

# School of Behavioral and Brain Sciences

## Neuroscience (B.S.)

Neuroscience is the multidisciplinary study of brain function that draws on recent advances in cell and molecular biology, biochemistry, biophysics, and computer and behavioral and cognitive sciences. It examines the brain's global and nanoscale biochemistry, its complex and extensively networked anatomical structure, and its remarkably adaptive physiology. The field considers neuronal development from early embryology through advanced senescence, and examines the brain's plasticity from the level of single proteins, of individual neurons, up through the level of networks or systems of cells, on up to complete behaving organisms. It studies the regulation and expression of behavior, the impact of that behavior on the brain, and the complex interactions of multiple neuronal systems that underlie the emergence of cognitive function. The Neuroscience program at UT Dallas provides students with the opportunity to focus on the brain from a systems-level perspective, drawing on behavioral and cognitive expertise combined with cellular and molecular analyses. It allows undergraduates extensive interactions with working neuroscientists who use the latest experimental techniques.

The Neuroscience program is designed to prepare students for admission to graduate, medical, or dental school, or for careers in related biomedical research, industry, and allied health science fields. Required courses and guided electives can include the approved pre-medical curriculum and offer an alternative to other traditional pre-health majors. Students who wish to continue their education in the fields of medicine, dentistry or allied professional areas should register with the Health Professions Advisory Committee during their first semester. Students are encouraged to design a personalized degree plan of guided electives with their advisor that combines courses from the neurosciences and related disciplines of mathematics, physics, chemistry, biology, engineering, computer science, psychology, and speech pathology and audiology in a way that will suit their individual interests and goals. Students are also strongly encouraged to gain research experience as part of their undergraduate training in Neuroscience.

Students can complete Core Curriculum and Neuroscience major requirements in a minimum of 85 semester credit hours, leaving 35 elective semester credit hours. Students can complete Core Curriculum, Neuroscience major, and pre-health Professions requirements in a minimum of 111 semester credit hours, leaving 9 remaining elective semester credit hours.

## Bachelor of Science in Neuroscience

Degree Requirements (120 semester credit hours)

I. Core Curriculum Requirements<sup>1</sup>: 42 semester credit hours

Communication (6 semester credit hours)

3 semester credit hours Communication ([RHET 1302](#))

3 semester credit hours Communication Elective ([NSC 4353](#))<sup>2</sup>

Social and Behavioral Sciences (15 semester credit hours)

6 semester credit hours Government ([GOVT 2301](#) and [GOVT 2302](#))

6 semester credit hours American History

3 semester credit hours Social and Behavioral Science Elective ([PSY 2301](#))<sup>2</sup>

**Humanities and Fine Arts (6 semester credit hours)**

3 semester credit hours Fine Arts ([ARTS 1301](#))

3 semester credit hours Humanities ([HUMA 1301](#))

**Mathematics and Quantitative Reasoning (6 semester credit hours)**

3 semester credit hours College Math ([MATH 2414](#) or [MATH 2417](#))<sup>2</sup>

3 semester credit hours Quantitative Methods ([PSY 2317](#) or [STAT 1342](#))<sup>2</sup>

**Science (9 semester credit hours)**

9 semester credit hours Science ([CHEM 1311](#) and [CHEM 1111](#), [BIOL 2311](#) and [BIOL 2281](#))<sup>2</sup>

II. Major Requirements: 45 semester credit hours<sup>3</sup>

**Major Preparatory Courses (24 semester credit hours)<sup>3</sup>**

All of the following:

[BIOL 2281](#) Introductory Biology Laboratory<sup>3</sup>

[BIOL 2311](#) / [BIOL 2111](#) Introduction to Modern Biology I<sup>3</sup> with Workshop

[CHEM 1311](#) / [CHEM 1111](#) General Chemistry I with Laboratory<sup>3</sup>

[CHEM 1312](#) / [CHEM 1112](#) General Chemistry II with Laboratory

[MATH 2414](#) Integral Calculus

or [MATH 2417](#) Calculus I<sup>3</sup>

[PSY 2301](#) Introduction to Psychology<sup>3</sup>

[PSY 2317](#) Statistics for Psychology<sup>3</sup>

or [STAT 1342](#) Statistical Decision Making<sup>3</sup>

**Major Core Courses (25 semester credit hours)<sup>3</sup>**

All of the following:

[NSC 3361](#) Behavioral Neuroscience<sup>3</sup>

[NSC 4352](#) Cellular Neuroscience<sup>3</sup>

[NSC 4353](#) Neuroscience Laboratory Methods<sup>3</sup>

[NSC 4354](#) Integrative Neuroscience<sup>3</sup>

[NSC 4356](#) Neurophysiology

[NSC 4363](#) Neuropharmacology

[NSC 4366](#) Neuroanatomy

And one emphasis course from the following four:

[NSC 4357](#) Neurobiology of Learning and Memory

or [NSC 4367](#) Developmental Neurobiology

or [NSC 4373](#) Sensory Neuroscience

or [NSC 4362](#) Molecular Neuroscience

**Major Related Courses (15 semester credit hours beyond the Core Curriculum)**

Advanced Guided Electives. 15 semester credit hours from the following list (the Emphasis Course selected above will not count twice as an Advanced Guided Elective). Consultation with an advisor is required.

[BIOL 3301/3101](#) Classical and Molecular Genetics with workshop

[BIOL 3302/3102](#) Eukaryotic Molecular and Cell Biology with workshop

[BIOL 3361/3161](#) Biochemistry I with workshop

[BIOL 3362/3162](#) Biochemistry II with workshop

[BIOL 3455](#) Human Anatomy and Physiology with Lab I

[BIOL 3456](#) Human Anatomy and Physiology with Lab II

[NSC 3344](#) Anatomy and Physiology of Speech and Hearing

[NSC 3345](#) Neural Basis of Communication

[NSC 4188](#) Dean's Scholars Seminar

[NSC 4351](#) Medical Neuroscience

[NSC 4355](#) Advanced Neuroscience Laboratory

[NSC 4357](#) Neurobiology of Learning and Memory

[NSC 4358](#) Neurobiology of Pain

[NSC 4359](#) Cognitive Neuroscience

[NSC 4362](#) Molecular Neuroscience

[NSC 4370](#) Neuroendocrinology

[NSC 4371](#) Neural Plasticity

[NSC 4373](#) Sensory Neuroscience

[NSC 4374](#) Neuroplasticity in Disorders of the Nervous System

[NSC 4375](#) Honors Seminar

[NSC 4376](#) Neurobiology of Stress

[NSC 4385](#) Neuropsychology

[NSC 4386](#) Adult Development and Aging

[NSC 4394](#) Internship in Neuroscience

[NSC 4395](#) Externship in Neuroscience<sup>4</sup>

[NSC 4397](#) Thesis Research

[NSC 4V90](#) Special Topics in Neuroscience

[NSC 4V98](#) Directed Research<sup>4</sup>

[NSC 4V99](#) Independent Study<sup>5</sup>

[PSY 4362](#) Perception

[SPAU 3304](#) Communication Sciences

III. Elective Requirements: 33 semester credit hours

**Advanced Electives (6 semester credit hours)**

Breadth Electives; 6 semester credit hours of upper-division courses, or lower-division courses that have prerequisites that are outside of Neuroscience).

**Free Electives (27 semester credit hours)**

At least 27 semester credit hours of lower- or upper-division courses of the student's choice. Students are encouraged to explore areas of concentration in Neuroscience as well as explore interests outside the field. Be aware that at least 51 semester credit hours of upper-division semester credit hours are required for graduation.

**Premedical and/or other pre-health professions students (29 semester credit hours)**

Students seeking to complete Pre-health Professions requirements should take the following as free electives:

Required pre-medical courses (12 semester credit hours)

[BIOL 2112](#) Introduction to Modern Biology II Workshop

[BIOL 2312](#) Introduction to Modern Biology II

[CHEM 2123](#) Introductory Organic Chemistry Laboratory I

[CHEM 2125](#) Introductory Organic Chemistry Laboratory II

[CHEM 2323](#) Introductory Organic Chemistry I

[CHEM 2325](#) Introductory Organic Chemistry II

Pre-med Advanced Biology requirement (8 semester credit hours, select 2 courses)

[BIOL 3301/3101](#) Classic and Molecular Genetics with workshop

[BIOL 3302/3102](#) Eukaryotic Molecular and Cell Biology with workshop

[BIOL 3361/3161](#) Biochemistry I with workshop

[BIOL 3362/3162](#) Biochemistry II with workshop

Pre-med Physics requirement (8 semester credit hours, select 2 courses)

[PHYS 1101](#) College Physics Laboratory I

[PHYS 1102](#) College Physics Laboratory II

[PHYS 1301](#) College Physics I<sup>6</sup>

[PHYS 1302](#) College Physics II<sup>6</sup>

[PHYS 2125](#) Physics Laboratory I

[PHYS 2126](#) Physics Laboratory II

[PHYS 2325](#) Mechanics<sup>7</sup>

## Minor in Neuroscience

Students who are not majoring in Neuroscience may minor in Neuroscience by taking 18 semester credit hours selected from the lists of major core courses, major related courses and major preparatory courses. At least 12 semester credit hours must be upper-division Neuroscience core courses. No semester credit hours may be used to satisfy both major and minor requirements; however, free elective semester credit hours or major preparatory courses may be used to satisfy the minor. At least one-third of the semester credit hours for a minor must be taken at UT Dallas.

## Fast Track Baccalaureate/Master's Degrees

UT Dallas undergraduate students with strong academic records who intend to pursue a master's degree in Applied Cognition and Neuroscience at UT Dallas may consider an accelerated undergraduate-graduate plan of study. When accepted into the program, students may take up to 15 semester credit hours of graduate courses that may be used to complete the baccalaureate degree and also satisfy requirements for the master's degree. Students must maintain a 3.000 grade point average and earn grades of B or better in graduate courses taken. Students must have completed at least 90 semester credit hours toward a baccalaureate degree before beginning Fast Track course work. Students should apply to admissions one semester before they reach 90 semester credit hours. To qualify for application, undergraduate students must have completed at least 18-semester credit hours in major core courses at UT Dallas. Apply to the Fast Track program through the Applied Cognition and Neuroscience Program Office. Students should consult with a graduate advisor regarding admissions criteria and plans of study.

1. Curriculum Requirements can be fulfilled by other approved courses from accredited institutions of higher education. The courses listed in parentheses are recommended as the most efficient way to satisfy both Core Curriculum and Major Requirements at UT Dallas.
2. A required Major course that also fulfills a Core Curriculum requirement. Semester credit hours are counted in Core Curriculum.
3. A required Major course that also fulfills a Core Curriculum requirement. Twenty-one (21) semester credit hours are counted in Core Curriculum.
4. May be repeated for credit, up to 9 semester credit hours.
5. May be repeated for credit, up to 6 semester credit hours.
6. Algebra-based Physics courses
7. Calculus-based Physics courses

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