School of Natural Sciences and Mathematics

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.

Biology (BA, BS)

Both BS and BA degrees are offered in Biology at UT Dallas. The BS degrees are intended as preparation for scientific careers in biology or careers in the health professions. The BA degree is intended as liberal arts biology major with less emphasis on calculus and more free semester credit hours for coursework in other disciplines. Biology offers a streamlined double major with Business Administration or Criminology. Fast Track BS / MS Biology and Molecular Biology degree programs are available.

The UTeach option may be added to either the BA or BS 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 coursework 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. See catalog.utdallas.edu/2014/undergraduate/programs/nsm/minors.

Faculty

Professors: Lee A. Bulla, Rockford K. Draper, Juan E. González, Lawrence J. Reitzer, Stephen Spiro, Li Zhang, Michael Qiwei Zhang

Professors Emeritus: Hans Bremer, Donald M. Gray, Claud S. Rupert

Associate Professors: Gail A. M. Breen, John G. Burr, Jeff L. Dejong, Ernest M. Hannig, Tae Hoon Kim, Dennis L. Miller
Assistant Professors: Nikki Delk, Heng Du, Jung-whan (Jay) Kim, Kelli Palmer, Anh T. Tran, Duane D. Winkler, Zhenyu Xuan, Hyuntae Yoo

Research Assistant Professor: Lan Guo

Senior Lecturers: Irina Borovkov, Mehmet Candas, Vincent P. Cirillo, Monique Duncan, Brenna Hill, Wen-Ju Lin, Li Liu, Robert C. Marsh, David Murchison, Jing Pan, Elizabeth Pickett, Ruben D. Ramirez, Scott A. Rippel, Elizabeth L. Rugg, Ilya Sapozhnikov, Uma Srikanth, Michelle Wilson, Wen-Ho Yu

Lecturers: Uyen Henson, John Kolar

Bachelor of Arts or Bachelor of Science in Biology

Degree Requirements (120 semester credit hours)\(^1\)

I. Core Curriculum Requirements: 42 semester credit hours\(^2\)

Communication: 6 semester credit hours

**COMM 1311** Survey of Oral and Technology-based Communication

**RHET 1302** Rhetoric

Mathematics: 3 semester credit hours

One of the following:

**MATH 2413** Differential Calculus - BA or BS\(^3, 4, 5\)

or **MATH 2417** Calculus I\(^3, 4, 5\)

**MATH 1325** Applied Calculus - BA only\(^3\)

Life and Physical Sciences: 6 semester credit hours

**CHEM 1311** General Chemistry I\(^3\)

**CHEM 1312** General Chemistry II\(^3\)

Language, Philosophy and Culture: 3 semester credit hours

Select any 3 semester credit hours from Language, Philosophy and Culture core courses (see advisor)

Creative Arts: 3 semester credit hours

Select any 3 semester credit hours from Creative Arts core courses (see advisor)
American History: 6 semester credit hours

Select any 6 semester credit hours from American History core courses (see advisor)

Government / Political Science: 6 semester credit hours

- **GOVT 2305** American National Government
- **GOVT 2306** State and Local Government

Social and Behavioral Sciences: 3 semester credit hours

Select any 3 semester credit hours from Social and Behavioral Sciences core courses (see advisor)

Component Area Option: 6 semester credit hours

Two of the following:

- **BIOL 2311** Introduction to Modern Biology I
- **MATH 2414** Integral Calculus - BS or BA
- **STAT 2332** Statistics for Life Sciences - BA only

II. Major Requirements: 53 - 61 semester credit hours beyond Core Curriculum (53-55 for BA; 61 for BS)

Major Preparatory Courses: 18-21 semester credit hours beyond Core Curriculum

- **CHEM 1311** General Chemistry I
- **CHEM 1111** General Chemistry Laboratory I
- **CHEM 1312** General Chemistry II
- **CHEM 1112** General Chemistry Laboratory II
- **CHEM 2323** Introductory Organic Chemistry I
- **CHEM 2123** Introductory Organic Chemistry Laboratory I
- **CHEM 2325** Introductory Organic Chemistry II
- **CHEM 2125** Introductory Organic Chemistry Laboratory II
- **MATH 2413** Differential Calculus and **MATH 2414** Integral Calculus (BA or BS)
- **MATH 2417** Calculus I and **MATH 2419** Calculus II (BA or BS)
- **MATH 1325** Applied Calculus I and **STAT 2332** Statistics for Life Sciences
- **PHYS 2325** Mechanics and **PHYS 2125** Physics Laboratory I
or PHYS 1301 College Physics I and PHYS 2125 Physics Laboratory I
PHYS 2326 Electromagnetism and Waves and PHYS 2126 Physics Laboratory II
or PHYS 1302 College Physics II and PHYS 2126 Physics Laboratory II
NATS 1101 Natural Sciences and Mathematics Freshman Seminar
UNIV 1010 Freshman Seminar

Major Core Courses: 26-29 semester credit hours beyond Core Curriculum

BIOL 2281 Introductory Biology Laboratory
BIOL 2111 Introduction to Modern Biology Workshop I
BIOL 2112 Introduction to Modern Biology Workshop II
BIOL 2311 Introduction to Modern Biology I
BIOL 2312 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

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

III. Elective Requirements: 17-24 semester credit hours (23-24 for BA; 16 for BS)

Free Electives: 17-24 semester credit hours (23-24 for BA; 16 for BS)
The plan must include sufficient upper-division courses to total 51 upper-division credit hours.

**Bachelor of Arts in Biology with UTeach Option**

**Degree Requirements (121 semester credit hours)**

I. Core Curriculum Requirements: 42 semester credit hours

**Communication: 6 semester credit hours**

- COMM 1311 Survey of Oral and Technology-based Communication
- RHET 1302 Rhetoric

**Mathematics: 3 semester credit hours**

One of the following:

- MATH 2413 Differential Calculus - BA or BS
- MATH 1325 Applied Calculus - BA only

**Life and Physical Sciences: 6 semester credit hours**

- CHEM 1311 General Chemistry I
- CHEM 1312 General Chemistry II

**Language, Philosophy and Culture: 3 semester credit hours**

Select any 3 semester credit hours from Language, Philosophy and Culture core courses (see advisor)

**Creative Arts: 3 semester credit hours**

Select any 3 semester credit hours from Creative Arts core courses (see advisor)

**American History: 6 semester credit hours**

Select any 6 semester credit hours from American History core courses (see advisor)

**Government / Political Science: 6 semester credit hours**

- GOVT 2305 American National Government
- GOVT 2306 State and Local Government

**Social and Behavioral Sciences: 3 semester credit hours**
Select any 3 semester credit hours from Social and Behavioral Sciences core courses (see advisor)

Component Area Option: 6 semester credit hours

Two of the following:

- **BIOL 2311** Introduction to Modern Biology [3]
- **MATH 2413** Differential Calculus and **MATH 2414** Integral Calculus - BS or BA [3, 4, 5]
  - or **MATH 1325** Applied Calculus [3] and **STAT 2332** Statistics for Life Sciences - BA only

II. Major Requirements: 53 semester credit hours

Major Preparatory Courses: 15-18 semester credit hours beyond Core Curriculum

- **CHEM 1311** General Chemistry [3]
- **CHEM 1111** General Chemistry Laboratory I
- **CHEM 1312** General Chemistry II [3]
- **CHEM 1112** General Chemistry Laboratory II
- **CHEM 2323** Introductory Organic Chemistry I
- **CHEM 2123** Introductory Organic Chemistry Laboratory I [6]
- **CHEM 2325** Introductory Organic Chemistry II [6]
- **CHEM 2125** Introductory Organic Chemistry Laboratory II [6]
- **MATH 2413** Differential Calculus and **MATH 2414** Integral Calculus (BA or BS) [3, 4, 5]
  - or **MATH 1325** Applied Calculus I and **STAT 2332** Statistics for Life Sciences (BA only) [3, 4]
- **PHYS 2325** Mechanics and **PHYS 2125** Physics Laboratory I
  - or **PHYS 1301** College Physics I and **PHYS 2125** Physics Laboratory I
- **PHYS 2326** Electromagnetism and Waves and **PHYS 2126** Physics Laboratory II
  - or **PHYS 1302** College Physics II and **PHYS 2126** Physics Laboratory II
- **NATS 1101** Natural Sciences and Mathematics Freshman Seminar
- **UNIV 1010** Freshman Seminar

Major Core Courses: 29 semester credit hours

- **BIOL 2281** Introductory Biology Laboratory [6]
- **BIOL 2111** Introduction to Modern Biology Workshop [6]
**BIOL 2112** Introduction to Modern Biology Workshop II
**BIOL 2311** Introduction to Modern Biology I
**BIOL 2312** 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: 9 semester credit hours**

9 semester credit hours upper-division BIOL electives

**NATS 4390** satisfies 3 semester credit hours of this requirement.

**III. Elective Requirements: 25 semester credit hours**

**UTeach Requirements: 21 semester credit hours beyond Major Related Courses**

**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** Research Methods
**NATS 4341** Project-Based Instruction
**NATS 4694** UTeach Apprentice Teaching, 8-12 Science and Mathematics
  or **NATS 4696** UTeach Apprentice Teaching, 4-8 Science and Mathematics
**NATS 4141** UTeach Apprentice Teaching Seminar
Upper-Division Free Electives: 4 semester hours

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

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 BS 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 BS degree in Biology after 120 semester credit hours of work and an MS 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 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 (BS) or 6 hours (BA) of upper-division transfer credit and not more than 3 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. Incoming freshmen must complete and pass UNIV 1010 Freshman Seminar 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 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 Major course that also fulfills a Core Curriculum requirement. Hours are counted in Core Curriculum.
4. Six semester credit hours of Calculus are counted under Mathematics Core and Component Area Option and 2 semester credit hours of Calculus are counted as Major Preparatory Courses.

5. Students may substitute MATH 2413 and MATH 2414 by taking MATH 2417 and MATH 2419.

6. Indicates a prerequisite class to be completed before enrolling for upper-division classes.

7. Up to 3 semester credit hours of individual instruction may be used in fulfilling this requirement for BA degree. Up to 6 semester credit hours of individual instruction may be used in fulfilling this requirement for BS degree.

8. Up to 3 hours of individual instruction may be used in fulfilling this requirement.

9. NATS 4390 counts as an upper-division Biology Elective.