School of Natural Sciences and Mathematics

Biochemistry (B.S.)

The Biochemistry program at UT Dallas, administered through the Department of Chemistry, draws on faculty from the Departments of Chemistry, Molecular and Cell Biology, and researchers from UT Southwestern Medical School to provide courses and research opportunities to its majors. The Biochemistry major bridges the gap between modern Chemistry and Biology. The curriculum, designed to prepare students for either graduate work in the Biological Sciences, the Chemical Sciences, or for entry-level positions in the biotechnology industry, builds on a base of biology, chemistry, physics, and mathematics to provide the student the opportunity to develop essential theoretical and practical skills.

Faculty

Chemistry:

Robert A. Welch Chair in Chemistry; Professor of Chemistry: Ray H. Baughman, Dennis Smith Jr.

Cecil and Ida Green Distinguished Chair in Systems Biology; Professor of Chemistry: A. Dean Sherry

Distinguished Chair in Natural Sciences and Mathematics; Dean of the School of Natural Sciences and Mathematics: Bruce M. Novak

Professors: Kenneth J. Balkus, Jr., Rockford K. Draper (Biology), John P. Ferraris, Bruce E. Gnade (Electrical Engineering), Inga H. Musselman

Associate Professors: Jung-Mo Ahn, Michael C. Biewer, Gregg R. Dieckmann, Warren J. Goux, Steven O. Nielsen, Paul Pantano, John W. Sibert IV

Assistant Professors: Mihaela C. Stefan, Jie Zheng

Affiliated Professors: Lee A. Bulla (Biology), Anvar A. Zakhidov (Physics)

Research Professors: Gary E. Kiefer, Duck Joo Yang

Emeritus Professor: Richard A. Caldwell

Senior Lecturers: Sergio Cortes, Sandhya R. Gavva, Claudia Taenzler

Molecular and Cell Biology:

Professors: Lee A. Bulla, Santosh D'Mello, Rockford K. Draper, Juan E. González, Donald M. Gray, Steven D. Levene, Betty S. Pace, Lawrence J. Reitzer, Li Zhang, Michael Q. Zhang
Associate Professors: Gail A.M. Breen, John G. Burr, Jeff L. Delong, Ernest M. Hannig, Dennis L. Miller, Stephen Spiro

Assistant Professor: Tianbing Xia, Zhenyu Xuan


UT Southwestern Medical School

UTD Biochemistry majors may perform their research in the laboratories of faculty members from the departments of Biochemistry, Internal Medicine, Pharmacology and Physiology at UT Southwestern, as available.

Bachelor of Science in Biochemistry

Degree Requirements (129 hours)

I. Core Curriculum Requirements\(^1\): 42 hours

Communication (6 hours)

3 hours Communication (RHET 1302)
3 hours Communication Elective (Satisfied by BIOL/CHEM 4390 or equivalent)\(^2\)

Social and Behavioral Sciences (15 hours)

6 hours Government (GOVT 2301 and GOVT 2302)
6 hours American History
3 hours Social and Behavioral Sciences Elective

Humanities and Fine Arts (6 hours)

3 hours Fine Arts (ARTS 1301)
3 hours Humanities (HUMA 1301)

Mathematics and Quantitative Reasoning (6 hours)\(^3\)

6 hours Calculus (MATH 2413 and MATH 2414 or MATH 2417 and MATH 2419)\(^2, 3\)

Science (9 hours)

Introductory Chemistry (CHEM 1311/1111, 1312/1112, and CHEM 2401)\(^3\)
II. Major Requirements: 69 hours

Major Preparatory Courses (29 hours beyond core curriculum)

- **BIOL 2111** Introduction to Modern Biology Workshop I
- **BIOL 2311** Introduction to Modern Biology I
- **CHEM 1111** General Chemistry Laboratory I\(^2, 3\)
  - or **CHEM 1115** Honors Freshman Chemistry Laboratory I\(^2, 3\)
- **CHEM 1112** General Chemistry Laboratory II\(^2, 3\)
  - or **CHEM 1116** Honors Freshman Chemistry Laboratory II\(^2, 3\)
- **CHEM 1311** General Chemistry II\(^2, 3\)
  - or **CHEM 1315** Honors Freshman Chemistry II\(^2, 3\)
- **CHEM 1312** General Chemistry III\(^2, 3\)
  - or **CHEM 1316** Honors Freshman Chemistry III\(^2, 3\)
- **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
- **CHEM 2401** Introductory Quantitative Methods in Chemistry\(^2, 3\)

**MATH Sequence - Students may choose one of the following sequences:**

I. **MATH 2413** Differential Calculus\(^3\)
   - and **MATH 2414** Integral Calculus\(^3\)
   - and **MATH 2415** Calculus of Several Variables\(^3\)

OR

II. **MATH 2417** Calculus I\(^3\)
   - and **MATH 2419** Calculus II\(^3\)
   - and **MATH 2451** Multivariable Calculus with Applications

- **PHYS 2125** Physics Laboratory I
- **PHYS 2126** Physics Laboratory II
**PHYS 2325** Mechanics\(^5\)
- or **PHYS 2421** Honors Physics I - Mechanics and Heat\(^5\)

**PHYS 2326** Electromagnetism and Waves\(^5\)
- or **PHYS 2422** Honors Physics II - Electromagnetism and Waves\(^5\)

**Major Core Courses (40 hours beyond core curriculum)**

- **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 3380** Biochemistry Laboratory
- **BIOL/CHEM 3361** Biochemistry I
- **BIOL/CHEM 3362** Biochemistry II
- **BIOL 3V93** (3 hours) Undergraduate Research in Biochemistry\(^6\)
  - or **CHEM 3V92** (3 hours) Undergraduate Research in Biochemistry\(^6\)
  - or **CHEM 4V91** (3 hours) Research in Chemistry\(^6\)
- **CHEM 3321** Physical Chemistry I
- **CHEM 3322** Physical Chemistry II
- **CHEM 3472** Instrumental Analysis
- **CHEM 4390** Research and Advanced Writing in Chemistry\(^2,6\)
  - or **BIOl 4391** Senior Research in Molecular and Cell Biology (Advanced Writing)\(^2,6\)
  - or **BIOl 4399** Senior Honors Research in Molecular and Cell Biology (Thesis/Advanced Writing)\(^2,6\)
  - or **CHEM 4399** Research and Advanced Writing in Chemistry for Honors Students\(^2,6\)

Any two upper-division Chemistry or Biology electives (6 hours) not taken to fulfill above.

**III. Elective Requirements: 18 hours**

**Advanced Electives (6 hours)**

- These courses must be outside the major and be upper-division and/or have prerequisites.
Free Electives (12 hours)

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

STAT 3332 Statistics for Life Sciences is strongly recommended.

Fast Track Baccalaureate/Master’s Degrees

Undergraduate students at UT Dallas with strong academic records who intend to pursue the M.S. in Chemistry at UT Dallas may apply for a Fast Track plan of study which involves taking selected graduate courses as an upper-level student. After admission to the graduate program, 15 hours of graduate courses with an earned grade of B or better can be used toward completion of the baccalaureate degree and to satisfy requirements for the master’s degree. Interested students should contact the undergraduate advisor well in advance of the junior year to prepare a sequence permitting maximal advantage to be taken of the catalog's regulations (see catalog.utdallas.edu/2012/undergraduate/policies/graduate-courses) regarding Undergraduate Registration for Graduate Courses.

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 Core Curriculum requirements. If hours are counted in the Core Curriculum, students must complete additional coursework to meet the minimum requirement for graduation. Course selection assistance is available from the undergraduate advisor.

3. Hours above the Core Curriculum requirement are counted as part of the Major Preparatory Courses.

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

5. Students will take one of the two Physics sequences: PHYS 2325 and PHYS 2326 or PHYS 2421 and PHYS 2422 with accompanying labs.

6. Undergraduate Research in Biochemistry (BIOL 3V93/CHEM 3V92), Research in Chemistry (CHEM 4V91), Research and Advanced Writing in Advanced Chemistry (CHEM 4390), Senior Research in Molecular and Cell Biology (Advanced Writing) (BIOL 4391), Senior Honors Research in Molecular and Cell Biology (Thesis/Advanced Writing) (BIOL 4399), and Research and Advanced Writing in Chemistry for Honors Students (CHEM 4399) are better defined as a project than a course and constitutes an important part of the B. S. degree. The student conducts original research under the supervision of a faculty member, and then must submit a research report which is defended orally in an undergraduate research symposium during the spring semester of their senior year. Normally this project will span two or more semesters. A complete set of guidelines is available from the undergraduate advisor.