

DEPAUL UNIVERSITY

COLLEGE OF SCIENCE AND HEALTH



Neuroscience

Student Guide 2017-2018



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Purpose

This guide is one of many resources to aid undergraduate students interested in a Neuroscience major to successfully pursue this new program. The material within this guide will be periodically updated. We have included information that students would find useful in scheduling their courses, selecting a concentration, and deciding on electives to take. Please use this guide to discover opportunities and suggested courses suited for your degree and future career interests within the Neuroscience field. Our goal is to make sure that every student has access to any information they need to pursue an undergraduate degree in Neuroscience and to help them succeed academically. We look forward to working with you!

Locations and Link

Main Offices: McGowan North, room 106; Byrne Hall, room 563

Phone: 773-325-2191; (773)-325-4136

Neuroscience Page: <https://csh.depaul.edu/academics/neuroscience/Pages/default.aspx>

Faculty and Staff Contact Information

<i>Name</i>	<i>Office</i>	<i>Extension</i>	<i>E-mail</i>
Dr. Clark Elliot (<i>Computational Neuroscience</i>)	CDM 649	(312)-362-8627	elliott@cdm.depaul.edu
Dr. Peter Hastings (<i>Computational Neuroscience</i>)	CDM 717	(312)-362-5736	peterh@cdm.depaul.edu
Dr. Dorothy Kozlowski (<i>Behavioral Neuroscience</i>)	McGN 106	(773)-325-2191	dkozlows@depaul.edu
Dr. Eric Norstrom (<i>Cellular/Molecular Neuroscience</i>)	McGN 123	(773)-325-2091	enorstro@depaul.edu
Dr. Daniela Raicu (<i>Computational Neuroscience</i>)	CDM 718	(312)-362-5512	dstan@cdm.depaul.edu
Dr. Elizabeth Rottenberg (<i>Philosophy of Mind</i>)	LAS 150-17	(773)-325-4864	erottenb@depaul.edu
Dr. Kevin Thompson (<i>Neuroethics</i>)	LAS 150-24	(773)-325-4866	kthomp12@depaul.edu
Dr. Sandra Virtue (<i>Cognitive Neuroscience</i>)	Byrne 563	(773)-325-4136	svirtue@depaul.edu

Academic Advising

Freshman, Sophomores and Transfers will be advised by the CSH Advising Office. Also contact the CSH Advising Office for questions regarding pre-health, transfer credits, degree progress, and other general advising inquiries.

CSH Advising Office
McGowan North Suite 400
(773)-325-8490
cshadvising@depaul.edu

Juniors and Seniors will be advised by the Director and Co-Director of the Neuroscience Program, Dr. Kozlowski and Dr. Virtue.

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Be sure to meet with your academic advisor at least once a quarter to ensure that you are on track for completing the Neuroscience major at your desired graduation time. If you do not know who your academic advisor is, please check your Blue Star account. If you plan to go on to medical school, also meet with a pre-health advisor.

Social Media

We use social media platforms to help inform our students about potential internships and research opportunities, upcoming events in the department, and other departmental news and information.



<https://twitter.com/DePaulNeuro>



<https://www.facebook.com/depaulneuro/>

Program Learning Outcomes

Students with a major in Neuroscience will be able to:

1. Describe the structure of the nervous system at the cellular and systems level and will be able to discuss how each component relates to neurological function, behavior, and cognition.
2. Evaluate scientific literature in neuroscience critically, formulate hypotheses, and design scientific experiments through multiple perspectives; describe and discuss landmark and contemporary publications in the field of neuroscience. They will be able to evaluate their scientific merit and formulate testable hypotheses that extend the findings of current research.
3. Explain basic techniques used in neuroscience research. Students will be able to describe and discuss the core technologies that have elucidated out fundamental understanding of neuroscience. They will also be able to describe and implement core analytical and statistical methods related to neuroscience discovery.
4. Process, analyze, model, integrate, and/or interpret data from multiple disciplines within neuroscience.
5. Communicate about neuroscience verbally and in writing in a clear, reasoned, and discipline-specific manner. Students will be able to describe, discuss, and debate core and developing neuroscience concepts. They will be able to present their ideas in a clear and organized manner and will be able to relate the essential components of their core discipline to a scientific and lay audience.
6. Identify challenges brought to ethical thinking by advances in neuroscience and formulate new ethical questions on the basis of these challenges. Students will be able to discuss ethical considerations of neuroscience research and applications. They will be able to describe key events in the ethical history of neuroscience and discuss the impact of those events on the modern field of neuroscience and neuroethics.
7. Discuss how disciplines such as humanities, social sciences, and natural sciences interact with neuroscience to address historical, contemporary, and future scientific challenges. Students will be able to relate the findings of neuroscience research to other areas of knowledge and discuss the impact that neuroscience has had on the state of the modern world. They will also be able to discuss how contemporary modes of thought have influenced the direction of neuroscience research and interpretation of results.

Summary of the Neuroscience Curriculum

Liberal Studies Program	17 courses
Neuroscience Core	11 courses
Neuroscience Concentration Courses	12 courses
Open Electives	8 courses
Total	48 courses

Liberal Studies Program

Neuroscience majors will participate in the liberal studies program in the following way:

First Year Program	4 courses
Explore/Discover, Focal Point, WRD 103, and WRD 104	
Sophomore Seminar	1 course
LS Learning Domains	
Arts & Literature	3 courses
Philosophical Inquiry	2 courses *
Religious Dimensions	2 courses *
Self, Society, and Modern World	1 course**
Understanding the Past	2 courses
Junior Year Experiential Learning:	1 course
Senior Capstone	1 course***
TOTAL	17 courses

*One of the four PI and RD courses must come from the following:

PHL 200 Ethical Theories.

PHL 230 Contemporary Issues in Ethics.

PHL 291 Moral Philosophy.

PHL 229 Biomedical Ethics

REL 229 Biomedical Ethics

HLTH 229 Ethics in the Health Sciences.

CSC 208 Ethics in the Digital Age.

PHL 228 Neuroethics – if you chose Neuroethics: please register for **PHL 228** if you intend to use this course for a PI or RD designation, and use **NEU 228** if you will be taking it as an elective.

**PSY 105 and 106 will fulfill the other two SSMW requirements

***NEU 390 Capstone in Neuroscience will be strongly encouraged

Neuroscience Core

The core is designed to address the following learning goals for all students graduating with a B.S. in Neuroscience:

1. To understand how the components of the nervous system are organized, function, and relate to behavior and cognition.

2. To evaluate scientific literature in neuroscience critically, formulate hypotheses, and design scientific experiments through multiple perspectives.
3. To understand basic techniques used in neuroscience research. To process, analyze, model, integrate, and/or interpret data from multiple disciplines within neuroscience.
4. To communicate about neuroscience verbally and in writing in a clear, reasoned, and discipline-specific manner.
5. To recognize the impact that neuroscience has and will have on ethics and society and their reciprocal interaction.
6. To articulate how disciplines such as humanities, social sciences, and natural sciences interact with neuroscience to address historical, contemporary, and future scientific challenges.

Required Courses for Neuroscience Core:

General Biology I, II, III	BIO 191, 192, 193
General Chemistry I, II	CHE 130/131, 132/133 or CHE 120/121, 122/123
Survey of Organic Chemistry	CHE 228/229
Students who take Organic Chemistry I can substitute it for this requirement.	
Intro to Psychology I, II	PSY 105, 106
Statistics	BIO 206 or PSY 240 or IT223
Introduction to Neuroscience	NEU 201
Research Methods	NEU 301 or PSY 242
Capstone in Neuroscience	NEU 390*

*Students can take other capstones, but this will be strongly recommended

Concentrations

The four concentrations in the Neuroscience major represent major sub-disciplines within neuroscience and include:

- A. Cellular/Molecular Neuroscience, for students who are interested in the cellular and molecular mechanisms that are involved in the functioning of the nervous system and how they relate to the creation of behavior or play a role in disease.
- B. Behavioral/Cognitive Neuroscience, for students who are interested in understanding how the nervous system is involved in behaviors such as sensation/perception, movement and the cognitive functioning that includes learning, memory, and emotion.
- C. Computational Neuroscience, for students who are interested in quantitative and computational modeling methods to understand the functions of the nervous system and behavior and/or in the design of human-made devices that duplicate nervous system functioning.
- D. General Neuroscience, for students who are undecided, switch majors, transfer in with credits, are pursuing a health career, or have an ongoing curriculum that makes it difficult to fulfill

requirements of the other concentrations. Students are strongly encouraged to pick one of the concentrations above.

Cellular/Molecular Neuroscience Concentration

All students in this concentration will take the following required courses in addition to the major core (**prerequisites in parenthesis**) and 6 major electives from an approved list of courses seen in Table 5.

CHE 134/135 - Gen Chem III	(CHE 132/133)
BIO 250 – Cell biology	(BIO 193, CHE 134)
BIO 260 – Genetics	(BIO 193)
BIO 360 – Molecular biology	(BIO 250, BIO 260, CHE 228)
BIO/NEU 339 – Cellular Neurobiology	(BIO 250 or PSY 377)
BIO 340 – Behavioral Neuroscience	(NEU 201 or BIO/NEU 339 or BIO 310/ HLTH 301 or PSY 377)

Table 1 – Sample timeline for students in the Cellular/Molecular Neuroscience Concentration.
Red = LSP requirements Blue = Neuro requirements Green = Concentration courses

	Autumn Quarter	Winter Quarter	Spring Quarter
YEAR 1	BIO191 CHE130/131 WRD103 LSP110/111	BIO192 CHE132/133 WRD104 LSP112	BIO193 CHE134/135 PSY105 Open Elective
YEAR 2	NEU201 Intro to Neuroscience PSY106 BIO206 or PSY 240 Open Elective	PSY 242 Research Methods II BIO250 LSP200 Learning Domain	NEU/PHL228– Neuro/Ethics or other Ethics course CHE228/229 BIO260 Learning Domain
YEAR 3	BIO/NEU339 BIO360 Learning Domain Open Elective	BIO340 NEU Elective Learning Domain NEU Elective	NEU Elective Learning Domain Learning Domain JYEL
YEAR 4	NEU Elective Learning Domain Learning Domain Open Elective	NEU Elective Learning Domain Open Elective Open Elective	NEU390 Senior Capstone NEU Elective Open Elective Open Elective

Behavioral/Cognitive Neuroscience Concentration

All students in this concentration will take the following required courses in addition to the major core (**prerequisites in parenthesis**) and 7 major electives from an approved list of courses seen in Table 5.

BIO 310 – Vertebrate Physiology	(BIO 250 & CHE 134)
OR HLTH 301 – Human Anatomy & Physiology	(BIO 193)
BIO/NEU 339 – Cellular Neurobiology	(BIO 250 or PSY 377)
BIO 340 – Behavioral Neuroscience	(NEU 201 or BIO/NEU 339 or BIO 310/ HLTH 301 or PSY 377)
BIO 342 – Cognitive Neuroscience	(NEU 201 or BIO/NEU 339 or 340, or PSY 377)
OR PSY 379 – Cognitive Neuroscience	
PSY 360 –Theories of Learning and Cognition	(PSY 105 & 106)
OR PSY 373 – Happiness, Judgment and Decision Making	(PSY 105 & 106)

Table 2 – Sample timeline for students in the Behavioral/Cognitive Neuroscience Concentration.
Red = LSP requirements Blue = Neuro requirements Green = Concentration courses

	Autumn Quarter	Winter Quarter	Spring Quarter
YEAR 1	BIO191 CHE130/131 WRD103 LSP110/111	BIO192 CHE132/133 WRD104 LSP112	BIO193 CHE228/229 PSY105 Open Elective
YEAR 2	NEU201 Intro to Neuroscience PSY106 BIO206 or PSY 240 Open Elective	PSY 242 Research Methods II [BIO310 or HLTH 301 – Anatomy & Physiology] LSP 200 Learning Domain	NEU/PHL228– Neuro/Ethics or other Ethics course NEU Elective Learning Domain Learning Domain
YEAR 3	BIO/NEU 339-Cellular Neuro [PSY 360 or PSY 373] Learning Domain Learning Domain	BIO340-Behavioral Neuro NEU Elective Learning Domain Open Elective	[BIO342 or PSY 379- Cognitive Neuro] NEU Elective Learning Domain JYEL
YEAR 4	NEU Elective NEU Elective Learning Domain Open Elective	NEU Elective Learning Domain Open Elective Open Elective	NEU390 Senior Capstone NEU Elective Open Elective Open Elective

Computational Neuroscience Concentration

All students in this concentration will take the following required courses in addition to the major core (**prerequisites in parenthesis**) and 6 major electives from an approved list of courses seen in Table 5.

MAT 150 – Calculus I	(Mat 131)
CSC 241– Introduction to Computer Science I	(MAT 130)
NEU 256 – Introduction to Computational Neuroscience *	(MAT 150 & CSC 241 & NEU 201)
CSC 250 – Computers and Human Intelligence	
CSC 367 – Introduction to Data Mining	(IT 223 or BIO 206 or PSY 240)
CSC 381 – Introduction to Image Processing	(MAT 150)

* Intro to Computational Neuroscience provides an introduction to basic computational methods for understanding what nervous systems do and how they function. The course covers the structure of the brain, from neurons to circuits to regions, and also the computational and theoretical approaches to model the brain. The course will introduce students to the physiology of individual neurons, how they communicate through synapses and firing, and how they work together to create systems that control, learn and memorize. The course will include the application of mathematical and computational models to neural systems.

Table 3 – Sample timeline for students in the Computational Neuroscience Concentration.
Red = LSP requirements Blue = Neuro requirements Green = Concentration courses

	Autumn Quarter	Winter Quarter	Spring Quarter
YEAR 1	BIO191 CHE130/131 WRD103 LSP110/111	BIO192 CHE132/133 WRD104 LSP112	BIO193 MAT150 Open Elective PSY105
YEAR 2	NEU201 Intro to Neuroscience PSY106 IT223 or BIO 206 or PSY 240 Open Elective	PSY 242 Research Methods II LSP 200 NEU256 Intro Comp Neuro CSC 241	CHE228/229 NEU/PHL228– Neuro/Ethics or other Ethics course Learning Domain CSC250
YEAR 3	NEU Electives Learning Domain Learning Domain Open Elective	CSC367 NEU Elective Learning Domain Learning Domain	CSC381 NEU Elective Learning Domain JYEL
YEAR 4	NEU Elective Learning Domain Learning Domain Open Elective	NEU Elective Learning Domain Open Elective Open Elective	NEU 390 Senior Capstone NEU Elective Open Elective Open Elective

General Neuroscience Concentration

Students are strongly encouraged to pick one of the concentrations above. However, for students, who are pre-health, undecided, switch majors, transfer in with credits, or have a curriculum that makes it difficult to fulfill requirements of the other concentrations, the General Concentration will require the following in addition to the major core requirements (**prerequisites in parenthesis**) and 6 major electives from the list in Table 5.

One course from the following:

BIO/NEU 339 – Cellular Neurobiology	(BIO 250 or PSY 377)
BIO 340 – Behavioral Neuroscience	(NEU 201 or BIO/NEU 339 or BIO 310/ HLTH 301 or PSY 377)
BIO 342 – Cognitive Neuroscience OR PSY 379 – Cognitive Neuroscience	(NEU 201 or BIO/NEU 339 or 340, or PSY 377)

Five courses from any of the following:

BIO/NEU 339 – Cellular Neurobiology	if not taken to fulfill requirement above
BIO 340 – Behavioral Neuroscience	if not taken to fulfill requirement above
BIO 342/PSY 379 - Cognitive Neuroscience	if not taken to fulfill requirement above
CHE 134/135 – Gen Chemistry III	(CHE 132/133)
BIO 250 – Cell biology	(BIO 193, CHE 134)
BIO 260 – Genetics	(BIO 193)
BIO 360 – Molecular biology	(BIO250, BIO260, CHE 228)
BIO 310 – Vertebrate Physiology OR HLTH 301 – Human Anatomy & Physiology	(BIO 250 & CHE 134) (BIO 193)
PSY 360 – Theories of Learning and Cognition	(PSY 105 & 106)
PSY 373 – Happiness, Judgment and Decision Making	(PSY 105 & 106)
MAT 150 – Calculus I	(Mat 131)
CSC 241 – Introduction to Computer Science I	(MAT 130)
NEU 256 – Introduction to Computational Neuroscience	
CSC 250 – Computers and Human Intelligence	
CSC 367 – Introduction to Data Mining	(IT 223 or BIO 206 or PSY 240)
CSC 381 – Introduction to Image Processing	(MAT 150)

Table 4– Sample timeline for students in the General Concentration
Red = LSP requirements Blue = Neuro requirements Green = Concentration courses

	Autumn Quarter	Winter Quarter	Spring Quarter
YEAR 1	BIO191 CHE130/131 WRD103 LSP110/111	BIO192 CHE132/133 WRD104 LSP112	BIO193 CHE228/229 Open Elective PSY105
YEAR 2	NEU201 Intro to Neuroscience PSY106 BIO206 or PSY 240 Open Elective Learning Domain	PSY 242 Research Methods II NEU ConcReq LSP 200 Learning Domain	NEU/PHL228– Neuroethics or other Ethics course NEU Elective NEU Conc Req Learning Domain

YEAR 3	BIO/NEU 339-Cell Neuro NEU Conc. Req Learning Domain Learning Domain	NEU Conc. Req NEU Elective Learning Domain Open Elective	NEU Conc. Req NEU Elective Learning Domain JYEL
YEAR 4	NEU Elective NEU Elective Learning Domain Open Elective	NEU Elective Learning Domain Open Elective Open Elective	NEU 390 Senior Capstone NEU Elective Open Elective Open Elective

Table 5: Electives by Concentration

Cellular/Molecular Pick 6 electives from list below:	Behavioral/Cognitive Pick 7 electives from list below	Computational Pick 7 electives from list below:
NEU256 - Introduction to Computational Neuroscience NEU380- Topics in Neuroscience NEU399 - Independent Study NEU 228 - Neuroethics BIO 201 – Anatomy BIO220 – Biotechnology BIO 301 – Animal Behavior BIO310 – Vertebrate physiology (L) BIO330 – Developmental Biology BIO341 – Topics in Neurobiology BIO342 – Cognitive Neuroscience BIO362 – Bioinformatics BIO375 – Pharmacology BIO386 – Endocrinology CHE230/231, 232/233, 234/235 Organic Chemistry (Can substitute for CHE 228) CHE 340 – Biochemistry CSC250 Computers and Human Intelligence CSC 241 Introduction to Computer Science I CSC 367 – Foundations of Data Science CSC 381 Intro to Digital Image Processing PHY 150/151/152 – General Physics or PHY 170/171/172 or PHY 155/166 PSY 317 – Psychology of Interpersonal Relationship PSY 333 – Child Psychology PSY 334 – Adolescent Psychology PSY 347 Social Psych PSY 348 – Social Cognition and Mental Control PSY 353 Abnormal Psychology PSY 360 Theories of Learning and Cognition PSY 364 – Health Psychology PSY 366- Behavior Problems of Children	NEU256 - Introduction to Computational Neuroscience NEU 380 – Topics in Neuroscience NEU399 - Independent Study NEU 228 – Neuroethics BIO 201 – Anatomy BIO220 – Biotechnology BIO250 – Cell biology (L) [BIO193, CHE134] BIO260 – Genetics (L) [BIO193] BIO 301 – Animal Behavior BIO310 – Vertebrate physiology (L) BIO330 – Developmental Biology BIO341 – Topics in Neurobiology BIO360- Molecular Biology BIO362 – Bioinformatics BIO375 – Pharmacology BIO386 – Endocrinology CHE 134/135 Gen Chem III (CHE 132/133) CHE230/231, 232/233, 234/235 Organic Chemistry (Can substitute for CHE 228) CHE 340 – Biochemistry CSC250 Computers and Human Intelligence CSC 241 Introduction to Computer Science I CSC 367 – Foundations of Data Science CSC 381 Intro to Digital Image Processing PHY 150/151/152 – General Physics or PHY 170/171/172 or PHY 155/166 PSY 317 – Psychology of Interpersonal Relationship PSY 333 – Child Psychology PSY 334 – Adolescent Psychology PSY 347 Social Psych PSY 348 – Social Cognition and Mental Control PSY 353 Abnormal Psychology PSY 360 Theories of Learning and Cognition PSY 364 – Health Psychology PSY 366- Behavior Problems of Children PSY 370 – Social and Emotional Development	NEU 380- Topics in Neuroscience NEU 228 – Neuroethics NEU399 Independent Study IM210 Introduction to Human Computer Interaction IT240 Introduction to Databases CSC242 Introduction to Computer Science 2 CSC382 Image Analysis and its Applications CSC324 Data Analysis and Statistical Software IT300 Research Experience CSC399 Independent Study BIO220 – Biotechnology BIO250 – Cell biology (L) [BIO193, CHE134] BIO 201 – Anatomy BIO260 – Genetics (L) [BIO193] BIO 301 – Animal Behavior BIO310 – Vertebrate physiology (L) BIO330 – Developmental Biology BIO /NEU 339- Cellular Neurobiology BIO 340- Behavioral Neuroscience BIO341 – Topics in Neurobiology BIO 342 – Cognitive Neuroscience BIO 360- Molecular Biology BIO362 – Bioinformatics BIO375 – Pharmacology BIO386 – Endocrinology CHE 134/135 Gen Chem III (CHE 132/133) CHE230/231, 232/233, 234/235 Organic Chemistry (Can substitute for CHE 228) CHE 340 – Biochemistry PHY 150/151/152 – General Physics or PHY 170/171/172 or PHY 155/166 PSY 317 – Psychology of Interpersonal Relationship PSY 333 – Child Psychology PSY 334 – Adolescent Psychology PSY 347 Social Psych PSY 348 – Social Cognition and Mental Control PSY 353 Abnormal Psychology PSY 360 Theories of Learning and Cognition PSY 364 – Health Psychology

PSY 370 – Social and Emotional Development PSY 373 Happiness, Judgment and Decision-making PSY 377 Physiological Psychology (PSY 105 or PSY 106, PSY 240, and PSY 242)	PSY 373 Happiness, Judgment and Decision-making PSY 377 Physiological Psychology (PSY 105 or PSY 106, PSY 240, and PSY 242)	PSY 366- Behavior Problems of Children PSY 370 – Social and Emotional Development PSY 373 Happiness, Judgment and Decision-making PSY 377 Physiological Psychology (PSY 105 or PSY 106, PSY 240, and PSY 242)
8 open Electives	8 open electives	8 open electives

Pre-Med Students*: are encouraged to major in Neuroscience- General so that requirements for the major and professional school can be met.

Requirements for Medical School admission below can be met with a combination of the major requirements, major electives, and liberal studies program:

- 1 year General Biology – NEU major requirement
- 1 year of General Chemistry – NEU major requirement + 1 major elective
- 1 year of Physics – Major Electives
- 1 year of Organic Chemistry – Major Electives
- Biochemistry – Major Electives
- PSY 105 & 106 – NEU major requirement
- SOC 101 – SSMW Learning Domain

*For students interested in going to Medical School, it is highly recommended to meet with an advisor from the Pre-Health Advising Office: <https://csh.depaul.edu/student-resources/advising-student-services/pre-health-advising/Pages/default.aspx>

Students Applying to Graduate School in Neuroscience:

Requirements for graduate school in neuroscience differ significantly. All general prerequisites for graduate school have been included in either the required or elective courses for the major. However, students who want to go to graduate school are advised to meet with a Neuroscience advisor early to make appropriate elective choices within their concentration.

Students in the Honors Program:

Students admitted to DePaul as part of the Honors Program can major in any of the concentrations. Instead of the LSP requirements the students will take an equal amount of courses (17) in the Honors Program. Please continue to work with your assigned advisor in the Honors program in addition to one in Neuroscience. The courses are:

- HON 100: Rhetoric and Critical Inquiry
- HON 101: World Literature
- HON 102: History in Global Contexts
- HON 104: Religious Worldviews and Ethical Perspectives
- HON 105: Philosophical Inquiry

HON 110 or 111: Discover or Explore Chicago
HON 201: States, Markets, and Societies
HON 205: Interdisciplinary Arts
HON 301: Honors Junior Seminar in Multiculturalism
HON 350 or 351 or 395: Honors Senior Capstone
1 Fine Arts Elective
3 Language Courses (intermediate and above)
3 Honors Approved Electives
(NEU/PHL 228 Neuroethics and NEU390 Capstone, if taken can count as 2)
Experiential Learning Verification.

2017-18 Course Offerings by Quarter – Please note that these may change over the year.

Field	Fall Quarter	Winter Quarter	Spring Quarter
NEU	201- Intro. to Neuroscience 339- Cellular Neurobiology	201- Intro. to Neuroscience 228- Neuroethics 339- Cellular Neurobiology 256- Computational Neuroscience 380- Special Topics in Neuroscience: Neuroeconomics: Decision-Making	201- Intro. to Neuroscience 390- Neuroscience Capstone
BIO	191- General Biology I 193- General Biology III 206- Biostatistics 250- Cell Biology 310- Vertebrate Physiology 380- Cancer Biology 339- Cell Neurobiology 381- Topics in Cancer	191- General Biology I 192- General Biology II 206- Biostatistics 220- Prin. Of Biotechnology 250- Cell Biology 260- Genetics 340- Behavioral Neuroscience 360- Molecular Biology	192- General Biology II 193- General Biology III 201- Human Anatomy 206- Biostatistics 250- Cell Biology 260- Genetics 310- Vertebrate Physiology 342- Cognitive Neuroscience 386- Intro. To Endocrinology
PSY	105- Intro. To Psychology I 106- Intro. To Psychology II 240- Statistics I 241- Research Methods I 242- Research Methods II 333- Child Psychology 353- Abnormal Psychology 360- Theories of Learning/Cog. 373- Happiness, Judgement	105- Intro. To Psychology I 106- Intro. To Psychology II 240- Statistics I 242- Research Methods II 333- Child Psychology	105- Intro. To Psychology I 106- Intro. To Psychology II 240- Statistics I 242- Research Methods II 317- Psych. Of Interpersonal Rel. 333- Child Psychology
CHE	130/131- General Chem. II 134/135- General Chem. III 230/231- Organic Chem. II 234/235- Organic Chem. III 340/341- Biochemistry I	130/131- General Chem. I 132/133- General Chem. II 230/231- Organic Chem. I 232/233- Organic Chem. II 340/341- Biochemistry I 342/343- Biochemistry II	132/133- General Chem. II 134/135- General Chem. III 228/229- Survey Of Organic 232/233- Organic Chem. II 234/235- Organic Chem. III 346- Principles of Biochemistry

CDM	IT 240- Intro. To Databases IT 223- Statistics/Data Analysis CSC 241- Computer Science I CSC 242- Computer Science II CSC 324- Data Analysis and Statistical Software II CSC 367- Data Science CSC 381- Image Processing MAT 150,151,152- Calc. I,II,III	IT 240- Intro. To Databases IT 223-Statistics/Data Analysis CSC 241- Computer Science I CSC 242- Computer Science II CSC 324- Data Analysis and Statistical Software II MAT 150,151,152- Calc. I,II,III	IT 240- Intro. To Databases IT 223- Statistics/Data Analysis CSC 241- Computer Science I CSC 242- Computer Science II CSC 324- Data Analysis and Statistical Software CSC 367- Data Mining MAT 150,151,152- Calc. I,II,III
HLTH	140- Medical Terminology 201- Intro to Health Science 210- Intro to Public Health	201- Intro to Health Science 210- Intro to Public Health 301- Integrated Human Anatomy/Physiology A	201- Intro to Health Science 210- Intro to Public Health 301- Integrated Human Anatomy/Physiology B

Class Standing:

- Freshman: 0-43 credit hours
- Sophomores: 44-87 credit hours
- Juniors: 88-131 credit hours
- Seniors: 132 credit hours or more

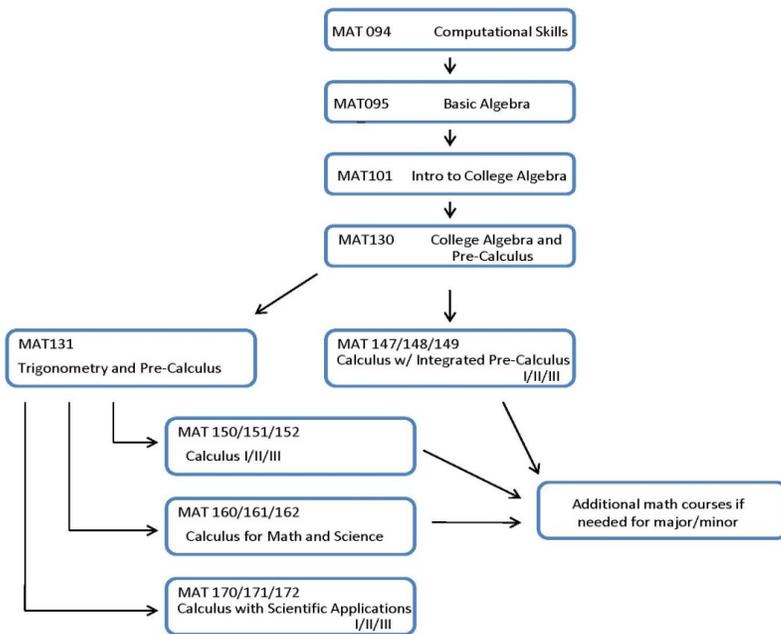
Degree Conferral:

- Complete a minimum of 192 quarter hours.
- Earn a minimum of 2.000 cumulative GPA.
- Satisfy all the regulations of the individual college or school granting the degree.
- Earn grades of C- or better in all major, minor and allied field classes (GPA greater than or equal to 2.000).
- Complete the residency requirement: final 60 quarter hours of credit; one-half of credit earned in the major concentration; one-half of credit earned in the minor if applicable; all courses in senior year.
- Complete the online degree conferral application in Campus Connection by the designated deadline date.

Math Placement:

Below is a math path that is useful in determining your math placement. Some pre-requisite notes:
MATH 130 is the pre-requisite for General Biology I and General Chemistry I
MAT 131 is the pre-requisite for Calculus I and Physics I

Take any one of the following math sequences to fulfill the math sequence for the biology degree:



Math 147/148/149 – Calculus with integrated pre-calculus. Math 131 is not needed before taking this sequence. MAT 147 only offered in Fall; MAT 148 only offered in Winter; MAT 149 only offered in Spring. *Note: some graduate programs will not take this sequence as the calculus pre-requisite.*

Math 150/151/152 – Standard calculus. MAT 150/151/152 are each offered every quarter

Math 160/161/162 – Calculus for math and science majors. A longer lab section with more mathematical application MAT 160 only offered in Fall; MAT 161 only offered in Winter; MAT 162 only offered in Spring.

Math 170/171/172 – Calculus with scientific application. Course content will use more science examples. Designed for students majoring in physical or life sciences. Heavier focus on differential equations. MAT 170 only offered in Fall; MAT 171 only offered in Winter; MAT 172 only offered in Spring.

Getting Started

Declaring or Changing Your Major, Minor, or Concentration: You can officially register or change your intended major, minor, or concentration in Campus Connect. This can be done by the following method: *Campus Connect > Main Menu > Self Service > Academic Planning > Change College, Major, Minor, or Concentration*

Registering & Wait list Procedures: Follow this link for video tutorials on your Degree Progress and Registering for classes. (<http://offices.depaul.edu/depaul-central/registration/Pages/default.aspx>) Also, please understand waitlists are automatic within our system. If you are on the waitlist for a class, you will need to wait until the appropriate amount of people drop from the class to which then our system will automatically add you to the class from the waitlist. There is little to nothing your advisor or the professor can do to get you into a class you are waitlisted for, especially lab based classes. This is due to space and safety issues.

Pre-Health Advising: Interested in a health related career? There are many forms of Pre-Health Advising at DePaul. There is the Pre-health Advisory Committee (PAC), which is comprised of an interdisciplinary body of faculty and staff whose primary function is the academic advising of students intending to pursue a career in one of the health professions. We also have a dedicated Pre-Health staff advisor in addition to the Biology staff advisor. To learn more about the PAC and our Pre-Health Advisor, and to obtain information about upcoming events and speakers that the PAC organizes, we encourage you to visit their website and register for their services at: <http://csh.depaul.edu/student-resources/advising-student-services/pre-health-advising>

Getting Involved

Student Groups: DePaul has a vast amount of student organizations for students wishing to get involved. There are many science-based organizations and clubs available. Please visit the Student Involvement website by logging in through OrgSync: <http://www.orgsync.com/> to join and to learn more about all of the student organizations. Here are a few:

- DePaul Neuroscience Club
- Psi Chi
- Chemistry Club of DePaul
- Society of Physics Students
- DePaul Mathematics Club
- Pre-Health Advising Committee Student Organization (PACSO)
- Under-Represented Groups in Medicine
- Life Science and Pre-med Club
- Computer Science Society
- Psychology Peer Mentors

Transfer Students

Students transferring to DePaul from other Colleges and Universities, either within the same field or a different field or major, should see an academic advisor as soon as possible in order to ensure that your credits match up to get you on track for degree completion.

As this is a new program, we expect many students to be transferring from another major. Keep in mind that depending on previous coursework and level of science background completed it might take longer to complete the intended degree.

AP Credit

All freshmen and transfer students who have taken an Advanced Placement (AP) test will be awarded DePaul course credit in the amounts indicated below provided that official score reports are submitted to the Office of Admission prior to enrolling at DePaul.

For information regarding other exams not listed follow this link

<http://www.depaul.edu/admission-and-aid/test-credit-and-placement/credit-given-by-exam/Pages/ap.aspx> or contact the Transfer Articulation Center at TrAC@depaul.edu.

Subject	AP Exam Name	Score	Course Credit	Course Awarded
AP Capstone	Research/Seminar Course	4 or 5	4	LSP 112
Biology	Biology	3 4 5	4 8 12	BIO 191 BIO 191 & 192 BIO 191, 192 & 193
Chemistry	Chemistry	3 4 5	4 4 8	CHE 102 CHE 130 & 131 CHE 130/131 & CHE 132/133
Computer Science	Computer Science A	3 4 5	4 4 8	IT 130 CSC 243 CSC 241 & 242
Mathematics	Calculus AB Calculus BC Statistics	3 4 or 5 3, 4 or 5 3, 4 or 5	4 8 12 4	MAT 135 or 150 MAT 150 & 151 or 135 & 136 MAT 150-152 or 135 & 136 & one SI MAT 242 or SOC 279
Physics	Physics B Physics C Part 1 Physics C Part 2 Physics 1 Physics 2	4 or 5 4 or 5 5 4 or 5 4 or 5	12 4 8 4 4	PHY 150, 151 & 152 PHY 170 PHY 171 & 172 PHY 150 PHY 152
Psychology	Psychology	4 or 5	8	PSY 105 & 106

Many professional school programs do not accept AP credit for science courses. Students who are considering applying to professional programs (e.g. medical, dental, pharmacy, optometry, etc.) should take science courses at DePaul.

What to do after receiving a B.S. in Neuroscience

By achieving a Bachelor of Science in Neuroscience, our students will be prepared to pursue a variety of career paths that include options such as:

- Within the health field, students can go on to graduate training programs that focus on neuroimaging and neurophysiology for example, administering electroencephalograms or magnetic resonance imaging.
- Professional health careers dealing with Neuroscience include Psychiatry, Neurology, Neuropathology, Neuro-physics, and Neurosurgery.
- Students interested in Psychology can pursue careers in counseling, clinical psychology, or neuropsychology.
- Students in computational neuroscience can go on to graduate programs in computer science, imaging, artificial intelligence, and “big data.”
- Another option is to move on to graduate programs in marketing and economics as Neuro-marketing and Neuro-economics are fairly new fields, or in law and ethics.
- Upon completion of a B.S. in Neuroscience, without pursuit of graduate studies, students will be qualified for numerous positions as biomedical, pharmaceutical, and psychology researchers, forensics technicians, science writers, data analysis, or non-for-profit agencies dealing with disease and disorder of the brain.

For additional opportunities and information, visit the Ohio State University Undergraduate Neuroscience Major site: <https://neurosciencemajor.osu.edu/careers-neuroscience>.

Also, the Society for Neuroscience site: <https://www.sfn.org/careers-and-training/career-tools-and-resources>

Senior Year Career Checklist

1. Revamp your resume. Review and update your resume, cover letter, and portfolio.
2. Improve your profile. Strengthen your personal brand by updating your LinkedIn account and using its tools to expand and organize your network. You can start by joining the Virtual Networking Lounge.
3. Connect over coffee. Get an insider’s perspective on a job or industry and learn about your field by setting up an informational interview.
4. Practice interviewing. Practice your interviewing skills from the comfort of your couch with DePaul Interview Stream.
5. Research and apply. Put your Googling skills to work. Research your ideal employers, types of jobs and positions in your field. Over 1000 new jobs and internships are posted each month in DePaul.Experience.
6. Questions? Contact the Career Center.

Email Etiquette

(1) Send email at appropriate time of day between 9am-5pm M-F

From: Student

Sent: Monday, April 18, 2016 12:25 PM (1)

To: Thomas, Matt

Cc:

(2) Have a clear applicable subject line

Bcc:

Subject: Advising Meeting (2)

Dear Professor (3) Thomas,

(3) Always make sure you're addressing properly

(4) Use a nice greeting

(5) Identify who you are

Hope this message finds you well. (4) My name is Shannon (5), and I am a sophomore neuroscience major at DePaul, I was wondering if you would have time this week to meet with me to discuss courses (6) for next fall quarter. I am available after 1:00pm Monday through Friday this week, whenever is most convenient for you (7) during that time, would work for me.

Let me know what time would be best, or if I can provide any further information. Thank you in advance, looking forward to hearing from you! (8)

(8) Include a sincere goodbye

(7) Include availability

(6) Identify why you are writing to them

Student's full name

Student's contact info (9)

(9) Make sure signatures are concise and include contact info

Final Checks

Is the email concise?

Are there any spelling or grammatical errors?

Is the information included relevant?

Am I using the appropriate tone?

Avoid bold, underline, all capitals, but 'please' and 'thank you' go a long way!

Key Elements of a Successful Resume

Header: Your header must include all contact information, such as: First and last name, phone number, email address, street address, city, state, and zip code

Objective: An objective aims to state your purpose in creating and submitting your resume, namely the position you are seeking. This section is optional and could be omitted to save space or substituted with a “Career Highlights” or “Summary of Qualifications” section. If you do include an objective statement, it is recommended that you be very specific with your goals and that you aim to preview your top qualities, proven skills, and knowledge.

Education: Your education section should include the institution and its location (city, state), degree, and (expected) graduation date. Include the full name of your expected degree along with any minors or concentrations. It is recommended that you include your GPA, but only if it is higher than a 3.0/4.0. Other possible information you might add to this section includes study abroad experiences, relevant coursework, or academic awards and honors.

Experience: Options include one large experience section (with positions listed in reverse chronological order) or multiple sections titled to highlight more relevant experience by placing it towards the top of your resume (e.g. “Relevant Experience,” “Health Related Experience,” or “Research Experience, followed by “Additional Experience”).

Headers for each position should include job title, employer, location (city, state), and the date range of employment (months and years or by season). Following your header, describe the skills and knowledge you demonstrated in each position using well developed accomplishment statements.

Quick tips for quality accomplishment statements:

- Emphasize transferable and technical skills and knowledge by way of concrete examples of when you applied them.
- Start with a strong action verb, and then follow with an explanation of what you did, describe how you did it, and, when possible, include any outcomes that were achieved. Be specific by including quantity, frequency, population, and impact of your work whenever possible. Vary your action verbs throughout the resume.
- Accomplishment statements should be in the proper tense (past or present tense) and use correct grammar and punctuation.

Consider the following questions to help you create more effective accomplishment statements:

- What were your accomplishments?
- How does this experience relate to your internship/employment goal?
- How did you help the organization?
- What skills/knowledge did you enhance?
- What was the result/outcome of your work?

Additional Skills: In this section include only skills that are testable and concrete. Soft skills such as communication, organizational, and interpersonal skills should not be listed here, but rather incorporated into your bulleted accomplishment statements above. Be sure to qualify your level of proficiency for each skill.

You might consider using subsections here such as:

Laboratory Skills: Include skills, familiarity with equipment and processes/procedures, and knowledge relevant to the laboratory setting. Examples include Distillation, Extraction, and Chromatography etc.

Technology: Focus on programs and proficiency levels that would not be assumed based on education and include your proficiency level. For example: Advanced user of Microsoft Office Suite, including Outlook, Excel, and PowerPoint, as well as Adobe Photoshop; Beginner user of SPSS.

Languages: For example: Fluent in oral and written German; Beginner knowledge of Spanish.

DePaul's Career Center Resume Resources

The Career Center offers several options for getting help in creating and perfecting your resume. Take advantage of one or more of the following services available to students and alumni:

- **Peer Career Advising:** Peer Career Advisors have been specially trained to provide resume assistance and basic career services to the DePaul community. Peers are available on a walk-in basis during most business hours or via email at peercareeradvisor@depaul.edu for questions, job search advice, resume assistance, and cover letter critiques.
- **Online Tutorial and Resources:** Visit the Career Center's website at www.careercenter.depaul.edu to access an interactive resume tutorial, Instant Message a Peer Career Advisor, or access this packet and other documents electronically.
- **Career Advising:** Career Advisors, who specialize in serving the needs of students and alumni from each of DePaul's colleges, are available to meet by appointment. Advising sessions can cover a variety of topics, including selecting a major, advanced resume development, job search strategies, interviewing skills, and other career-related concerns.

Contact the Career Center to schedule an appointment with a Career Advisor or inquire about Peer Career Advisor Availability.

Lincoln Park Campus
2320 N Kenmore Ave, SAC 192
Chicago IL, 60614
(773)-325-7431

Loop Campus
1 E. Jackson Blvd, Suite 9500
Chicago IL, 60604
(312)-362-8437

Research in Neuroscience:

Research Opportunities at DePaul: Faculty within the College of Science and Health department often have positions available for undergraduates seeking research experience. We encourage students to contact faculty and explore the opportunity for research here at DePaul:

- Visit our website and read through faculty profiles to see the current research projects of our faculty members:
<https://csh.depaul.edu/academics/neuroscience/research/Pages/default.aspx>
- Visit the College of Science and Health Research website for college sponsored internships and other information: <http://go.depaul.edu/cshstudentresearch> .
- Handshake is our online hub for all things college to career - jobs, internships, career fairs, events, mentors and more. Goal in mind: to help connect students to their dream career.
<https://depaul.joinhandshake.com/> .

Rosalind Franklin: <https://rosalindfranklin.edu/academics/chicago-medical-school/departments/neuroscience/>

“The mission of the Department of Neuroscience is to conduct high quality research and to educate medical and graduate students at Rosalind Franklin University of Medicine and Science regarding molecular, cellular, and clinical aspects of central nervous system function.”

DePaul/Rosalind Franklin University of Medicine and Science Summer Research Program: DePaul and RFUMS offer a paid summer biomedical sciences research program for undergraduates on the Rosalind Franklin campus in North Chicago. In this program you are matched with a faculty member at RFUMS and assist in various research areas, including neuroscience. For questions see the college website: <http://go.depaul.edu/cshstudentresearch> .The application deadline is typically in January for the following year.

Internships in Neuroscience for Undergrads:

The Faculty for Undergraduate Neuroscience maintains a website that contains information on summer internships in Neuroscience for undergraduates:

https://www.funfaculty.org/drupal/undergrad_internships_neuroscience

The BRAIN Initiative: <http://www.braininitiative.nih.gov/>

“The Brain Research through Advancing Innovative Neurotechnologies® (BRAIN) Initiative is part of a new Presidential focus aimed at revolutionizing our understanding of the human brain. By accelerating the development and application of innovative technologies, researchers will be able to produce a revolutionary new dynamic picture of the brain that, for the first time, shows how individual cells and complex neural circuits interact in both time and space. Long desired by researchers seeking new ways to treat, cure, and even prevent brain disorders, this picture will fill major gaps in our current knowledge and provide unprecedented opportunities for exploring exactly

how the brain enables the human body to record, process, utilize, store, and retrieve vast quantities of information, all at the speed of thought.”

The Human Brain Project: <https://www.humanbrainproject.eu/>

“The Human Brain Project (HBP) is a European Commission Future and Emerging Technologies Flagship. The HBP aims to put in place a cutting-edge, ICT-based scientific research infrastructure that will allow scientific and industrial researchers to advance our knowledge in the fields of neuroscience, computing and brain-related medicine. The Project promotes collaboration across the globe, and is committed to driving forward European industry.”

Emory University’s Program: <http://compneurosci.college.emory.edu/index.html>

“The Emory University – Georgia Institute of Technology training program in Computational Neuroscience, “From Cells to Systems and Applications,” selects graduate and undergraduate students admitted to one of the existing programs in Biology, Neuroscience, or Biomedical Engineering and obtain a 2 year stipend to complete a specialization in Computational Neuroscience with a focus on biologically applied questions. Lab rotations facilitate the choice of a thesis advisor, and an interactive format of Methods Clinics, Journal Clubs, and an Annual Program Retreat engender an atmosphere of personal interactions and mentorship.”

Neurological Sciences Programs: http://www.ninds.nih.gov/jobs_and_training/summer

“The National Institute of Neurological Disorders and Stroke's Summer Program in the Neurological Sciences is a student research training program in brain and nervous system research. The Summer Program in the Neurological Sciences offers a unique opportunity for academically talented high school, undergraduate, graduate, and medical students to receive first-rate training in neuroscience research. Students get hands-on experience working with leading scientists in the Institute's Division of Intramural Research, the "in-house" research component of the NINDS. NINDS Labs are located in Bethesda, Rockville and Cape Cod, Massachusetts.”

NINDS also has mechanisms in place to support students in combined MD-PhD or other dual-doctoral degree training programs, as well as for PhD students. They will only consider applications designed to support the training and development of scientists with interests relevant to the mission of NINDS. Check out the link for more information.

http://www.ninds.nih.gov/funding/areas/training_and_career_development/pre-doctoral-fellowship.htm.

Allen Brain Atlas: www.brain-map.org

“The Allen Institute for Brain Science, founded in 2003 by philanthropist Paul G. Allen, is dedicated to understanding how the human brain works in health and disease. As part of a 10-year plan

launched in March 2012 to understand the neural code—how activity in the brain’s cortex leads to perception, decision making, and ultimately action—the Allen Institute has created a set of large-scale programs to understand the fundamentals of the cortex. We will be focusing our understanding through simultaneous study of the brain’s components, computation, and cognition.”

Local Neuroscience Organizations:

Society for Neuroscience: <https://www.sfn.org/>

Society for Neuroscience Chicago Chapter: <http://chicagosfn.org/>

Cognitive Neuroscience Society: <https://www.cogneurosociety.org/>

Resources

Science and Math Learning Center:

Students currently enrolled at DPU can get help from the Science and Math Learning Center (SMLC) partnering with the Learning Commons in Room 111 of the Richardson Library and the Center for Writing-based Learning. Together they provide free tutoring and academic support in the following areas: **chemistry, mathematical sciences, nursing, physics, and psychology.**

Is Neuroscience right for you:

Students who are unsure about a Major in Neuroscience can check out this link from College Board website to get further insight on the vast amount of research and career opportunities!
<https://bigfuture.collegeboard.org/majors/biological-biomedical-sciences-neuroscience> .

Next Steps for Incoming Students:

Now that you’ve been admitted, there are important steps that you need to take before you start your first quarter. Check out DePaul’s website to select your student type (Freshman, Transfer/Adult, International) and follow the checklist. <http://www.depaul.edu/admission-and-aid/Pages/default.aspx> .