

# BACHELOR OF SCIENCE IN BEHAVIORAL NEUROSCIENCE

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Behavioral neuroscience is an interdisciplinary field that explores the connection between the brain, experience and behavior in an integrative way. All behavioral neuroscience majors complete foundational courses in psychology, neuroscience, biology and chemistry, as well as advanced courses in neuroscience, cognition, biology and scientific reasoning. Based on individual goals and interests, majors then complete one of three tracks: the *Self-Directed* track, *Psychological Science* track or *Pre-Health* track.

- The **Self-Directed track** provides students the freedom to select additional introductory- and upper-level courses based on interest. Some students explore biology, others biomedical sciences, others ethics, computer science or data science.
- The **Psychological Science track** requires additional upper-level psychology courses to broaden and deepen psychological understanding and better prepare students for fields that strongly connect psychology to biological basis of behavior, affect and experience (e.g., clinical practice, counseling, child development, special needs).
- The **Pre-Health track** explicitly connects the major to careers in medicine, dentistry, nursing and healthcare more broadly. By completing this science-intensive track, majors will complete most of the requirements for the Pre-Medical Studies designation and the prerequisites for health-related professional programs (e.g., medical or dental schools, physician assistant programs, nursing).

Students completing the behavioral neuroscience major are well prepared for employment or entry into master's and PhD programs in behavioral neuroscience and related fields. Students can consider Quinnipiac University's Master of Science in Molecular and Cell Biology program (<http://catalog.qu.edu/graduate-studies/arts-sciences/molecular-cell-biology-ms/>) or the Master of Health Sciences in Biomedical Sciences (<http://catalog.qu.edu/graduate-studies/health-sciences/medical-laboratory-sciences-mhs/>) and their respective dual-degree (<http://catalog.qu.edu/arts-sciences/biological-sciences/#programstext>) programs (<http://catalog.qu.edu/health-sciences/biomedical-sciences/#programstext>).

Students seeking a BS in Behavioral Neuroscience must complete the University Curriculum and demonstrate foreign language competency at the 102 level or higher. Initial placement in English and mathematics is determined by examination and evaluation of high school units presented. After PS 101 (Introduction to Psychology), all majors complete a sequence of PS 206 (Statistics), PS 307 (Introduction to Research Methods), PS 353 (Research Methods in Behavioral Neuroscience), and PS 401 (Capstone). Students must earn a grade of C- or higher#in PS 101 before progressing to any 200-level PS courses and C- or higher before progressing to the next sequence course: PS 206, PS 307, PS 353. For PS 252, a C- or higher is required before continuing to PS 357. The capstone course (PS 401) must be taken after successful completion of PS 353, and it must be completed as a seminar in the senior year during the regular academic year. All majors are encouraged to work closely with their academic adviser to plan their progress through the major.

## BS in Behavioral Neuroscience

Students majoring in Behavioral Neuroscience must complete:

Code	Title	Credits
<b>University Curriculum</b> <sup>1</sup>		<b>46</b>
<b>Modern Language Requirement</b>		<b>3-6</b>
<b>Foundational Core</b>		<b>25</b>
BIO 150/150L	General Biology for Majors <sup>2</sup>	
BIO 151/151L	Molecular and Cell Biology and Genetics <sup>3</sup>	
CHE 110 & 110L	General Chemistry I and General Chemistry I Lab	
CHE 111 & 111L	General Chemistry II and General Chemistry II Lab	
PS 101	Introduction to Psychology	
PS 206	Introduction to Statistics in Psychology <sup>4</sup>	
PS 307	Introduction to Research Methods in Psychology with Lab	
<b>Advanced Core</b>		<b>21-22</b>
BIO 211 & 211L	Human Anatomy and Physiology I and Human Anatomy and Physiology Lab I	
	or BMS 3Neuroanatomy	
BIO 329	Neurobiology	
PS 233	Cognitive Psychology	
PS 252	Biological Psychology	
PS 272	Psychopathology	
PS 353	Research Methods in Behavioral Neuroscience	
PS 401	Integrative Capstone for Psychology and Behavioral Neuroscience Majors	
<b>Specialization - Must Complete One Track</b>		<b>9-33</b>
Self-Directed Track (At Least 9 Credits)		
Psychological Science Track (At Least 12 Credits)		
Pre-Health Track (33 credits)		
<b>Total Credits</b>		<b>104-132</b>

All majors are encouraged to work closely with their academic adviser to plan their progress through the major.

### Self-Directed Track

Code	Title	Credits
<b>Advanced Psychology:</b>		
PS 354	Sensation and Perception	3
	or PS 357 Drugs, Brain and Behavior	
<b>At Least 6 Credits of Elective Exploration</b>		<b>6</b>
<b>Total Credits</b>		<b>9</b>

## Psychological Science Track

Code	Title	Credits
<b>Advanced Psychology:</b>		
PS 354	Sensation and Perception	3
or PS 357	Drugs, Brain and Behavior	
At Least 6 Credits in PS at the 200 Level or Higher		6
<b>At Least 3 Credits of Elective Exploration</b>		<b>3</b>
<b>Total Credits</b>		<b>12</b>

## Pre-Health Track

Code	Title	Credits
BIO 346 & 346L	Cell Physiology and Cell Physiology Lab	4
CHE 210 & 210L	Organic Chemistry I and Organic Chemistry I Lab	4
CHE 211 & 211L	Organic Chemistry II and Organic Chemistry II Lab	4
CHE 315 & 315L	Biochemistry I and Biochemistry I Lab	4
CSC 110	Programming and Problem Solving	3
or DS 110	Introduction to Data Science	
MA 141	Calculus of a Single Variable <sup>5</sup>	3
or MA 151	Calculus I	
PHY 110 & 110L	General Physics I and General Physics I Lab	4
or PHY 121	University Physics	
PHY 111 & 111L	General Physics II and General Physics II Lab	4
or PHY 122	University Physics II	
PS 354	Sensation and Perception	3
or PS 357	Drugs, Brain and Behavior	
<b>Total Credits</b>		<b>33</b>

## Elective Exploration Courses

Code	Title	Credits
BIO 202	Inside Out: Human Form and Function, Inside Out: An Introduction to Human Form and Function	
BIO 225/225L	Physiological Diversity	
BIO 240	Cellular Communication	
BIO 282/282L	Genetics	
BIO 317/317L	Developmental Biology	
BIO 329	Neurobiology	
BIO 346/346L	Cell Physiology	
BIO 375/375L	Physiological Models for Human Disease	
BIO 382/382L	Human Genetics	

BIO 471/471L	Molecular Genetics
BMS 200	Biomedical Basis and Experience of Human Aging
BIO 205	Bioethics
BMS 213/213L	Microbiology and Pathology
BMS 276	Drug Development
BMS 318	Pathophysiology
BMS 325	Toxicology
BMS 330	Endocrinology
BMS 370/370L	General Microbiology
CHE 210/210L	Organic Chemistry I
CHE 211/211L	Organic Chemistry II
CSC 110/110L	Programming and Problem Solving
CSC 111/111L	Data Structures and Abstraction
CSC 210/210L	Digital Logic and Design, Computer Architecture and Organization
CSC 215	Algorithm Design and Analysis
DS 110	Introduction to Data Science
DS 201	Introduction to Python
DS 300	Tools for Data Science
MA 141	Calculus of a Single Variable
MA 170	Probability and Data Analysis
MA 205	Introduction to Discrete Mathematics (CSC 205)
PHY 110/110L	General Physics I
PHY 121	University Physics
PL 102	Introduction to Ethics
PL 222	Bioethics
Any PS course at the 200 level or higher	

## Footnotes

- <sup>1</sup> All students must complete the 46 credits of the University Curriculum (<http://catalog.qu.edu/academics/university-curriculum/>).
- <sup>2</sup> Students who took BIO 101 and 101L before declaring the BNS major may use these courses in lieu of BIO 150 and 150L.
- <sup>3</sup> Students who took BIO 102 and 102L before declaring the BNS major may use these courses in lieu of BIO 151 and 151L.
- <sup>4</sup> Students who took MA 275 or MA 206 before declaring the BNS major may use these courses in lieu of PS 206.
- <sup>5</sup> Students who do not directly place into MA 141 should take MA 140.

## Student Learning Outcomes

1. **Breadth of Knowledge:** Use and evaluate various neuroscientific, biological and psychological perspectives to evaluate and predict

complexities in behavior, cognition and affect. Understand how behavioral neuroscience integrates with psychology and biology.

2. **Scientific Reasoning:** Conduct, interpret and evaluate scientific studies in terms of the reliability, validity and generalizability of the research designs; develop open-mindedness, curiosity and amiable skepticism toward claims.
3. **Ethical Responsibility:** Apply ethical standards to research and practice situations; demonstrate interpersonal sensitivity in work and communities.
4. **Communication Skills:** Demonstrate flexibility and clarity of argument in both written and oral communication.
5. **Personal Development:** Apply psychological and neuroscientific thinking to issues encountered in work and personal life, such as using evidence to solve problems; engage in teamwork as well as self-reflection and self-management.

## Admission Requirements: College of Arts and Sciences

The requirements for admission into the undergraduate College of Arts and Sciences programs are the same as those for admission to Quinnipiac University.

Admission to the university is competitive, and applicants are expected to present a strong college prep program in high school. Prospective first-year students are strongly encouraged to file an application as early in the senior year as possible, and arrange to have first quarter grades sent from their high school counselor as soon as they are available.

For detailed admission requirements, including required documents, please visit the Admissions (<http://catalog.qu.edu/general-information/admissions/>) page of this catalog.

## Pre-Medical Studies Program

Students majoring in Health Science Studies, Biology, Biomedical Sciences or the pre-health track of Behavioral Neuroscience may fully participate in the pre-medical studies program. The curriculum in this degree program can fulfill the science prerequisites for most professional schools. Students should refer to Pre-Medical Studies (<http://catalog.qu.edu/academics/premedical-studies/>) for more information about the pre-medical studies program and contact the Health Professions Advisory Committee for further academic advising.

## Self-Directed Track or Psychological Science Track

Shown below is one of many possible paths through the curriculum. Each student's individual academic plan is crafted in consultation with their academic adviser.

Code	Title	Credits
<b>First Year</b>		
Milestones: Earn 30 credits and a GPA of 2.00 or higher, and meet with your adviser at least once a semester.		
<b>Fall Semester</b>		
BIO 150 & 150L	General Biology for Majors and General Biology for Majors Laboratory	4

CHE 110 & 110L	General Chemistry I and General Chemistry I Lab	4
EN 101	Introduction to Academic Reading and Writing	3
FYS 101	First-Year Seminar	3

### Spring Semester

BIO 151 & 151L	Molecular and Cell Biology and Genetics and Molecular and Cell Biology and Genetics Lab	4
CHE 111 & 111L	General Chemistry II and General Chemistry II Lab	4
EN 102	Academic Writing and Research	3
PS 101	Introduction to Psychology	3

### Second Year

Milestones: Earn 60 credits and a GPA of 2.00 or higher. Meet with your adviser at least once per semester to discuss academic, experiential learning, career and co-curricular opportunities.

### Fall Semester

BIO 211 & 211L	Human Anatomy and Physiology I and Human Anatomy and Physiology Lab I	4
MA 140	Pre-Calculus	3
PS 252	Biological Psychology	3
Language at the 101 level		3
University Curriculum course		3

### Spring Semester

PS 206	Introduction to Statistics in Psychology	3
PS 272	Psychopathology	3
Elective Exploration		3-4
Language at the 102 level (satisfies CAS language requirement)		3
University Curriculum course		3

### Third Year

Milestones: Earn 90 credits and a GPA of 2.00 or higher. Meet with your adviser at least once per semester. Participate in study abroad, complete internship or research opportunities.

### Fall Semester

PS 307	Introduction to Research Methods in Psychology with Lab	3
PS 233	Cognitive Psychology	3
University Curriculum course		3
Elective Exploration		3-4
Open Elective		3

### Spring Semester

Self-Directed Track: Adv Psychobiology or Psychological Science Track: Adv Psychology		3
Self-Directed Track: Elective Exploration or Psychological Science Track: Any 200- or 300-level PS Course		3
University Curriculum course		3
University Curriculum course		3

Open Elective	3
<b>Fourth Year</b>	
Milestones: Earn 120 credits and a GPA of 2.00 or higher. Complete possible minor or double major and prepare for graduation.	
<b>Fall Semester</b>	
PS 353 Research Methods in Behavioral Neuroscience	3
Psychological Science Track: Any 200- or 300-level PS Course	3
University Curriculum course	3
Open Elective	1-3
Open Elective	1-3
<b>Spring Semester</b>	
PS 401 Integrative Capstone for Psychology and Behavioral Neuroscience Majors	3
University Curriculum course	3
BIO 329 Neurobiology	3
PS 357 Drugs, Brain and Behavior	3
Open Elective	1-3
<b>Total Credits</b>	<b>113-121</b>

## Pre-Health Track

Shown below is one of many possible paths through the curriculum. Each student's individual academic plan is crafted in consultation with their academic adviser.

Code	Title	Credits
<b>First Year</b>		
Milestones: Earn 30 credits and a GPA of 2.00 or higher, and meet with your adviser at least once a semester.		
<b>Fall Semester</b>		
BIO 150 & 150L	General Biology for Majors and General Biology for Majors Laboratory	4
CHE 110 & 110L	General Chemistry I and General Chemistry I Lab	4
EN 101	Introduction to Academic Reading and Writing	3
FYS 101	First-Year Seminar	3
PS 101	Introduction to Psychology	3
<b>Spring Semester</b>		
BIO 151 & 151L	Molecular and Cell Biology and Genetics and Molecular and Cell Biology and Genetics Lab	4
CHE 111 & 111L	General Chemistry II and General Chemistry II Lab	4
EN 102	Academic Writing and Research	3
MA 140	Pre-Calculus	3
Language at the 101 level		3
<b>Second Year</b>		

Milestones: Earn 60 credits and a GPA of 2.00 or higher. Meet with your adviser at least once per semester to discuss academic, experiential learning, career, and co-curricular opportunities.		
<b>Fall Semester</b>		
BIO 211 & 211L	Human Anatomy and Physiology I and Human Anatomy and Physiology Lab I	4
CHE 210 & 210L	Organic Chemistry I and Organic Chemistry I Lab	4
MA 141	Calculus of a Single Variable	3
PS 252	Biological Psychology	3
Language at the 102 level (satisfies CAS language requirement)		
<b>Spring Semester</b>		
BIO 212 & 212L	Human Anatomy and Physiology II and Human Anatomy and Physiology II Lab	4
CHE 211 & 211L	Organic Chemistry II and Organic Chemistry II Lab	4
PS 206	Introduction to Statistics in Psychology	3
PS 272	Psychopathology	3
SO 101	Introduction to Sociology	3

### Third Year

Milestones: Earn 90 credits and a GPA of 2.00 or higher. Meet with your adviser at least once per semester. Participate in study abroad, complete internship or research opportunities.

Code	Title	Credits
<b>Fall Semester</b>		
PS 307	Introduction to Research Methods in Psychology with Lab	3
PS 233	Cognitive Psychology	3
PHY 110 & 110L	General Physics I and General Physics I Lab	4
University Curriculum course		
<b>Spring Semester</b>		
PHY 111 & 111L	General Physics II and General Physics II Lab	4
CHE 315 & 315L	Biochemistry I and Biochemistry I Lab	4
University Curriculum course		
University Curriculum course		
<b>Fourth Year</b>		
Milestones: Earn 120 credits and a GPA of 2.00 or higher. Complete possible minor or double major and prepare for graduation.		
<b>Fall Semester</b>		
PS 353	Research Methods in Behavioral Neuroscience	3
PS 354	Sensation and Perception	3
BIO 346 & 346L	Cell Physiology and Cell Physiology Lab	4
DS 110	Introduction to Data Science	3
University Curriculum course		
<b>Spring Semester</b>		

PS 357	Drugs, Brain and Behavior	3
PS 401	Integrative Capstone for Psychology and Behavioral Neuroscience Majors	3
BIO 329	Neurobiology	3
University Curriculum course		3
Open Electives		3-4
<b>Total Credits</b>		<b>126-127</b>