (3 cr)	580.636 Feedback Control in Biological Signaling Pathways (3 cr)	580.448 Biomechanics: Cells and Organisms (3 cr)
	580.690 Systems Biology of Cell Regulation (3 cr)	580.461 Biological Transport (3 cr)