

Fall 2024 Neuroscience Course Directory

Boston University College of Arts and Sciences
Undergraduate Program in Neuroscience

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RESEARCH FOR CREDIT

If you are working or intend to work in a lab during the Fall 2024 semester, you are welcome to apply for a research-for-credit class in order to receive academic credits towards graduation. Guidelines and the application will be available here: <https://www.bu.edu/upn/undergraduate-research/>

REGISTRATION DATES

Class Year	Start Date	Start Time
Seniors	April 14th	9:00a
Juniors	April 21st	9:00a
Sophomores	April 28th	9:00a

WAITLISTS

You can find more information about waitlists here:

<https://www.bu.edu/upn/advising/undergraduate-waitlists/>

REGISTRATION NOTES

- You **must** schedule an advising appointment with your **assigned advisor** prior to registration at [bu.joinhandshake.com](https://www.bu.edu/joinhandshake.com)
- Full time status is a minimum of **12 credits** per semester.
- To change your class standing, apply for an overload fee waiver, and more, visit the CAS Advising page: <http://www.bu.edu/cas/current-students/undergraduate/casadvising/forms/>
- PDP, ROTC, and CAS FY/SY courses **do not** count toward the **128 credits needed to graduate**.
- Find more info about the Undergraduate Neuroscience Program at <https://www.bu.edu/upn/>
- Learn more about the BU Hub at [bu.edu/hub](https://www.bu.edu/hub)
- Declare a second major, change your major, or add a minor here:
Major: <https://www.bu.edu/cas/cas-advising-major-declaration-form/> **Minor:** <https://www.bu.edu/cas/academics/undergraduate-education/academic-advising/advising/minor-declaration-form/>
- Change your class standing here:
<http://www.bu.edu/cas/current-students/undergraduate/casadvising/forms/cas-advising-change-of-class-year-form/>
- Search for classes using the Course Search tool here: <https://www.bu.edu/phpbin/course-search/>

Core Neuroscience Courses

Boston University College of Arts and Sciences
Undergraduate Program in Neuroscience

NE 101: Introduction to Neuroscience

4 cr | Hub: SI1 | Div Studies: NS | Prereq: None

An introduction to the biological basis of behavior and cognition. Includes theoretical and practical foundations rooted in psychology, biology, neuropharmacology, and clinical sciences (e.g., neurology and neuropsychiatry). Neuroethical dilemmas are highlighted and integrated when relevant to discussion topics. Note: You cannot receive credit for NE 101 and PS 231.

Lecture

A1	Bushell	MWF	12:20p-1:10p
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Discussion

B1	Bushell	M	1:25p-2:15p
B2	Bushell	M	1:25p-2:15p
B3	Bushell	M	2:30p-3:20p
B4	Bushell	M	2:30p-3:20p
B5	Bushell	M	3:35p-4:25p
B6	Bushell	M	3:35p-4:25p
B7	Bushell	M	4:40p-5:30p
B8	Bushell	M	4:40p-5:30p

NE 202: Intro. to Cognitive Neuroscience

4 cr | Prereq: CAS NE 101 or PS 231; sophomore standing

Cognitive neuroscience seeks to understand the brain basis of cognition. This course introduces research methods and human neuroanatomy, and provides a survey of topics including learning and memory, attention, perception, language, social cognition, and executive function. Also offered as CAS PS 339.

Lecture

A1	Somers	TR	2:00p-3:15p
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Discussion

A2	Staff	F	12:20p-1:10p
A3	Staff	F	1:25p-2:15p
A4	Staff	F	2:30p-3:20p
A5	Staff	F	3:35p-4:25p

NE 203: Principles of Neuroscience

4 cr | Hub: RIL, TWC, WIN | Prereq: Sophomore standing & (BI 203 or NE 102) & (CH 102 or CH 116 or CH 110) & First Year Writing Seminar (WR 120)

Fundamentals of the nervous system, emphasizing synaptic transmission; hierarchical organization; autonomic nervous system; mechanisms of sensory perception; reflexes and motor function; biorhythms; and neural mechanisms of feeding, mating, learning, and memory. Project labs focus on behavioral neurobiology through inquiry-based experiments. Effective Fall 2019, this course fulfills a single unit in each of the following BU Hub areas: Writing-Intensive Course, Research and Information Literacy, and Teamwork/Collaboration.

Lecture

A1	Tullai	TR	11:00a-12:15p
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Lab

L1	Staff	M	6:30p-9:15p
L2	Staff	T	12:30p-3:15p
L3	Staff	T	6:30p-9:15p
L4	Staff	W	8:00a-10:45p
L5	Staff	W	2:30p-5:15p
L6	Staff	W	6:30p-9:15p
L7	Staff	R	12:30p-3:15p
L8	Staff	R	6:30p-9:15p

Core Neuroscience Courses

Boston University College of Arts and Sciences
Undergraduate Program in Neuroscience

NE 212: Intro to MATLAB Programming

4 cr | Hub: QRI, CRT | Prereq: (NE 101 or PS 101) & one semester of calculus

Teaches computer programming concepts, core statistical concepts, and related skills via MATLAB. Programming examples that cover four steps of neuroscience research (experiment control; random samples; data analysis; brain process simulation) promote "constructive" understanding of the quantitative reasoning behind decisions based on descriptive and inferential statistics (e.g., confidence intervals, linear regression models, model-specific anovas). Explains numerical integration programs in two settings: probability distributions, and simulations of neural dynamics. Does not count toward the principal courses required for the major or minor. Effective Fall 2018, this course fulfills a single unit in each of the following BU Hub areas: Quantitative Reasoning I, Critical Thinking.

Lecture

A1	Yazdanbakhsh	TR	3:30p-4:45p
Lab			
B1	Yazdanbakhsh	W	10:10a-11:00a
B2	Yazdanbakhsh	W	2:30p-3:20p
B3	Yazdanbakhsh	W	3:35p-4:25p
B4	Yazdanbakhsh	W	4:40p-5:30p

NE 218: Integrated Science Experience II

5 cr | Hub: TWC, WIN | Prereq: NE 116 & CH 116 | Coreq: CH 218

Integration of cell biology with organic chemistry and neuroscience, with emphasis on how each discipline interacts experimentally. Laboratory focuses on synthesizing compounds and testing in biological systems. 3 lecture hours (meets with CAS NE 203 lecture), 1 discussion hour, 4 hours lab, 2 hour lab discussion.

Lecture

A1	Tullai	TR	11:00a-12:15p
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Lab

L1	Bushell	W	1:25p-5:25p
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Pre-Lab

P1	Bushell	M	2:30p-4:15p
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Group 1: Neurobiology

Boston University College of Arts and Sciences
Undergraduate Program in Neuroscience

NE 445: Neurophysiology

4 cr | Prereq: BI 203 or BI 315 or BI 325 or NE 203, or consent of instructor.

Cellular and molecular basis of neural excitability and synaptic transmission. The molecular understanding of ion channels is extrapolated to higher brain functions such as learning, memory, and sleep. Three hours lecture, three hours lab, one hour pre-lab. Also offered as CAS BI 445.

Independent

A1	Lin	TR	2:00p-3:15p
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NE 455: Developmental Neurobiology

4 cr | Prereq: BI 203 or BI 325 or NE 203, or consent of instructor.

Fundamental principles of developmental neurobiology, stressing molecular mechanisms that underlie early neural development, differentiation, process outgrowth, and behavior. Three hours lecture, one hour discussion. Also offered as CAS BI 455.

Lecture

A1	Man	W	10:10a-11:55a
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Discussion

A2	Man	F	10:10a-11:55a
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NE 481: Molecular Biology of the Neuron

4 cr | Hub: OSC, SI2, RIL | Prereq: (NE 102 or BI 203) or equivalent

Topics include electrical properties of neurons, a survey of neurotransmitters, molecular structure and function of receptors, synaptic transmission, intracellular signaling, and the molecular biology of sensory transduction. Three hours lecture, one hour discussion. Also offered as CAS BI 481.

Independent

A1	Ho	MW	10:10a-11:55a
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NE 503: Neuroimmunology

4 cr | Prereq: BI 203 or NE 102, or BI 213, and BI 325 or NE 203.

Neuroimmunology is a burgeoning field in neuroscience. This course examines current topics including the role of glia in brain development, health, and disease, glia-neuron crosstalk, impact of stress and environment on the neuroimmune system, and cell trafficking into the brain.

Independent

A1	Tay	TR	9:30a-11:25a
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Group 1: Neurobiology

Boston University College of Arts and Sciences
Undergraduate Program in Neuroscience

NE 520: Sensory Neurobiology

4 cr | Prereq: BI 325 or NE 203, or consent of instructor.

A broad survey of sensory system function in model organisms and humans, focusing on fundamental principles of neural processing. Topics include basic cellular transduction, neural coding, and links between neural activity and sensory perception. Also offered as CAS BI 520.

Lecture

A1	Younger	TR	11:00a-12:15p
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Discussion

B1	Younger	W	4:40p-5:30p
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NE 535: Translational Research in Alzheimer's Disease

4 cr | Hub: OSC, ETR, RIL | Prereq: (BI 203 or NE 102) & (BI 325 or NE 203)

An introduction to translational research focused on Alzheimer's disease, with particular emphasis on the search for new therapeutic targets, from observations of pathogenic phenotypes in patients to the development of appropriate animal and cellular models of the disease. Also offered as CAS BI 535.

Independent

A1	Pastorino	MWF	11:15a-12:05p
		W	12:20p-1:10p

NE 561: Proteostasis in the Biology of Neurodegenerative Diseases

4 cr | Hub: SI2, CRI, RIL | Prereq: (BI 108 or NE 102). BI 203 or BI 213 recommended. | Satisfies [Neuro Research Requirement](#)

A hands-on class focusing on the mechanisms that control protein homeostasis, and on the approaches that we can use to study how it may change in conditions associated with neurodegenerative diseases. The class mimics, as much as possible, a real research environment, as students carry out experiments throughout the semester, learn how to develop and test new hypotheses, and also share knowledge through weekly readings and presentation of research articles inherent to the topics of the class. Effective Fall 2021, this course fulfills a single unit in each of the following BU Hub areas: Scientific Inquiry II, Creativity/Innovation, Research and Information Literacy.

Independent

A1	Pastorino	MF	12:20p-4:15p
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Group 1: Neurobiology

Boston University College of Arts and Sciences
Undergraduate Program in Neuroscience

NE 589: Neural Impacts on Tumorigenesis

4 cr | Hub: OSC, SI2, RIL | Prereq: (NE 203 or BI 325)

Explores neuronal invasion and mechanisms of neurogenesis into solid tumors, cross-talk in tumor microenvironments, and nervous system influence on cancer modulators that enhance tumorigenesis. Enhancement of cancer from environmental stress at this interface is also examined. Effective Fall 2021, this course fulfills a single unit in each of the following BU Hub areas: Oral and/or Signed Communication, Scientific Inquiry II, Research and Information Literacy.

Independent

A1	Tullai	TR	12:30p-1:45p
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Group 2: Cognitive

Boston University College of Arts and Sciences
Undergraduate Program in Neuroscience

NE 234: Psychology of Learning

4 cr | Hub: SI1, SO1, CRT | Div Studies: SS | Prereq: PS 101

The aim of this course is to review the major traditional and current theories of learning and memory. Students will begin with an understanding of simple learning, including theories and basic principles of classical and operant conditioning. Students will then be introduced to the memory system, the three stages of memory, implicit and explicit memory processes.

Lecture

A1	Dunne	MWF	2:30p-3:20p
Discussion			
A2	Dunne	F	9:05a-9:55a
A3	Dunne	F	10:10a-11:00a
A4	Dunne	F	11:15a-12:05p
A5	Dunne	F	12:20p-1:10p

NE 327: Experimental Psychology: Perception

4 cr | Prereq: PS 101 & (PS211 or NE 212 or (MA 115 & MA 116)) & PS 222 | Satisfies [Neuro Research Requirement](#)

Introduces psychophysical methods and their use in the study of perceptual processes: Students learn to think critically about the relation between theory and experiment, conduct perception experiments, and write experimental reports. Also offered as CAS PS 327.

Independent

A1	Ling	MW	12:20p-2:05p
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NE 333: Drugs & Behavior

4 cr | Prereq: PS 101 & (PS 231 or NE 101) & Junior/Senior Standing

Comprehensive survey of drug influences on behavior; introduces a neuroscience approach to behavior. Several classes of drugs are discussed, including abused and addictive substances and psychoactive and therapeutic agents. Also offered as CAS PS 333.

Lecture

A1	Scott	TR	3:30p-4:45p
Discussion			
A2	Scott	W	9:05a-9:55a
A3	Scott	W	10:10a-11:00a
A4	Scott	W	12:20p-1:10p
Lecture			
B1	DiBenedictis	MWF	12:20p-1:10p
Discussion			
B2	DiBenedictis	F	9:05a-9:55a
B3	DiBenedictis	F	10:10a-11:00a
B4	DiBenedictis	F	11:15a-12:05p
B5	DiBenedictis	F	1:25p-2:15p

Group 2: Cognitive

Boston University College of Arts and Sciences
Undergraduate Program in Neuroscience

NE 338: Neuropsychology

4 cr | Prereq: PS 231 or BI 325 or NE 203

Survey of theoretical aspects and major empirical findings in human neuropsychology, including memory, language, spatial function, attention, emotion, and abstract thought. Emphasis is on the relation between brain disorders (resulting from head injury, stroke, degenerative disease, etc.) and abnormal behavior. Also offered as CAS PS 338.

Lecture

A1	Cronin-Golom	TR	11:00a-12:15p
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Discussion

A2	Cronin-Golom	W	9:05a-9:55a
A3	Cronin-Golom	W	10:10a-11:00a
A4	Cronin-Golom	W	11:15a-12:05p

NE 456: Neurobiology of Sex & Aggression

4 cr | Hub: OSC, HCO, SI2 | Prereq: PS 231 or NE 203 or BI 325 or permission of instructor

Examines neurobiological and genetic factors that influence sex and violence. Students review primary literature from the past century that highlights major scientific discoveries that have reconceptualized our understanding of the origins of sexual-determination, -attraction and -aggression.

Independent

A1	Gobrogge	TR	5:00p-6:15p
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NE 531: Imaging and Manipulating Memories

4 cr | Prereq: PS 231 or NE 101 or PS/NE 327 or PS 339/NE 202 or NE 203/BI 325 or permission of instructor

The nature of memory engrams, the physical manifestations of experiences in the brain, will be explored at the systems neuroscience level by surveying primary literature.

Independent

A1	Ramirez	TR	11:00a-12:15p
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NE 544: Developmental Neuropsychology

4 cr | Prereq: PS 241 or consent of instructor

Study of the neural mechanisms underlying behavioral development. Topics include the plasticity of the developing brain in response to deprivation or damage and mechanisms underlying specific syndromes (e.g., aphasia, dyslexia, learning disabilities, hyperactivity, autism, and Tourette's syndrome). Also offered as CAS PS 544.

Independent

A1	Carrillo	T	12:30p-3:15p
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Group 3: Computational

Boston University College of Arts and Sciences
Undergraduate Program in Neuroscience

MA 242: Linear Algebra

4 cr | Hub: QR2, CRT | Prereq: (CASMA122 OR CASMA124 OR CASMA127 OR CASMA129)

Cannot be taken for credit in addition to CAS MA 442 or ENG EK 103. Matrix algebra, solution of linear systems, determinants, Gaussian elimination, fundamental theory, row-echelon form. Vector spaces, bases, norms. Computer methods. Eigenvalues and eigenvectors, canonical decomposition. Applications. Effective Fall 2019, this course fulfills a single unit in the following BU Hub area: Quantitative Reasoning II.

Lecture

A1	Bourguin	TR	3:30p-4:45p
B1	Fried	MWF	9:00a-9:55a
C1	Weinstein	TR	5:00p-6:15p

Discussion

A2	Bourguin	R	11:15a-12:05p
B2	Fried	W	2:30p-3:20p
C2	Weinstein	M	8:00a-8:50a
C3	Weinstein	M	9:05a-9:55a
C4	Weinstein	M	10:10a-11:00a
C5	Weinstein	M	3:35p-4:25p
C6	Weinstein	M	4:40p-5:30p

MA 573: Qualitative Theory of Differential Equations

4 cr | Prereq: (MA 226 OR MA 231) & (MA 242 OR MA 442)

It's often said that "The only constant in life is change" (attributed to Heraclitus). Ordinary differential equations (ODEs) arise ubiquitously to describe the rates of change of all manner of quantities, including in biomedical engineering, mathematics, mechanical engineering, neurosciences, and physics. We will learn lots of fascinating and powerful mathematical tools for linear and nonlinear ODEs. Examples will be chosen based on student background and interest.

Independent

A1	Fried	MWF	10:10a-11:00a
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MA 578: Bayesian Statistics

4 cr | Prereq: (MA 581 & MA 582)

The principles and methods of Bayesian statistics. Subjective probability, Bayes rule, posterior distributions, predictive distributions. Computationally based inference using Monte Carlo integration, Markov chain simulation. Hierarchical models, mixture models, model checking, and methods for Bayesian model selection.

Lecture

A1	Atchade	TR	12:30p-1:45p
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Discussion

B1	Atchade	W	9:05a-9:55a
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Group 3: Computational

Boston University College of Arts and Sciences
Undergraduate Program in Neuroscience

CN 510: Principles and Methods of Cognitive and Neural Modeling I

4 cr | Prereq: CAS MA 226 or equivalent, CS 108 or CS 111, NE 101 or equivalent

Explores psychological, biological, mathematical, and computational foundations of behavioral and brain modeling. Topics include organizational principles, mechanisms, local circuits, network architectures, cooperative and competitive non-linear feedback systems, associative learning systems, and self-organizing code-compression systems. The adaptive resonance theory model unifies many course themes. CAS CN 510 and 520 may be taken concurrently.

CS 542: Machine Learning

4 cr | Prereq: CASC5112, CASC5132 or equivalent, CASC5237 or equivalent; CASMA225 highly recommended. | Satisfies [Neuro Research Requirement](#)

Introduction to modern machine learning concepts, techniques, and algorithms. Topics include regression, kernels, support vector machines, feature selection, boosting, clustering, hidden Markov models, and Bayesian networks. Programming assignments emphasize taking theory into practice, through applications on real-world data sets.

Independent

A1	Yazdanbakhsh	TR	11:00a-12:15p
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Lecture

A1	Saenko	MW	11:00a-12:15p
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Lab

A2	Saenko	R	8:00a-8:50a
A3	Saenko	R	9:05a-9:55a
A4	Saenko	R	10:10a-11:00a
A5	Saenko	R	11:15a-12:05p

Restricted Electives

Boston University College of Arts and Sciences
Undergraduate Program in Neuroscience

BI 203: Cell Biology

4 cr | Hub: SI1, QR1, CRT | Prereq: (CASBI108 & CASCH102) or equivalent | Coreq: (CASCH203) or equivalent.

Principles of cellular organization and function: biological molecules, flow of genetic information, membranes and subcellular organelles, and cell regulation. Three hours lecture, one hour discussion. Students may receive credit for CAS BI 203 or 213, but not both courses. Effective Fall 2019, this course fulfills a single unit in each of the following BU Hub areas: Scientific Inquiry I, Quantitative Reasoning I, Critical Thinking.

Lecture

A1	Beffert	TR	9:30a-10:45a
A2	Beffert	TR	3:30p-4:45p

Discussion

See MyBU Student for full list of options.

BI 213: Intensive Cell Biology

4 cr | Hub: SI1, QR1, RIL | Prereq: (CASBI108 & CASCH102) or equivalent | Coreq: (CASCH203) or equivalent.

Recommended for students in BMB and the Specialization in Cell Biology, Molecular Biology & Genetics. Alternative to CAS BI 203 emphasizing experimental approaches and in-depth discussion. Molecular basis of cell biology, including genomics, subcellular organelles, cell signaling, stem cells, and cancer. Students may receive credit for CAS BI 213 or 203, but not both courses. Effective Fall 2019, this course fulfills a single unit in each of the following BU Hub areas: Scientific Inquiry I, Quantitative Reasoning I, Research and Information Literacy

Lecture

A1	Naya	TR	9:30a-10:45a
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Discussion

B1	Naya	M	12:20p-1:10p
B2	Naya	M	1:25p-2:15p
B3	Naya	M	4:40p-5:30p
B4	Naya	W	12:20p-1:10p

BI 315: Systems Physiology

4 cr | Hub: SI2, WRI, CRT, TWC | Prereq: (CASBI108 OR ENGBE209), and CASCH101 and CASCH102, or equivalent. First Year Writing Seminar (e.g., WR 100 or WR 120)

An introduction to physiological principles applied across all levels of organization (cell, tissue, organ system). Preparation for more advanced courses in physiology. Topics include homeostasis and neural, muscle, respiratory, cardiovascular, renal, endocrine, gastrointestinal, and metabolic physiology. Three hours lecture, three hours lab. Effective Fall 2019, this course fulfills a single unit in each of the following BU Hub areas: Scientific Inquiry II, Writing-Intensive Course, Critical Thinking, Teamwork/Collaboration.

Lecture

A1	Muscedere	MWF	11:15a-12:05p
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Lab

See MyBU Student for full list of options.

Restricted Electives

Boston University College of Arts and Sciences
Undergraduate Program in Neuroscience

CH 203: Organic Chemistry I

4 cr | SI1, QR1 | Prereq: (CASCH102 OR CASCH110 OR CASCH112)

Fundamentals of contemporary organic chemistry, including skeletal and electronic structure, stereochemistry, and reactions of important functional groups. Applications of organic reactions to important synthetic targets in materials and drug discovery will be highlighted, as will reactions pertinent to biochemistry. Laboratory includes training in basic organic chemistry skills, such as extraction, reaction performance, spectroscopy interpretation and chromatography. Effective Fall 2018, this course fulfills a single unit in each of the following BU Hub areas: Scientific Inquiry I, Quantitative Reasoning I.

Lecture

A1	Loy	TR	8:00a-9:15a
A2	Courtney	MWF	10:10a-11:00a
A3	Kerr	TR	5:00p-6:15p

Lab

See MyBU Student for full list of options.

Discussion

See MyBU Student for full list of options.

Pre-Lab

See MyBU Student for full list of options.

CH 218: Organic Chemistry 1 with Integrated Science Experience II Lab

4 cr | Hub: SI1, QR1, CRT, RIL | Prereq: CH 116/CH 102 and either BI 107/BI 116 or NE 102/116 | Coreq: NE 218 or BI 218

Integration of organic chemistry with cell biology and neuroscience, with emphasis on how each discipline interacts experimentally. Laboratory focuses on synthesizing compounds and testing in biological systems. 3 lecture hours (meets with CH 203 lecture), 1 discussion hour, 4 hours lab, 2 hour lab discussion. 4 Credits Effective Fall 2019, this course fulfills a single unit in each of the following BU Hub areas: Scientific Inquiry I, Quantitative Reasoning I, Critical Thinking, Research and Information Literacy. [Click here](#) to learn more about Integrated Science Experience and how to register.

Lecture

A1	Loy	TR	8:00a-9:15a
A2	Courtney	MWF	10:10a-11:00a
A3	Loy	TR	5:00p-6:15p

Lab

L1	Courtney	F	12:20p-4:20p
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Pre-Lab

P1	Courtney	M	2:30p-4:15p
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Discussion

B1	Staff		Arranged
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Restricted Electives

Boston University College of Arts and Sciences
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CS 111: Introduction to Computer Science I

4 cr | Hub: QR2, CRI, CRT

The first course for computer science majors and anyone seeking a rigorous introduction. Develops computational problem-solving skills by programming in the Python language, and exposes students to a variety of other topics from computer science and its applications. Carries MCS divisional credit in CAS. Effective Fall 2018, this course fulfills a single unit in each of the following BU Hub areas: Quantitative Reasoning II, Creativity/Innovation, Critical Thinking.

Lecture

A1	TBA	MWF	10:10a-11:00a
A2	TBA	MWF	11:15a-12:05p

Lab

**See MyBU Student for full list of options.*

CS 112: Introduction to Computer Science II

4 cr | Hub: QR2, CRI, CRT | Prereq: (CASC111) or equivalent.

Covers advanced programming techniques and data structures. Topics include recursion, algorithm analysis, linked lists, stacks, queues, trees, graphs, tables, searching, and sorting. Carries MCS divisional credit in CAS. Effective Fall 2018, this course fulfills a single unit in the following BU Hub area: Quantitative Reasoning II, Creativity and Innovation, Critical Thinking.

Lecture

A1	TBA	TR	11:00a-12:15p
A2	TBA	TR	12:30p-1:45p

Lab

**See MyBU Student for full list of options.*

Restricted Electives

Boston University College of Arts and Sciences
Undergraduate Program in Neuroscience

MA 226: Differential Equations

4 cr | Hub: CRT | Prereq: (CASMA225 OR CASMA230)

First-order linear and separable equations.
Second-order equations and first-order systems.
Linear equations and linearization. Numerical and qualitative analysis. Laplace transforms. Applications and modeling of real phenomena throughout.
(Cannot be taken for credit in addition to CAS MA 231.)

Lecture

A1	Avery	TR	9:30a-10:45a
B1	TBA	MWF	9:05a-9:55a

Discussion

**See MyBU Student for full list of options.*

A2-A6	Avery
B2-B5	TBA

MA 416: Analysis of Variance

4 cr | Hub: CRT | Prereq: (MA116 or MA214) or equivalent

Fundamental concepts and analytical skills in analysis of variance, including crossed and nested designs, as well as fixed- and random- effect models. Trend analysis for repeated measures, expected mean squares, and non-parametric techniques. SAS is used throughout the course. Effective Fall 2020, this course fulfills a single unit in the following BU Hub area: Critical Thinking.

Lecture

A1	Moore	TR	3:30p-4:45p
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Discussion

A2	Moore	W	1:25p-2:15p
A3	Moore	W	2:30p-3:20p
A4	Moore	W	3:35p-4:25p
A5	Moore	W	4:40p-5:30p
A6	Moore	R	8:00a-8:50a

Remaining on track to complete your Hub requirements requires thoughtful planning, including knowing what Hub units you will satisfy by courses needed for your major.

Students majoring in Neuroscience who complete the core neuroscience courses and foundational requirements in writing, chemistry, physics, calculus, and statistics generally have **8-11 Hub units** left to satisfy:

Philosophical Inquiry and Life's Meaning (PLM)	1 unit
Aesthetic Exploration (AEX)	1 unit
Historical Consciousness (HCO)*	1 unit
Social Inquiry (SO1)*	1 unit
Individual in Community (IIC)	1 unit
Global Citizenship and Intercultural Literacy (GCI)	2 units
Oral and/or Signed Communication (OSC)*	1 unit
Digital Multimedia Expression (DME)*	1 unit
Creativity/Innovation (CRI)*	2 units

You may satisfy some of the above units with your choice of neuroscience required courses and/or electives, 2nd language requirement, and additional academic tracks (minors, pre-health, KHC, etc.), but you will likely need to search outside your normal scheduling path to satisfy at least some Hub units.

*OSC, DME, and CRI hub unit(s) have the potential to be met through your choice in WR 15X course. HCO, SO1, OSC, DME, and CRI hub units have the potential to be met through your selection of Neuroscience electives. SO1 and CRI hub units have potential to be met through your choice of calculus/computer science courses which count as part of your basic science courses for the major.

It is encouraged to spread your Hub courses throughout your time at Boston University, so that you are not scrambling to take all your Hub courses or find seats in courses that meet a specific permutation of 3 Hub units your final year.

You can also leverage the [Course Description Search](#) tool to identify other courses that meet specific Hub units. Some courses are still in process of being evaluated for Hub, but should get approval throughout March, so keep checking the Course Description Search as new courses get added!

We've included a list of courses on the next few pages which are running in Fall 2024 that are helpful in satisfying some of your Hub Units that are not met by Neuroscience. **This list is by no means exhaustive and you should continue to do your own research, including looking at classes outside of CAS.**

Select Hub Courses

Boston University College of Arts and Sciences
Undergraduate Program in Neuroscience

AH 111: Pyramids to Cathedrals: An Introduction to Ancient and Medieval Art

4 cr | Hub: AEX, HCO

A chronological examination of the fundamentals of art and architectural history, this course introduces students to major monuments and works of art from antiquity to the middle ages in their social, religious and historical contexts.

AH 114: Kongo to Cuba: Art, Exchange, and Self-Determination in Africa and Latin America

4 cr | Hub: AEX, GCI, CRT

This course introduces the arts of Africa and Latin America. It explores the rich diversity of each continent's artistic production and highlights the impact of their intertwining histories on visual expression in the wake of transcontinental exchange and globalization. Effective Fall 2022, this course fulfills a single unit in each of the following BU Hub areas: Global Citizenship and Intercultural Literacy, Aesthetic Exploration, Critical Thinking.

AH 201: Understanding Architecture

4 cr | Hub: AEX, HCO, RIL

Introduces a range of approaches to understanding architecture in an historical perspective. Learn how architects and others have interpreted meaning through rubrics of art, nature, and culture, focused upon European and American architecture from 1400 to the present.

AN 101: Introduction to Sociocultural Anthropology

4 cr | Hub: SOI, GCI, RIL

Introduction to the basic concepts, principles, and problems of sociocultural anthropology, emphasizing the study of traditional and complex societies. Special attention to the organization and meaning of religion, economic life, kinship and political order; and the problem of cultural variation in the contemporary world. Carries social science divisional credit in CAS.

AN 211: Humans Among Animals

4 cr | Hub: PLM, ETR, CRT

Examines how humans understand (other) animals and their thought, feeling, and communication and the ways we humans in varied cultures and societies use animals for interaction and self-understanding. Interdisciplinary approach that considers language, aesthetics, ideology, practice, and regulation. Effective Fall 2018, this course fulfills units in the following BU Hub areas: Philosophical Inquiry and Life's Meanings, Ethical Reasoning, and Critical Thinking.

AN 252: Ethnicity and Identity

4 cr | Hub: IIC, GCI

Explores anthropological approaches to community, belonging, and difference using case studies from the South Pacific, Europe, North America, and Africa. Special attention paid to how contemporary economic and political changes impact the ways people think about and belong to communities. Carries social science divisional credit in CAS. Effective Fall 2018, this course fulfills a single unit in each of the following BU Hub areas: The Individual in Community, Global Citizenship and Intercultural Literacy.

Select Hub Courses

Boston University College of Arts and Sciences
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AN 290: Children and Culture

4 cr | Hub: SO1, GCI

Explores the way cultures shape the social development and caregiving of children. Topics include cultural concepts of childhood; the acquisition of culture; socialization and moral development; childhood cognition, emotion, and behavior; children's language and play; and the cultural shaping of gender and personality. Carries social science divisional credit in CAS. Effective Fall 2018, this course fulfills a single unit in each of the following BU Hub areas: Social Inquiry I, Global Citizenship and Intercultural Literacy.

AN 308: Food In Place(s): Identity, Location, and the Culture of Taste

4 cr | Hub: AEX, GCI, WIN | Pre-req: First Year Writing Seminar (WR 100 or WR 120)

Explores foodways, culinary history, personal, social, and cultural identity, as well as sensory experiences of taste. Special attention given to communities in the Boston area as locations of cultural and culinary diversity. Effective Fall 2019, this course fulfills a single unit in each of the following BU Hub areas: Aesthetic Exploration, Global Citizenship and Intercultural Literacy, Writing-Intensive Course.

BI 310: Human Structure & Function: Anatomy, Histology, and Pathology

4 cr | Hub: SI1, DME, CRI | Pre-req BI 108 and 203 or equivalent

Examines the cells and tissues that make up our organs (histology), the structure and interactions of the organ systems (anatomy), and how disease reshapes our bodies (pathology). As a secondary focus, this course also studies and critiques educational media related to human anatomy, and builds introductory competency in health communication.

CI 200: Introduction to Film & Media Aesthetics

4 cr | Hub: AEX, DME, CRT

Introduction to fundamental concepts for the analysis/understanding of film and media. Key concepts of formal composition (e.g. editing, mise-en-scene, cinematography, sound and more) over a diverse set of media texts. Foundational skills in analysis appropriate to film, television and moving- image media.

CL 101: The World of Greece

4 cr | Hub: PLM, HCO, CRT

The literature, philosophy, art, and culture of ancient Greece and their impact on the Western tradition. Topics covered include the emergence of epic poetry; art and lyric in the Archaic Age; drama, architecture, philosophy, and political developments of classical Athens and Greece. All texts in translation. Carries humanities divisional credit in CAS. Effective Fall 2018, this course fulfills a single unit in each of the following BU Hub areas: Historical Consciousness, Philosophical Inquiry and Life's Meanings, Critical Thinking.

CL 213: Greek and Roman Mythology

4 cr | Hub: PLM, HCO

A general introduction to the myths of the ancient classical world, with particular regard to the patterns of experience, both religious and psychological, from which they evolved. All texts in translation.

Select Hub Courses

Boston University College of Arts and Sciences
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EN 121: Reading World Literature

4 cr | Hub: AEX, GCI, RIL

Study of literature in English or English translation -- poetry, drama, and prose narrative -- outside of British and American traditions. Attention to such topics as cultural self-construction, relationships of historical context to artistic expression, and development of literary forms.

EN 122: Medieval Worlds

4 cr | Hub: AEX, HCO, TWC

Why does the deep medieval past continue to haunt our dreams? In novels, games, and on TV? Medieval literature and its afterlives. Topics may include Arthurian romance, otherworld visions, monsters and heroes, women's lives and writing, modern medievalism. Carries humanities divisional credit in CAS. Effective Fall 2018, this course fulfills a single unit in each of the following BU Hub areas: Aesthetic Exploration, Historical Consciousness, Teamwork/Collaboration.

EN 132: Write Back Soon: Blackness and the Prison

4 cr | Hub: AEX, IIC, CRT

This course interrogates the theme of black containment from slavery and Jim Crow to, principally, mass incarceration. The topic is explored in tandem with the development of open letter writing skills. This epistolary form allows both for the intimate engagement of individual, familiar contact and the deft inclusion of targeted eavesdroppers in order to raise the consciousness of listeners and affirm the value of personal relationships. Course texts include letters to and from prison, poetry, short stories, memoir, social science, documentaries, and critical theory. Effective Fall 2021, this course fulfills a single unit in each of the following BU Hub areas: The Individual in Community, Aesthetic Exploration, Critical Thinking.

EN 170: The Graphic Novel

4 cr | Hub: AEX, DME, CRI

Examination of the rise, nature, and status of the contemporary book-length graphic novel. Topics include graphic vs. traditional novel, word and image, style and space, representations of subjectivity, trauma, and history.

EN 176: Introduction to Film & Media Aesthetics

4 cr | Hub: DME, AEX, CRT

Introduction to fundamental concepts for the analysis/understanding of film and media. Key concepts of formal composition (e.g. editing, mise-en-scene, cinematography, sound and more) over a diverse set of media texts. Foundational skills in analysis appropriate to film, television and moving- image media. Effective Fall 2022, this course fulfills a single unit in each of the following BU Hub areas: Digital/Multimedia Expression, Aesthetic Exploration, and Critical Thinking.

HI 190: History of Boston: Community and Conflict

4 cr | Hub: HCO, IIC, TWC

Explores the history of Boston and the city's changes over time. Students work with archival objects, maps, and manuscripts. Topics include Native American history, colonial settlement, revolution, immigration, urban development, and race. Students visit nearby historical sites and museums.

Select Hub Courses

Boston University College of Arts and Sciences
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HI 203: Magic, Science, and Religion

4 cr | Hub: HCO, PLM, CRT

Boundaries and relationships between magic, science, and religion in Europe from antiquity through the Enlightenment. Explores global cultural exchange, distinctions across social, educational, gender, and religious lines, the rise of modern science, and changing assumptions about God, Nature, and humanity

HI 207: Game of Thrones: Power and Politics in Pre-Modern Europe

4 cr | Hub: ETR, HCO, CRT

This course employs medieval and early modern authors, as well as contemporary scholars, as vehicles for understanding the dynamics of power, gender, violence and politics in George Martin's novel, *Game of Thrones*. Effective Fall 2023 this course fulfills a single unit in each of the following BU Hub areas: Ethical Reasoning, Historical Consciousness, Creativity/Innovation.

HI 151: The Emerging United States to 1865

4 cr | Hub: HCO, SO1

Explores how the United States, at first only a series of borderland outposts, became a sprawling national republic. Investigates factors that brought Americans together and those that tore them apart, as they struggled passionately over racial, religious, and sectional values. Carries social science divisional credit in CAS.

PH 150: Introduction to Ethics

4 cr | Hub: PLM, ETR, CRT

Many of us want to lead meaningful lives. But what is it for a life to be meaningful? What makes some lives better or more meaningful than others? Can life as a whole have some significance or meaning? Carries humanities divisional credit in CAS. Effective Fall 2018, this course fulfills a single unit in each of the following BU Hub areas: Philosophical Inquiry and Life's Meanings, Ethical Reasoning, Critical Thinking.

PH 251: Medical Ethics

4 cr | Hub: PLM, ETR, CRT

This course will survey ethical issues that arise in connection with medicine and emerging biotechnologies. It will examine topics such as the right to healthcare, research on human subjects, euthanasia, abortion, cloning, genetic selection, disabilities, and the biomedical enhancement of human capacities. Students can expect to gain not only training in the concepts and methods of moral philosophy and the logic of argumentation, but also the resources needed for assessing ethically difficult questions that healthcare professionals routinely face.

PH 256: Philosophy of Sex and Gender

4 cr | Hub: PLM, IIC, CRT

This course explores philosophical questions that arise about gender and sexuality. What is sexism? What is oppression? What is the relationship between sexism and other forms of oppression? What is the correct response to sexism and oppression? How many sexes are there? How many genders? What is sexual orientation? What is sexual perversion? What are sexual ethics, including questions about the value and status of monogamy, polyamory, promiscuity, and adultery? What is the moral status of practices such as sex work and pornography?

Select Hub Courses

Boston University College of Arts and Sciences
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RN 100: Introduction to Religion

4 cr | Hub: PLM, GCI, CRI

Religion matters. It makes meaning and provides structure to life, addressing fundamental questions about body, spirit, community, and time. But what is it? How does it work in our world? This course explores religion in ritual, philosophical, experiential, and ethical dimensions.

RN 101: The Bible

4 cr | Hub: AEX, HCO, CRI

Introduction to the great canonical anthologies of Jews and Christians. Students will learn to read for historical context and genre conventions; study classical and modern strategies of interpretation; and create a collaborative commentary or piece of "fan-fiction." Carries humanities divisional credit in CAS. Effective Fall 2018, this course fulfills a single unit in each of the following BU Hub areas: Aesthetic Exploration, Historical Consciousness, Creativity/Innovation.

RN 103: Religions of Asia

4 cr | Hub: GCI, AEX, TWC

Study of Hinduism, Buddhism, Daoism, Confucianism, and Shinto. Focus on the world view of each tradition and the historical development of that world view. Effective Fall 2018, this course fulfills a single unit in each of the following BU Hub areas: Global Citizenship and Intercultural Literacy, Historical Consciousness, Critical Thinking. Effective Fall 2023, this course fulfills a single unit in each of the following BU Hub areas: Global Citizenship and Intercultural Literacy, Aesthetic Exploration, Teamwork/Collaboration.

RN 106: Death and Immortality

4 cr | Hub: PLM, GCI, CRI

Examines death as religious traditions have attempted to accept, defeat, deny, or transcend it. Do we have souls? Do they reincarnate? What to do with a corpse? Other topics include mourning, burial, cremation, martyrdom, resurrection, near-death experiences.

RN 242: Magic, Science, and Religion

4 cr | Hub: HCO, PLM, CRT

Boundaries and relationships between magic, science, and religion in Europe from antiquity through the Enlightenment. Explores global cultural exchange, distinctions across social, educational, gender, and religious lines, the rise of modern science, and changing assumptions about God, Nature, and humanity.

WS 240: Sexuality and Social Life

4 cr | Hub: SO1, CRT, DME

Introduction to sociological perspectives on sexuality. Historical and comparative analysis of sexuality, with a focus on the social and cultural institutions that shape sexuality in the contemporary U.S. Effective Fall 2018, this course fulfills a single unit in each of the following BU Hub areas: Social Inquiry I, Critical Thinking. Effective Fall 2021, this course fulfills a single unit in each of the following BU Hub areas: Social Inquiry I, Critical Thinking, Digital/Multimedia Expression.