

Biological Science Courses for MS/PhD in Bioengineering

*Please note that not all courses will be offered every year/semester and it is up to the student to confirm they have the appropriate background/prerequisites for the course.

*Please also note that there may be alternative courses that will meet the requirement, they should be 500-level or greater and should generally be taught outside of SEAS. You should review the available courses found on the Registrar's website:

<http://www.upenn.edu/registrar/>

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BE 5260 Immunology for Bioengineers

BE 5270 Immune Engineering

BE 5300 Theoretical and Computational Neuroscience

BE 5400 Principles of Molecular and Cellular Bioengineering

BE 5530 Principles, Methods, and Applications of Tissue Engineering

BE 5550 Nanoscale Systems Biology

BE 5560 Molecular Diagnostics for Precision

BE 5580 Principles of Biol Fabrication

BE 5610 Musculoskeletal Biology & Bioengineering

BE 5630 Advanced Topics in Musculoskeletal Biology & Bioengineering

BE 5650 Developmental Engineering of Tissues

BE 5660 Network Neuroscience

BE 5670 Modeling Biological Systems

BE 5690 Systems Biology of Cell Signaling and Behavior

BE 5760 The Cell as a Machine

BE 5780 – Principles of Controlled Release Systems

BIOL 5010 Advanced Cell Biology

BIOL 5062 – Biological Foundations for Bioengineering and Biotechnology: Cellular and Molecular Biology

BIOL 5262 Omics Analysis: From Genomes to Organisms

BIOL 5110 Neural Systems and Behavior

BIOL 5116 Neural Circuits for Survival

BIOL 5210 Molecular Biology and Genetics

BIOL 5220 Human Evolutionary Genomics

BIOL 5231 Genome Science and Genomic Medicine

BIOL 5234 Epigenetics

BIOL 5240 Genetic Analysis

BIOL 5262 – Biological Foundations for Bioengineering and Biotechnology: Genomics and Omics Technologies

BIOL 5318 Systems Biology: Integrative physiology and biomechanics of the muscular system

BIOL 5820 Biological Foundations: Exploring Groundbreaking Research
BIOL 5825 Biochemistry and Molecular Genetics Superlab
BIOM 5010 Mechanisms of Disease and Therapeutics
BIOM 6000 Cell Biology
BIOM 5020 Mechanisms of Disease
BIOM 5100 Case Studies in Translational Research
BMB 5080 Molecular Biophysics I
BMB 5090 Macromolecular Biophysics II
BMB 5100 Data Analysis and Scientific Inference
BMB 5670 Bioinorganic Chemistry
BMB 5850/BBCB 5850 Wistar Institute Cancer Biology Course: Signaling Pathways in Cancer
BMB 5900 Biological Physics
BMB 6140 Membrane Structural Biology
BMB 6160 Medical Problems in Modern Biochemistry
BMB 6220 Physical Principles of Mechano-Enzymes
BMB 6240 Ion Channels and Pumps
BMB 6250 Optical Methods in Cell Physiology
BMB 6260 Mass Spectrometry and Proteomics
BMIN 5010 Introduction to Biomedical and Health Informatics
BSTA 5090 Introduction to Epidemiology
BSTA 5100 Introduction to Anatomy and Physiology
BSTA 7510 Statistical Methods for Neuroimaging
CAMB 5100 Immunology
CAMB 5110 Principles of Development
CAMB 5220 Human Evolutionary Genomics
CAMB 5260 Experimental Principles in Cell and Molecular Biology
CAMB 5320 Human Physiology
CAMB 5500 Genetic Principles
CAMB 5970 Neural Development, Regeneration and Repair
CAMB 6090 Vaccines and Immunization Therapy
CAMB 6100 Molecular Basis of Gene Therapy
CAMB 6330 Advanced Seminar in Gene Therapy
CAMB 6380 Advanced Seminar in Cell Death and Survival
CAMB 6970 Biology of Stem Cells
CAMB 7520 Genomics
CBE 5170 Principles of Genome Engineering
CIS 5350 Introduction to Bioinformatics (also offered as GCB 5350 and MTR 5350)
GCB 5270 Genetics for Computational Biology
IMUN 5060 Immune Mechanisms
IMUN 5080 Immune Responses
IMUN 6090 Vaccines and Immune Therapeutics
INSC 5750 Neurobiology of Learning and Memory
MEAM 5550 Nanoscale Systems Biology
MPHY 6030 Image- Based Anatomy

MPHY 6070 Radiation Biology
MSE 5180 Structure and Function of Biological Materials
NGG 5720 Neuroscience Core I
NGG 5730 Neuroscience Core III
NGG 5750 Neurobiology of Learning and Memory
NGG 5870 Neurobiology of Disease
NGG 5880 Topics in Translational Neuroscience
NGG 5920 Cognitive Neuroscience of Memory
NGG 5930 Structural Neurobiology
NGG 5940 Theoretical and Computational Neuroscience
NGG 5970 Neural Development, Regeneration and Repair
NGG 5980 Advanced Systems Neuroscience
NGG 6180 Recovery after Neural Injury
NGG 6310 Cognitive Neuroscience Affect
NGG 6320 Cognitive Neuroscience Vision
PHRM 5310 Intro to Genome Science
PHRM 5700 Principles of Cardiovascular Biology
PHRM 6000 Medical Pharmacology
PHRM 6230 Fundamentals of Pharmacology
PSYC 5470 Foundations of Social, Cognitive, and Affective Neuroscience
PSYC 5490 A Neuroscience Perspective of Artificial Intelligence
REG 6210/CAMB 7070/MTR 6210 Cell and Gene Therapy
ANAT 5150 Human Anatomy: Musculoskeletal System
BE 5300 Theoretical and Computational Neuroscience
BE 5400 Biomolecular and Cellular Engineering
BE 5550 Nanoscale Systems Biology
BE 5740 Special Topics: Applied Neurophysiology.
BE 5780 Principles of Controlled Release Systems
BIOL 5062 Biological Foundations for Bioengineering and Biotechnology:
Cellular and Molecular Biology
BIOL 5210 Molecular Biology and Genetics
BIOL 526 Experimental Principles in Cell and Molecular Biology
BIOL 527 Genetics for Computational Biology
BIOL 5250 Molecular Genetics of Development
BIOL 5262 Bioengineering and Biotechnology: Genomics and Omics Technologies
BIOL 540 Genetic Analysis
BIOL 5318 Systems Biology: Integrative physiology and biomechanics of the
muscular system
BIOM 501 Mechanisms of Disease and Therapeutics
BIOM 600 Cell Biology
BIOM 502 Mechanisms of Disease
BIOM 510 Case Studies in Translational Research
BMB 508 Molecular Biophysics I
BMB 509 Macromolecular Biophysics II

BMB 567 Bioinorganic Chemistry
 BMB 585 Macromolecular Biophysics: Principles and Methods
 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
 BMIN 5030 Data Science for Biomedical Informatics
 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 5300 (The Cell Cycle, Genome Integrity and Cancer)
 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
 CAMB 609 Vaccines and Immune Therapeutics
 CAMB 692 – Advanced Topics in Cell Biology, Physiology, and Metabolism II:Cell Signaling and Metabolism
 CBE 5170 Principles of Genome Engineering
 CIS 535 Introduction to Bioinformatics
 GCB 527 Genetics for Computational Biology
 GCB 5350 Bioinformatics
 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
 MPHY 5000 Introduction to Global Oncology
 MPHY 6030 Image- Based Anatomy
 MPHY 6070 Radiation Biology
 NGG 572 Neuroscience Core II
 NGG 573 Neuroscience Core III
 NGG 575 Neurobiology of Learning and Memory
 NGG 587 Neurobiology of Disease
 NGG 592 Cognitive Neuroscience of Memory
 NGG 593 Structural Neurobiology
 NGG 594 Theoretical and Computational Neuroscience

NGG 598 Advanced Systems Neuroscience
NGG 618 Recovery after Neural Injury
NGG 631 Cognitive Neuroscience Affect
NGG 632 Cognitive Neuroscience Vision
PHRM 531 Intro to Genome Science
PHRM 570 Principles of Cardiovascular Biology
PHRM 600 Medical Pharmacology
PHRM 623 Fundamentals of Pharmacology
PSYC 5470 Foundations of Social, Cognitive, and Affective Neuroscience
PSYC 5490, A Neuroscience Perspective of Artificial Intelligence: