School of Natural Sciences and Mathematics

Biology (B.A, B.S.)

The Biology Program at UT Dallas emphasizes the unifying molecular and cellular nature of organisms. At the center of the Biology undergraduate curriculum are the biochemical, genetic, and cell biology concepts and tools used to study the genes of prokaryotes and eukaryotes, to study the proteins and ribonucleic acids (RNA) encoded by these genes, and to study how the expression of these genes is regulated during the development and lifetimes of organisms. Molecular Biology represents a fusion of the four disciplines of biochemistry, biophysics, genetics, and cell biology. Modern biology requires a background in other disciplines such as chemistry, mathematics, physics, and computer sciences. Principles from these disciplines have to be merged to understand and apply new biotechnology and genetic engineering techniques. It is desirable for entering students to have a broad interest and background in the sciences.

Both B.S. and B.A. degrees are offered in Biology at UT Dallas; a B.S. degree is offered in Molecular Biology. The B.S. degrees are intended as preparation for scientific careers in biology or careers in the health professions. The B.A. degree is intended as liberal arts biology major with less emphasis on calculus and more free semester credit hours for course work in other disciplines. Each degree in Biology offers a streamlined double major with Business Administration or Crime and Justice Studies. Five-year Fast Track B.S. /M.S. Biology and Molecular Biology degree programs are available.

The UTeach option may be added to the BA degree in Biology. UTeach Dallas Option degree plans are streamlined to allow students to complete both a rigorous Bachelor of Science or Bachelor of Arts degree and all course work for middle or high school teacher certification in four years. Teaching Option degrees require deep content knowledge combined with courses grounded in the latest research on math and science education. While most graduates go on to classroom teaching, UTeach alums are also prepared to enter graduate school and to work in discipline related industry.

Minors are offered in Biology, Biomolecular Structure, Microbiology, Molecular and Cell Biology, and Neurobiology.

Faculty

Professors: Lee A. Bulla, Santosh D'Mello, Rockford K. Draper, Juan González, Donald M. Gray, Stephen D. Levene, Lawrence J. Reitzer, Stephen Spiro, Li Zhang, Michael Q. Zhang

Associate Professors: Gail A.M. Breen, John G. Burr, Jeff L. DeJong, Ernest M. Hannig, Dennis L. Miller

Assistant Professors: Tianbing Xia, Zhenyu Xuan, Hyuntae Yoo

Professor Emeritus: Hans Bremer, Claud S. Rupert

Senior Lecturers: Irina Borovkov, Mehmet Candas, Vincent P. Cirillo, Wen-ju Lin, Robert C. Marsh, David Murchison, Elizabeth Pickett, Ruben D. Ramirez, Scott A. Rippel, Ilya Sapozhnikov, Wen-Ho Yu

Bachelor of Arts or Bachelor of Science in Biology

Degree Requirements (124 semester credit hours)

I. Core Curriculum Requirements[1]: 42 semester credit hours

Communication (6 semester credit hours)

3 semester credit hours Communication (RHET 1302)

3 semester credit hours Communication Elective (BIOL 4337, BIOL 4390, BIOL 4391, BIOL 4398, BIOL 4399 or NATS 4310)[2]

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 Behavior Sciences Elective

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)

6 semester credit hours Calculus (MATH 2413 and MATH 2414) - BA or BS[3]

or Applied Calculus and Statistics for Life Sciences (MATH 1325 and STAT 3332) - BA only

Science (9 semester credit hours)

9 semester credit hours Chemistry (CHEM 1311/1111, CHEM 1312/1112 and CHEM 2123)

II. Major Requirements: 53 - 61 semester credit hours (53-55 for B.A.; 61 for B.S.)

Major Preparatory Courses (16-18 semester credit hours beyond Core Curriculum)

CHEM 1311/1111, CHEM 1312/1112 General Chemistry I and II with Laboratory

CHEM 2323[4]/2123, CHEM 2325, CHEM 2125 Introductory Organic Chemistry I and II with Laboratory

MATH 2413 Differential Calculus and MATH 2414 Integral Calculus (BA or BS)

or MATH 1325 Applied Calculus I and STAT 3332 Statistics for Life Sciences (BA only)

PHYS 2325/2125 Mechanics with Laboratory (BA or BS)

or PHYS 1301/1101 College Physics I with Laboratory (BA only)

PHYS 2326/2126 Electromagnetism and Waves with Laboratory (BA or BS)

or PHYS 1302/1102 College Physics II with Laboratory (BA only)

Major Core Courses (29-32 semester credit hours)

BIOL 2281[4] Introductory Biology Laboratory

BIOL 2111[4] Introduction to Modern Biology Workshop

BIOL 2112[4] Introduction to Modern Biology Workshop II

BIOL 2311[4] Introduction to Modern Biology I

BIOL 2312[4] Introduction to Modern Biology II

BIOL 3101 Classical and Molecular Genetics Workshop

BIOL 3102 Eukaryotic Molecular and Cell Biology Workshop

BIOL 3161 Biochemistry Workshop I

BIOL 3162 Biochemistry Workshop II

BIOL 3301 Classical and Molecular Genetics

BIOL 3302 Eukaryotic Molecular and Cell Biology

BIOL 3361 Biochemistry I

BIOL 3362 Biochemistry II

or BIOL 3335 Microbial Physiology

BIOL 3380 Biochemistry Laboratory

BIOL 4380 Cell and Molecular Biology Laboratory (BS only)

Major Related Courses (9-12 semester credit hours)[5]

9 semester credit hours upper-division BIOL electives (BA only)

12 semester credit hours upper-division BIOL electives (BS only)

III. Elective Requirements: 21-29 semester credit hours (27-29 for B.A.; 21 for B.S.)

Advanced Electives

All students are required to take at least six semester credit hours of advanced electives outside their major field of study. These must be either upper-division classes or lower-division classes that have prerequisites.

Free Electives

The plan must include sufficient upper-division credit to total 51 upper-division semester credit hours.

Bachelor of Arts in Biology with UTeach Option

Degree Requirements (124 semester credit hours)

I. Core Curriculum Requirements[1]: 42 semester credit hours

Communication (6 semester credit hours)

3 semester credit hours Communication (RHET 1302)

3 semester credit hours Communication Elective (NATS 4390/NATS 4399)[6]

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 Behavior Sciences Elective

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)

6 semester credit hours Calculus (MATH 2413 and 2414)[3] or (MATH 1325 Applied Calculus and STAT 3332 Statistics for Life Sciences)

Science (9 semester credit hours)

9 semester credit hours Chemistry (CHEM 1311/1111, CHEM 1312/1112 and CHEM 2123)

II. Major Requirements: 49-52 semester credit hours

Major Preparatory Courses (15-17 semester credit hours beyond Core Curriculum)

CHEM 1311/1111, CHEM 1312/1112 General Chemistry I and II with Laboratory

CHEM 2323[4]/2123, CHEM 2325, CHEM 2125 Introductory Organic Chemistry I and II with Laboratory

MATH 2413 Differential Calculus and MATH 2414 Integral Calculus

or MATH 1325 Applied Calculus I and STAT 3332 Statistics for Life Sciences

PHYS 1301/1101 College Physics I with Laboratory

PHYS 1302/1102 College Physics II with Laboratory

Major Core Courses (28-29 semester credit hours)

BIOL 2281[4] Introductory Biology Laboratory

BIOL 2111[4] Introduction to Modern Biology Workshop

BIOL 2112[4] Introduction to Modern Biology Workshop II

BIOL 2311[4] Introduction to Modern Biology I

BIOL 2312[4] Introduction to Modern Biology II

BIOL 3101 Classical and Molecular Genetics Workshop

BIOL 3102 Eukaryotic Molecular and Cell Biology Workshop

BIOL 3161 Biochemistry Workshop I

BIOL 3162 Biochemistry Workshop II

BIOL 3301 Classical and Molecular Genetics

BIOL 3302 Eukaryotic Molecular and Cell Biology

BIOL 3361 Biochemistry I

BIOL 3362 Biochemistry II

or BIOL 3335 Microbial Physiology

BIOL 3380 Biochemistry Laboratory

Major Related Courses (6 semester credit hours beyond core curriculum)[5]

9 semester credit hours upper-division BIOL electives (NATS 4390/4399 fulfills 3 of these semester credit hours)

III. Elective Requirements: 30-33 semester credit hours

UTeach Requirements (21 semester credit hours beyond core curriculum)

NATS 1141 UTeach Step 1

NATS 1143 UTeach Step 2

NATS 3341 Knowing and Learning in Mathematics and Science

NATS 3343 Classroom Interactions

HIST 3328 History and Philosophy of Science and Medicine

NATS 4390/4399 Research Methods[6]

NATS 4341 Project-Based Instruction

NATS 4694 UTeach Student Teaching, 8-12 Science and Mathematics

or NATS 4696 UTeach Student Teaching, 4-8 Science and Mathematics

NATS 4141 UTeach Student Teaching Seminar

Free Electives (9-12 semester credit hours)

The plan must include sufficient upper-division credit to total 51 upper-division semester credit hours.

Minor in Biology

Minor in Biology

Course Requirements: 18 semester credit hours

BIOL 2311/2111 Introduction to Modern Biology I with Workshop

BIOL 3301/3101 Classical and Molecular Genetics with Workshop

BIOL 3361/3161 Biochemistry I with Workshop

Two BIOL electives for majors

Minor in Biomolecular Structure

Course Requirements: 18 semester credit hours

BIOL 3336 Protein and Nucleic Acid Structure

BIOL 4461 Biophysical Chemistry, unless taken to fulfill the Molecular Biology major requirements

BIOL 4261 Biomolecular Modeling

CHEM 2323 and 2325 Introductory Organic Chemistry I and II

One to two approved BIOL, CHEM, CS, EE, MATH, or PHYS electives

Minor in Molecular and Cell Biology

Course Requirements: 18 semester credit hours

CHEM 2323 and 2325 Introductory Organic Chemistry I and II

Four approved molecular and cell biology electives

Minor in Microbiology

Course Requirements: 18 semester credit hours

BIOL 3V20 General Microbiology with Laboratory[7]

BIOL 3335 Microbial Physiology[8]

BIOL 4350 Medical Microbiology

or BIOL 4316 Parasites and Symbionts

BIOL 4345 Immunobiology

CHEM 2323 Introductory Organic Chemistry I

One approved microbiology elective

Minor in Neurobiology

Course Requirements: 18 semester credit hours

BIOL 4370 Developmental Neurobiology

BIOL 3371 Biology of the Brain

or NSC 4352 Cellular Neuroscience

CHEM 2323 and CHEM 2325 Introductory Organic Chemistry I and II

NSC 4353 Neuroscience Laboratory Methods

NSC 4354 Integrative Neuroscience

Fast Track Baccalaureate/Master's Degrees

UT Dallas undergraduate students with strong academic records, including at least 15 semester credit hours of upper-division Biology core courses, who intend to pursue graduate work in Biology at UT Dallas, may apply for the Fast Track which involves taking selected graduate courses as an upper-division student. After admission to the graduate program, 15 semester credit hours of graduate courses with an earned grade of B or better can be used toward completion of the B.S. and to satisfy requirements for those courses at the graduate level. Graduate courses must be approved by the graduate advisor. This program provides an opportunity to obtain the B.S. degree in Biology after 124 semester credit hours of work and an M.S. degree in Molecular and Cell Biology after an additional 21 semester credit hours of graduate course and research work. Interested students should contact the Biology undergraduate advisor well in advance of the senior year to prepare a degree plan taking maximal advantage of this 5-year Fast Track program.

Degree Planning

Upper-division biology courses taken at other institutions may be included as part of the degree plan subject to the provisions of the section on Transfer Admissions.

Major-related courses may not include more than 9 semester credit hours (B.S.) or 6 semester credit hours (B.A.) of upper-division transfer credit and not more than 3 semester credit hours (Biology major) or 6 semester credit hours (Molecular Biology major) of individual instruction (e.g., BIOL 3V90, BIOL 3V91, BIOL 3V92, BIOL 3V95, BIOL 3V96, BIOL 4302, BIOL 4390, BIOL 4391, BIOL 4398, BIOL 4399, BIOL 4V98, or BIOL 4V99).

Students planning a career in a particular allied health profession should consult the school they expect to attend to apprise themselves of the course requirements for admission.

Admission standards for medical and dental schools are set by the individual professional school, whose specific requirements should be reviewed with the help of the UT Dallas Health Professions Advising Center (HPAC). Most professional schools prefer that admission applications be channeled through the HPAC.

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. Biology majors may choose BIOL 4337, BIOL 4390, BIOL 4391, BIOL 4398, BIOL 4399 or NATS 4310 or another approved Biology elective to fulfill the Core Curriculum Communication Elective.
3. Six semester credit hours of Calculus are counted under Mathematics Core, and 2 semester credit hours of Calculus are counted as Major Preparatory Courses.
4. Indicates a prerequisite class to be completed before enrolling for upper-division classes.
5. Up to 3 semester credit hours of individual instruction may be used in fulfilling this requirement.
6. NATS 4390/4399 fulfills Core Communication requirement and counts as an Upper-Level Biology Elective
7. Two semester credit hours of BIOL 3V20 may be used to satisfy the Cell and Molecular Biology Laboratory core requirement for Biology and Molecular Biology majors.
8. May be substituted with CHEM 2325 Introductory Chemistry II if used to satisfy the Biochemistry II core requirement for Biology and Molecular Biology majors.

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