NEUROSCIENCE, BS

Integrated Learning Major in Neuroscience

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Program Description

Professionals in technically demanding fields are commonly asked to apply their expertise to other seemingly unrelated disciplines. As a result, they must have a comprehensive understanding of not only their own field, but also secondary knowledge of another broadly based, often interdisciplinary, field of study. A chemist might lend his or her expertise to a matter of legal or ethical importance. A curator might evaluate scientific and historical evidence about a painting's authenticity. A journalist might research a story involving science, medicine, and technology.

Integrated Learning Majors provide broad, interdisciplinary opportunities for students through valuable tools and knowledge in a variety of fields. This synergistic approach adds scholarly mettle to both the major and the interdisciplinary program, while exploiting their connective properties. For example, an undergraduate interested in chemistry could have an integrated learning program in forensic science. Or a student pursuing archeology could have an integrated learning major in ethics, with focus on social science research.

The integrated learning major in Neuroscience can be combined with majors in: Biochemistry, Biology, Biotechnology, Chemistry, Communication Sciences & Disorders (CSD), Computer Science, Linguistics, Nutrition, Philosophy, Physics, Psychology, Public Health, and two majors in Engineering and Computer Sciences (Bioengineering and Chemical Engineering). The ILM in Neuroscience may also be combined with other primary majors with approval of the Neuroscience ILM director.

This ILM may be combined with any other undergraduate major with approval by the program director. While certain majors typically serve as the base major for this ILM, students are encouraged to meet with the program director to determine their best choice of a base major. Dually enrolled students must have a base major within Arts and Sciences| Maxwell.

Student Learning Outcomes

1. Identify cellular components of the nervous system.
2. Identify the location and function of the major structures of the brain.
3. Compare and contrast methods of studying the brain.
4. Critically evaluate research as it is presented in the media or used in the arts.
5. Describe, and apply knowledge of, basic neuron physiology.

Requirements

An overall GPA of at least 2.0; a GPA of no lower than 3.0 in the 24 credit hours counting towards the Neuroscience IL Major, a grade no lower than "B-" in the two required entry level courses (NEU 211 Introduction to Neuroscience and NEU 223 Introduction to Cognitive Neuroscience) and students must successfully complete all of the requirements necessary to obtain a major in one of the following subjects: Biochemistry, Biology, Biotechnology, Chemistry, Communication Sciences & Disorders (CSD), Computer Science, Linguistics, Nutrition, Philosophy, Physics, Psychology, Public Health, Bioengineering or Chemical Engineering. **Other primary majors may also be possible with the approval of the Neuroscience ILM Director.**

Code	Title	Credits
Required Entry Courses		
6 credits (Grade of B- or better required in these two entry courses)		
NEU 211	Introduction to Neuroscience	3
NEU 223	Introduction to Cognitive Neuroscience	3
Required Courses		
NEU 340	Behavioral Neuroscience	3
NEU 407	Advanced Neuroscience	3
NEU 409	Cognitive Neuroscience of Speech and Language	3
NEU 496	Neuroscience and Society	3
Elective Courses		
Six credits (two courses) must be chosen from the list below. Both courses must be from fields other than the students primary major(s) and they cannot be classes required for any of the student's other majors. Other courses may be taken with permission of the Neuroscience ILM Director and the Neuroscience ILM committee.		6
Biology		
BCM 475	Biochemistry I	
BIO 327	Cell Biology	
BIO 361	Autonomic Physiology	
BIO 413	Neurobiology of Pain and Analgesia	
BIO 414	Brain & Behavioral Plasticity	
BIO 416	Biology of Aging	
BIO 417	Animal Behavior and Evolutionary Biology Laboratory	
BIO 437	Seminar in Developmental Neuroscience	
BIO 443	Seminar in Epigenetics	
BIO 444	Seminar in Neurotoxicology	
BIO 446	Epigenetics of Health & Disease	
BIO 452	Neurodegenerative Disease	
BIO 467	Advances in Biotechnology Research & Ideas	

BIO 468	Microbiomes in Biotechnology and Medicine
BIO 473	Pharmaceuticals and Cells
BIO 482	Neuroanatomy Lab
Communication Sciences & Disorders	
CSD 315	Anatomy and Physiology of the Speech and Hearing Mechanisms
CSD 325	Fundamentals of Hearing Sciences
CSD 345	Speech Science (prereq: CSD 315)
CSD 422	Development of Speech and Language
CSD 429	Basic Clinical Audiology
Neuroscience	
NEU 365	Systems Neuroscience
NEU 300	Selected Topics
NEU 400 Selected Topics in Neuroscience	
Philosophy	
COG 301	Introduction to Cognitive Science
PHI 378	Minds and Machines (prereq: any PHI or computer science course)
PHI 373	Introduction to the Philosophy of Science (prereq: PHI 107, PHI 251, or PHI 551)
PHI 376	Philosophy of Mind (prereq: 1 PHI and 1 BIO course)
Physics	
PHY 315	Biological and Medical Physics
Psychology	
PSY 315	Drugs and Human Behavior
PSY 321	Introduction to Sensation and Perception
PSY 322	Cognitive Psychology
PSY 323	Brain and Behavior
PSY 324	Developmental Biopsychology
PSY 331	Laboratory in Sensation and Perception (prereq: PSY 213, coreq or prereq PSY 321)
PSY 332	Experiments in Cognitive Psychology
PSY 334	Laboratory in Developmental Biopsychology
PSY 373	Human Memory (prereqs: PSY 205, PSY 322)
PSY 382	Health Psychology
PSY 392	Stress and Health
PSY 395	Mental Health Disorders
PSY 426	Cognitive Neurochemistry
PSY 437	Cognition and Aging
Public Health	
PHP 318	Alcohol, Other Drugs, Sex and Gambling: Dynamics of Addiction
PHP 405	Science and Practice of Mindfulness
Total Credits	**24**

College of Arts and Sciences Requirements

For all Arts and Sciences|Maxwell students, successful completion of a bachelor's degree in this major requires a minimum of 120 credits, 96 of which must be Arts and Sciences|Maxwell credits, completion of the Liberal Arts Core (https://coursecatalog.syracuse.edu/undergraduate/arts-sciences/#text) requirements, and the requirements for this major (30 credits) that are listed above.

Dual Enrollments:

Students dually enrolled in **Newhouse*** and Arts and Sciences|Maxwell will complete a minimum of 122 credits, with at least 90 credits in Arts and Sciences|Maxwell coursework and an Arts and Sciences|Maxwell major.

*Students dually enrolled in the College of Arts and Sciences|Maxwell as first year students must complete the Liberal Arts Core (https://coursecatalog.syracuse.edu/undergraduate/arts-sciences/#text). Students who transfer to the dual program after their first year as singly enrolled students in the Newhouse School will satisfy general requirements for the dual degree program by completing the Newhouse Core Requirements.

Undergraduate University Requirements

The following requirements and experiences apply to all Syracuse University Undergraduate matriculated degree programs.

- IDEA Course Requirement (https://coursecatalog.syracuse.edu/undergraduate/idea-course-requirement/)
- First Year Seminar (https://coursecatalog.syracuse.edu/undergraduate/courses/fys/)