

**Math**

AMCS 601 Algebraic Techniques for Applied Mathematics and Computational Science I  
AMCS 602 Algebraic Techniques for Applied Mathematics and Computational Science II  
AMCS 608 Analytic Techniques for Applied Math and Computational Science I  
AMCS 609 Analytic Techniques for Applied Mathematics and Computation Science II  
BE 530 Theoretical and Computational Neuroscience  
BE 567 Mathematical Computation Methods for Modeling Biological Sys  
BE 584 Mathematics of Medical Imaging and Measurements  
BE 619 Statistical Mechanics  
BIOL 556 Advanced Statistics  
BIOM 520 Concepts and Methods in Biostatistics - Basic  
BIOM 521 Concepts and Methods in Biostatistics - Intermediate  
BSTA 620 Probability I  
BSTA 621 Statistical Inference I  
BSTA 622 Statistical Inference II  
BSTA 630 Statistical Methods for Data Analysis I  
BSTA 631 Statistical Methods for Data Analysis II  
BSTA 651 Introduction to Linear Models and Generalized Linear Models.  
BSTA 774. Statistical Methods for Evaluating Diagnostic Tests.  
CBE 508 Probablity and Statistics for Biotechnology  
CBE 520 Modeling, Simulations, and Optimization of Chemical Processes  
CBE 617 Control of Nonlinear Systems  
Chem 521 Statistical Mechanics 1  
CIS 536 Computational Biology  
ENM 502 Numerical Methods and Modeling  
ENM 503 Introduction to Probability and Statistics  
ENM 510 Foundations of Engineering Mathematics I  
ENM 511 Foundations of Engineering Mathematics II  
ENM 520 Theory and Computation for ODE/PED-constrained optimization  
ENM 520 Topics in Computational Science and Engineering  
ENM 600 Functional Analysis  
ENM 601 Special Topics in Engineering Mathematics - Nonlinear Dynamics and Chaos  
ESE 500 Linear Systems Theory  
ESE 502 Introduction to Spatial Analysis  
ESE 504 Introduction to Optimization Theory  
ESE 505 Control of Systems  
ESE 530 Elements of Probability Theory and Random Processes  
ESE 531 Digital Signal Processing  
ESE 603 Simulation Modeling and Analysis  
ESE 632 Random Process Models and Optimum Filtering  
ESE 674 Information Theory  
Math 584 Mathematics of Medical Imaging  
MEAM 521 Introduction ot Parallel Computing  
MEAM 522 Fundamentals of Sensor Technology  
MEAM 527 Finite Element Analysis  
MEAM 528 Advanced Kinematics  
PUBH 501 Intro to Biostats  
Stat 500 Applied Regression and Analysis of Variance.  
Stat 510 Probability  
STAT 512 Mathematical Statistics.  
STAT 530 Probability  
STAT 541 Statistical Methods

**Biological Science courses**

BE 513 Molecular and Cellular Biology  
BE 555 Nanoscale Systems Biology.  
BIOM 501 Mechanisms of Disease and Therapeutic  
BIOM 600 Cell Biology  
BMB 508 Molecular Biophysics I  
BMB 509 Macromolecular Biophysics II  
BMB 567 Bioinorganic Chemistry  
BMB 590 Biological Physics  
BMB 614 Membrane Structural Biology  
BMB 616 Medical Problems in Modern Biochemistry  
BMB 622 Physical Principles of Mechano-Enzymes  
BMB 624 Ion Channels and Pumps  
BMB 625 Optical Methods in Cell Physiology  
BMB 626 Mass Spectrometry and Proteomics  
BSTA 509 Introduction to Epidemiology  
BSTA 510 Introduction to Anatomy and Physiology  
CAMB 511 Principles of Development  
CAMB 526 Experimental Principles in Cell and Molecular Biology  
CAMB 532 Human Physiology  
CAMB 550 Genetic Principles  
CAMB 597 Developmental Neuroscience  
CAMB 609 vaccines and Immunization Therapy  
CAMB 610 Molecular Basis of Gene Therapy  
CAMB 638 Advanced Seminar in Cell Death and Survival  
CAMB 752 Genomics  
GCB 527 Genetics for Computational Biology  
IMUN 506 Immune Mechanisms  
IMUN 508 Immune Responses  
IMUN 609 Vaccines and Immune Therapeutics  
INSC 575 Neurobiology of Learning and Memory  
MEAM 555 Nanoscale Systems Biology  
NGG 581 Auditory Neurobiology  
NGG 573 Neuroscience Core III  
NGG 575 Neurobiology of Learning and Memory  
NGG 592 Cognitive Neuroscience of Memory  
NGG 593 Structural Neurobiology  
NGG 598 Advanced Systems Neuroscience  
NGG 618 Recovery after Neural Injury  
NGG 631 Cognitive Neuroscience Affect  
NGG 632 Cognitive Neuroscience Vision  
PHRM 57 Principles of Cardiovascular Biology  
PHRM 531 Intro to Genome Science  
PHRM 600 Medical Pharmacology  
Phys 580 Biological Physics

### **Engineering and Science Electives**

BE 526 Building Brains in Silicon  
BE 539 Neural Networks, Chaos, and Dynamics: Theory and Application  
BE 583 Molecular Imaging  
BMB 628 Principles of Scientific Instruments  
CBE 535 Interfacial Phenomena  
EAS 504 Fundamental Concepts in Nanotec  
EAS 545 Engineering Entrepreneurship I  
EAS 546 Engineering Entrepreneurship II  
ENM 502 Numerical Methods and Modeling  
ENM 503 Introduction to Probability and Statistics  
ENM 510 Foundations of Engineering Mathematics I  
ENM 511 Foundations of Engineering Mathematics II  
ENM 520 Theory and Computation for ODE/PED-constrained optimization  
ENM 600 Functional Analysis  
ENM 601 Special Topics in Engineering Mathematics - Nonlinear Dynamics and Chaos  
ESE 510 Electromagnetic and Optical Theory  
ESE 511 Modern Optics and Image Understanding  
ESE 514 Physics of Materials  
ESE 519 Real-Time Embedded Systems  
ESE 525 nanoscale Science and Engineering  
ESE 529 Introduction to MEMS and NEMS  
ESE 572 Analog Integrated Circuits  
ESE 574 The Principles of Microfabrication Technology  
MSE 500 Experimental Methods in Material Science  
MSE 505 Mechanical Properties of Macro/Nanoscale Materials  
MSE 520 Structure of Materials  
MSE 537 Nanomechanics and Nanotribology at Interfaces  
MSE 550 Mechanical Properties of Nano and Macro-Scale Materials  
MSE 565 Fabrication and Characterization of Nanostructured Devices  
MSE 566 Physical Properties of Ceramics  
MSE 570 Physics of Materials I  
MSE 571 Physics of Materials II  
MSE 580 Polymers and Biomaterials  
MSE 650 Micromechanics of Deformation and Fracture  
MSE 670 Statistical Mechanics of Solids  
MTR 608 Translational Research

**BE Fundamentals**

BE 502 From Biomedical Science to the Marketplace  
BE 512 Bioengineering III: Biomaterials  
BE 521 Brain-Computer Interfaces  
BE 537 Biomedical Image Analysis  
BE 540 Biomolecular and Cellular Engineering  
BE 546 Fundamental Techniques of Imaging I  
BE 547 Fundamental Techniques of Imaging 2  
BE 550 Hemodynamics  
BE 552 Cellular Bioengineering  
BE 553 Principles, Methods, and Applications of Tissue Engineering  
BE 554 Engineering Biotechnology  
BE 555 Nanoscale Systems Biology  
BE 557 From Cells to Tissue: Engineering Structure and Function  
BE 562 Drug Discovery and Development  
BE 567 Mathematical and Computational Modeling of Biological Systems  
BE 580 Medical Radiation Engineering  
BE 581 Techniques of Magnetic Resonance Imaging  
BE 583 Molecular Imaging  
BE 608 Translational Therapeutics  
BIOL 536 Computational Biology  
BIOL 537 Advanced Computational Biology  
BMB 554 Macromolecular Crystallography: Methods and Applications  
BMB 590 Biological Physics  
BMB 601 Fundamentals of Magnetic Resonance  
BMB 603 Advanced Topics in Magnetic Resonance  
BMB 618 Applications of High Resolution NMR Spectroscopy to Problems in Structural Biology  
BMB 625 Optical Methods in Cell Physiology  
BMB 626 Mass Spectrometry and Proteomics  
CAMB 526 Experimental Principles in Cell and Molecular Biology  
CAMB 550 Genetic Principles  
CBE 510 Polymer Engineering  
CBE 560 Biomolecular Engineering  
CBE 563 Development and Manufacturing of Biopharm  
CBE 640 Transport Processes I  
CBE 641 Transport Processes II  
ESE 530 Elements of Neural Computation, Complexity, and Learning  
ESE 574 The Principles of Microfabrication Technology  
ESE 580 Polymers and Biomaterials  
MEAM 505 Mechanical Properties of Macro/Nanoscale Materials  
MEAM 519 Mechanical Properties of Nano and Macro-Scale Materials  
NGG 594 Computational Neuroscience  
PHRM 531 Intro to Genome Science  
MEAM 521 Introduction to Parallel Computing  
MEAM 522 Fundamentals of Sensor Technology  
MEAM 527 Finite Element Analysis  
MEAM 530 Continuum Mechanics  
MEAM 544 Continuum Biomechanics  
MEAM 554 Mechanics of Materials  
MEAM 555 Nanoscale Systems Biology  
MEAM 570 Transport Processes I  
MEAM 625 Haptic Interfaces  
MEAM 644 BioTransport: Fluid Mechanics, Heat and Mass Transfer

**Also Required for PhD students**

BE 699 Bioengineering Seminar  
BE 799 Research Rotation  
EAS 900 Research Conduct Research Engineering