School of Natural Sciences and Mathematics

Minors

Students must take a minimum of 18 semester credit hours for the minor, 12 of which must be upper-division semester credit hours. 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). Semester credit hours may not be used to satisfy both the major and minor requirements; however, free elective semester credit hours or major preparatory classes may be used to satisfy the minor.

For all minors in the School of Natural Sciences and Mathematics students must complete all prerequisite sequences for required minor courses.

The undergraduate minors in the School of Natural Sciences and Mathematics follow:

- Actuarial Science
- Biology
- Biomolecular Structure
- Chemistry
- Geosciences
- Mathematics
- Microbiology
- Molecular and Cell Biology
- Neurobiology
- Physics
- Statistics
- Secondary STEM Education

Minor in Actuarial Science: 24 semester credit hours

The Minor in Actuarial Science program at UT Dallas is administered through the Department of Mathematical Sciences. It is ideal for students who are interested in broadening their experience and knowledge base in the study and analysis of principles of Actuarial Science. The minor core courses prepare students for a number of actuarial exams required for a designation of Associate of the Society of Actuaries, Casualty Actuarial Society, or Canadian Institute of Actuaries. Specifically, the minor provides students with an intense background in principles of actuarial models. All of the courses in the minor serve as starting points for learning the concepts covered on the preliminary actuarial exams (P/1, FM/2, MLC/3L).
Students not majoring in Actuarial Science may obtain a minor in Actuarial Science by satisfying 24 semester credit hours (9 semester credit hours of minor core courses and 15 semester credit hours of minor preparatory courses).

**Minor Preparatory Courses (15 semester credit hours)**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
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<tbody>
<tr>
<td>MATH 2417</td>
<td>Calculus I (or MATH 2413 Differential Calculus)</td>
</tr>
<tr>
<td>MATH 2419</td>
<td>Calculus II (or MATH 2414 Integral Calculus)</td>
</tr>
<tr>
<td>MATH 2451</td>
<td>Multivariable Calculus with Applications</td>
</tr>
<tr>
<td>ITSS 3300</td>
<td>Information Technology for Business</td>
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</table>

**Minor Core Courses (9 semester credit hours)**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
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<tbody>
<tr>
<td>STAT 4351</td>
<td>Probability</td>
</tr>
<tr>
<td>ACTS 4301</td>
<td>Long Term Actuarial Mathematics I</td>
</tr>
<tr>
<td>ACTS 4308</td>
<td>Actuarial Financial Mathematics</td>
</tr>
</tbody>
</table>

2. Students whose major does not require MATH 2417 and MATH 2419 as part of their Mathematics and Component Area Option Core Curriculum Requirements, should take this sequence as their core curriculum courses to ensure efficiency toward the minor.

3. These classes prepare for the three preliminary actuarial examinations jointly administered by the Society of Actuaries (SOA), Casualty Actuarial Society (CAS), and the Canadian Institute of Actuaries (CIA).

**Minor in Biology: 18 semester credit hours**

**Required: 12 semester credit hours**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
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<tbody>
<tr>
<td>BIOL 2311</td>
<td>Introduction to Modern Biology I</td>
</tr>
<tr>
<td>BIOL 2111</td>
<td>Introduction to Modern Biology Workshop I</td>
</tr>
<tr>
<td>BIOL 3301</td>
<td>Classical and Molecular Genetics</td>
</tr>
<tr>
<td>BIOL 3101</td>
<td>Classical and Molecular Genetics Workshop</td>
</tr>
<tr>
<td>BIOL 3361</td>
<td>Biochemistry I</td>
</tr>
<tr>
<td>BIOL 3161</td>
<td>Biochemistry Workshop I</td>
</tr>
</tbody>
</table>

Also:

Two BIOL approved electives for majors
Minor in Biomolecular Structure: 18 semester credit hours

Required: 13 semester credit hours

**BIOL 3336** Protein and Nucleic Acid Structure

**BIOL 4461** Biophysical Chemistry (unless taken to fulfill the Molecular Biology major requirements)

**CHEM 2323** Introductory Organic Chemistry I

**CHEM 2325** Introductory Organic Chemistry II

Also:

A minimum of 5 additional semester credit hours in approved BIOL, CHEM, CS, EE, MATH, or PHYS electives

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Minor in Chemistry: 18 semester credit hours

Required: 11 semester credit hours

**BIOL 3161** Biochemistry Workshop I

**BIOL 3361** or **CHEM 3361** Biochemistry I

**CHEM 3321** Physical Chemistry I

**CHEM 3472** Instrumental Analysis

Also:

A minimum of 7 additional semester credit hours in chemistry courses

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Minor in Geosciences: 20 semester credit hours

Required lower-division courses: 8 semester credit hours

**GEOS 1103** Physical Geology Laboratory

**GEOS 1104** History of Earth and Life Laboratory

**GEOS 1303** Physical Geology

**GEOS 1304** History of Earth and Life
Upper-division courses: 12 semester credit hours

To be selected in consultation with Geosciences Undergraduate advisor

4. A prerequisite course to be completed before enrolling in upper-division GEOS core courses (GEOS 3300, GEOS 3421, GEOS 3434, GEOS 3464, GEOS 3470, GEOS 4300, GEOS 4320, GEOS 4322, and GEOS 4430).

Minor in Mathematics: 18 semester credit hours

The minor in Mathematics requires 18 semester credit hours math or statistics course requirements. Of these 18, 12 semester credit hours will be selected from a specific set of courses.

12 semester credit hours of courses must be chosen from the following:

- **MATH 3310** Theoretical Concepts of Calculus
- **MATH 4334** Numerical Analysis

And select two more upper-division mathematics courses that satisfy degree requirements by students in Mathematical Sciences.

The remaining 6 semester credit hours can be satisfied by choosing either MATH or STAT courses with advisor approval.

Minor in Microbiology: 18 semester credit hours

Required: 15 semester credit hours

- **BIOL 3520** General Microbiology with Lab
- **BIOL 3335** Microbial Physiology
- **BIOL 4350** Medical Microbiology
- **BIOL 4345** Immunobiology
- **CHEM 2323** Introductory Organic Chemistry I

Also:

One approved microbiology elective

5. Two semester credit hours of BIOL 3520 may be used to satisfy the upper-division elective requirement for Biology and Molecular Biology majors.

6. May be substituted with CHEM 2325 Introductory Organic Chemistry II if used to satisfy the Biochemistry II
Minor in Molecular and Cell Biology: 18 semester credit hours

Required: 6 semester credit hours

- **CHEM 2323** Introductory Organic Chemistry I
- **CHEM 2325** Introductory Organic Chemistry II

Also:

Four approved molecular and cell biology electives

Minor in Neurobiology: 18 semester credit hours

Required: 12 semester credit hours

- **CHEM 2323** Introductory Organic Chemistry I
- **CHEM 2325** Introductory Organic Chemistry II
- **NSC 4353** Neuroscience Laboratory Methods
- **NSC 4354** Integrative Neuroscience
  - or **NSC 4352** Cellular Neuroscience

Also:

Two BIOL approved electives for majors

Minor in Physics: 20 semester credit hours

Require: 12 semester credit hours

- **PHYS 2325** Mechanics
- **PHYS 2125** Physics Laboratory I
- **PHYS 2326** Electromagnetism and Waves
- **PHYS 2126** Physics Laboratory II
PHYS 3411  Theoretical Physics

Also:

Three other upper-division physics courses

Minor in Statistics: 18 semester credit hours

The minor in Statistics requires 18 semester credit hours math or statistics course requirements. Of these 18, 12 semester credit hours will be selected from a specific set of courses.

12 semester credit hours of courses must be chosen from the following:

- STAT 4351 Probability
- STAT 4352 Mathematical Statistics

And select two more upper-division mathematics courses that satisfy degree requirements by students in Mathematical Sciences.

The remaining 6 semester credit hours can be satisfied by choosing either MATH or STAT courses with advisor approval.

Minor in Secondary STEM Education: 21 semester credit hours

Required: 21 semester credit hours

- NATS 1141 UTeach STEP 1 (Inquiry Approaches to Teaching)
- or NATS 1142 UTeach STEP 1
- NATS 1143 UTeach STEP 2 Inquiry-Based Lesson Design in Science/Mathematics
- NATS 3341 Knowing and Learning in Mathematics and Science
- NATS 3343 Classroom Interactions
- HIST 3327 Perspectives on Science (SciEd)
- NATS 4341 Project-Based Instruction
- NATS 4694 UTeach Apprentice Teaching, 7-12 Science and Mathematics
- or NATS 4696 UTeach Apprentice Teaching, 4-8 Science and Mathematics
- NATS 4141 UTeach Apprentice Teaching Seminar
Also:

Students must complete the requirements for Texas Teacher Certification. See Teacher Education Certification Programs section of the catalog for additional information.

1. NATS 1142 meets twice weekly and satisfies the freshman seminar requirement (NATS 1101) for freshmen NS&M majors.