School of Behavioral and Brain Sciences

Neuroscience (BS)

Neuroscience is the multidisciplinary study of nervous system function that draws on recent advances in cell and molecular biology, biochemistry, biophysics, computer, behavioral and cognitive sciences. It examines the brain, spinal cord, and peripheral nervous system's global and nanoscale biochemistry, its complex and extensively networked morphology, and its remarkably adaptive physiology. The field considers neuronal development from early embryology through advanced senescence. Further, neurobiologists examine neuronal plasticity from the level of single proteins, of individual neurons, up through the level of networks or systems of cells, and up to complete behaving organisms. Neuroscience studies the regulation and expression of behavior, the impact of that behavior on neurons, and the complex interactions of multiple neuronal systems that underlie the emergence of cognitive and sensory functions. The Neuroscience program at UT Dallas provides students with opportunities to focus on the brain, spinal cord, and peripheral neurons 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 medical, dental or allied-health graduate schools (through the Medical Neuroscience track), for admission to research-based doctoral training programs (through the Research Neuroscience track), or for careers in biomedical science, industry, and allied health fields (through the Industrial Neuroscience track). Required courses within the Medical track include the approved pre-medical curriculum and offer a popular alternative to other pre-health majors. Students who wish to continue their education in the fields of medicine, dentistry or allied health professions should also register with the Health Professions Advising Center during their first semester.

Students can choose between three program tracks: Medical Neuroscience Track, Research Neuroscience Track, or Industrial Neuroscience Track to meet their career training needs. All tracks share a Core Curriculum and Neuroscience major requirements that can be completed in a minimum of 82 semester credit hours. Different coursework is required within the different tracks, with the total number of credit hours required for graduation the same for all three tracks.

Bachelor of Science in Neuroscience

Degree Requirements (120 semester credit hours)[1]

View an Example of Degree Requirements by Semester

Faculty

FACG> bbs-neuroscience-bs

Professors: Hervé Abdi, Peter F. Assmann, Sandra B. Chapman, W. Jay Dowling, Julia Evans, Francesca Filbey, Richard M. Golden, John Hart Jr., Michael P. Kilgard, Daniel Krawczyk, Aage R. Møller, Theodore Price, Robert L. Rennaker II, Michael D. Rugg, Bart Rypma, Steven Small, Sven Vanneste

Associate Professors: Chandramallika Basak, Gregory Dussor, Kristen Kennedy, Sven Kroener, Mandy J. Maguire, Christa McIntyre Rodriguez, Amy Pinkham, Jonathan E. Ploski, Karen Rodrigue, Lucien (Tres) Thompson, Gagan Wig

Assistant Professors: Michael Burton, Catherine Thorn

Senior Lecturers: Steven McWilliams, Siham Raboune, Rukhsana Sultana, Anna Taylor

I. Core Curriculum Requirements: 42 semester credit hours[2]

Communication: 6 semester credit hours

COMM 1311 Survey of Oral and Technology-based Communication

COMM 1315 Public Speaking

RHET 1302 Rhetoric

Mathematics: 3 semester credit hours

Choose one course from the following:

MATH 2414 Integral Calculus[3]

or MATH 2417 Calculus I[3]

Life and Physical Sciences (030): 6 semester credit hours

Select 6 semester credit hours from Life and Physical Sciences Core courses (see NSC advisor for options)

Language, Philosophy and Culture (040): 3 semester credit hours

Select 3 semester credit hours from Language, Philosophy and Culture Core courses

Creative Arts (050): 3 semester credit hours

Select 3 semester credit hours from Creative Arts Core courses

American History(060): 6 semester credit hours

Select 6 semester credit hours from American History Core courses

Government/Political Science (070): 6 semester credit hours

Select 6 semester credit hours from Government/Political Science Core courses

Social and Behavioral Sciences: 3 semester credit hours

PSY 2301 Introduction to Psychology[3]

Component Area Option: 6 semester credit hours

PSY 2317 Statistics for Psychology[3]

or STAT 1342 Statistical Decision Making[3]

or STAT 2332 Introductory Statistics for Life Sciences[3]

And CHEM 1312 General Chemistry II[3]

II. Major Core Requirements: 26 semester credit hours

Major Preparatory Courses: 24 semester credit hours - 5 semester credit hours beyond Core Curriculum[3]

All of the following:

BIOL 2111 Introduction to Modern Biology Workshop I

BIOL 2281 Introductory Biology Laboratory

BIOL 2311 Introduction to Modern Biology I[3]

CHEM 1111 General Chemistry Laboratory I

CHEM 1311 General Chemistry I[3]

CHEM 1112 General Chemistry Laboratory II

CHEM 1312 General Chemistry II[3]

MATH 2414 Integral Calculus[3]

or MATH 2417 Calculus I[3]

PSY 2301 Introduction to Psychology[3]

PSY 2317 Statistics for Psychology[3]

or STAT 1342 Statistical Decision Making[3]

or STAT 2332 Introductory Statistics for Life Sciences[3]

Major Core Courses required for all Tracks: 21 semester credit hours

All of the following:

NSC 3361 Introduction to Neuroscience

NSC 4352 Cellular Neuroscience

NSC 4353 Neuroscience Laboratory Methods

NSC 4354 Integrative Neuroscience

NSC 4356 Neurophysiology

NSC 4363 Neuropharmacology

NSC 4366 Neuroanatomy

III. Tracks - 52 semester credit hours

Neuroscience majors select one of three Tracks: Medical Neuroscience (12 hours, plus 29 hours of pre-med courses, plus 12 hours of free electives), Research Neuroscience (12 hours, plus 28 hours of pre-graduate courses, plus 12 hours of free electives), Industrial Neuroscience (22 hours, plus 30 hours of free electives).

Track 1: Medical Neuroscience

Choose four courses (12 hours) from the following:

NSC 4350 Medical Neuropathology

NSC 4351 Medical Neuroscience

NSC 4358 Neuroscience of Pain

NSC 4362 Molecular Neuroscience

NSC 4364 Journey into Medicine

NSC 4382 Neurobiology of Emotion

NSC 4372 Neuroimmunology

NSC 4378 Neurotoxicology

NSC 4387 Neuropathology

NSC 4388 Medical Physiology

NSC 4397 Thesis Research

NSC 4V75 Honors Seminar

NSC 4V98 Directed Research[4]

NSC 4V99 Independent Study[5]

Required Pre-medical Basic Biology, Chemistry and Physics (28 semester credit hours)

BIOL 2112 Introduction to Modern Biology Workshop II

BIOL 2312 Introduction to Modern Biology II

BIOL 3161 Biochemistry Workshop I

BIOL 3361 Biochemistry I

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

PHYS 1301 College Physics I

PHYS 2125 Physics Laboratory I

An additional 8 semester credit hours selected with your advisor. See advisor for additional guidance.

Elective Requirements: 12 semester credit hours of free electives.

At least 12 semester credit hours of lower- or upper-division courses of the student's choice. Students are encouraged to explore additional courses in Neuroscience as well as explore interests outside the field. Be aware that at least 51 semester credit hours of upper-division

courses are required for graduation.

Track 2: Research Neuroscience

Choose four courses (12 credit hours) from the following:

NSC 4355 Advanced Neuroscience Laboratory

NSC 4357 Neurobiology of Learning and Memory

NSC 4358 Neuroscience of Pain

NSC 4359 Cognitive Neuroscience

NSC 4362 Molecular Neuroscience

NSC 4367 Developmental Neurobiology

NSC 4382 Neurobiology of Emotion

NSC 4371 Neural Plastictiy

NSC 4372 Neuroimmunology

NSC 4374 Neuroplasticity in Disorders of the Nervous System

NSC 4376 Neurobiology of Stress

NSC 4391 Writing and Independent Study

NSC 4397 Thesis Research

NSC 4V75 Honors Seminar

NSC 4V98 Directed Research

NSC 4V99 Independent Study

Required pre-graduate courses, basic Biology, Chemistry and Physics (28 semester credit hours)

BIOL 2112 Introduction to Modern Biology Workshop II

BIOL 2312 Introduction to Modern Biology II

BIOL 3161 Biochemistry Workshop I

BIOL 3361 Biochemistry I

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

PHYS 1301 College Physics I

PHYS 2125 Physics Laboratory I

An additional 8 semester credit hours selected with your advisor. See advisor for additional guidance.

Elective Requirements: 12 semester credit hours of free electives.

At least 12 semester credit hours of lower- or upper-division courses of the student's choice. Students are encouraged to explore additional courses in Neuroscience as well as explore interests outside the field. Be aware that at least 51 semester credit hours of upper-division courses are required for graduation.

Track 3: Industrial Neuroscience

Required coursework (7 credit hours)

NSC 4360 Introduction to Entrepreneurship in Neuroscience

NSC 4361 Case Studies in Therapeutic Discovery in Neuroscience

NSC 4193 Internship Preparation

Select 3 additional courses (9 credit hours) from this list:

NSC 4391 Writing and Independent Study

NSC 4394 Internship in Neuroscience I

NSC 4395 Internship in Neuroscience II

NSC 4397 Thesis Research

NSC 4395 Externship in Neuroscience

NSC 4V99 Independent Study

Choose from one of the following two-course groups for additional emphasis (6 credit hours):

Entrepreneurship

ENTP 3301 Innovation and Entrepreneurship

ENTP 4311 Entrepreneurial Strategy and Business Models

Healthcare Management

HMGT 3301 Introduction to Healthcare Management

HMGT 3310 Healthcare Regulatory Environment

Marketing

MKT 3300 Principles of Marketing

MKT 3330 Introduction to Professional Selling

Additional Elective Requirements: 30 semester credit hours of free elective

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

Incoming freshmen must enroll and complete the requirement of BBSU1100.

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. If 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 should apply for Fast Track admission in the semester 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. To be eligible for Fast Track admission, students must have completed at least 90 semester credit hours toward a baccalaureate degree, completed a minimum of 36 hours of general education core curriculum classes, and meet program admission requirements. 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.

Minor in Neuroscience: 18 semester credit hours

Students who are not majoring in Neuroscience may minor in Neuroscience. Students who take a minor will be expected to meet the normal prerequisites in courses making up the minor, and should maintain a minimum GPA of 2.000 on a 4.00 scale (C average).

Students should take 9 semester credit hours (3 courses) from the Neuroscience Core courses:

NSC 3361 Introduction to Neuroscience

NSC 4352 Cellular Neuroscience

NSC 4354 Integrative Neuroscience

NSC 4356 Neurophysiology

NSC 4363 Neuropharmacology

NSC 4366 Neuroanatomy

Plus 9 semester credit hours (3 courses) from one of the Neuroscience career tracks:

Medical Neuroscience (9 semester credit hours)

NSC 4350 Medical Neuropathology

NSC 4351 Medical Neuroscience

NSC 4358 Neuroscience of Pain

NSC 4362 Molecular Neuroscience

NSC 4364 Journey into Medicine

NSC 4372 Neuroimmunology

NSC 4378 Neurotoxicology

Research Neuroscience (9 semester credit hours)

NSC 4353 Neuroscience Laboratory Methods

NSC 4357 Neurobiology of Learning and Memory

NSC 4358 Neuroscience of Pain

NSC 4362 Molecular Neuroscience

NSC 4367 Developmental Neurobiology

NSC 4371 Neural Plasticity

NSC 4372 Neuroimmunology

NSC 4376 Neurobiology of Stress

Industrial Neuroscience (9 semester credit hours)

NSC 4360 Introduction to Entrepreneurship in Neuroscience

NSC 4361 Case Studies in Therapeutic Discovery in Neuroscience

NSC 4391 Writing and Independent Study

NSC 4193 Internship Preparation

NSC 4394 Internship in Neuroscience I

NSC 4395 Internship in Neuroscience II

NSC 4397 Thesis Research

NSC 4V99 Independent Study

1. Incoming freshmen must enroll and complete requirements of UNIV 1010 and the corresponding school-related freshman seminar course. Students, including transfer students, who complete their core curriculum at UT Dallas must take UNIV 2020.

2. Curriculum Requirements can be fulfilled by other approved courses from accredited institutions of higher education. The courses listed are recommended as the most efficient way to satisfy both Core Curriculum and Major Requirements at UT Dallas.

3. A required preparatory course that also fulfills a Core Curriculum requirement. Eighteen (18) 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.

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