

## DOCUMENTS OF THE GENERAL FACULTY

**PROPOSED CHANGES TO THE BA PLAN I MAJOR CHANGES IN THE COLLEGE OF NATURAL SCIENCES IN THE *UNDERGRADUATE CATALOG 2016-2018***

Dean Linda Hicke, in the College of Natural Sciences has filed with the secretary of the Faculty Council the following changes to the Bachelor of Arts Plan I major in the *Undergraduate Catalog, 2016-2018*. The Departments of Astronomy, Chemistry, and Computer Science approved the proposal on September 8, 2015. The Departments of Physics and Mathematics approved it on September 9 and October 1, respectively. On October 7, 2015, the college faculty and dean approved it. The secretary has classified this proposal as legislation of *general* interest to more than one college or school.

The Committee on Undergraduate Degree Program Review recommended approval of the changes on October 22, 2015, and forwarded them to the Office of the General Faculty. The Faculty Council has the authority to approve this legislation on behalf of the General Faculty. The authority to grant final approval on this legislation resides with UT System.

If no objection is filed with the Office of the General Faculty by the date specified below, the legislation will be held to have been approved by the Faculty Council. If an objection is filed within the prescribed period, the legislation will be presented to the Faculty Council at its next meeting. The objection, with reasons, must be signed by a member of the Faculty Council.

To be counted, a protest must be received in the Office of the General Faculty by November 11, 2015.



Hillary Hart, Secretary  
General Faculty and Faculty Council



whenever possible.

**Computer Science:**

2. Remove CS 312H from major and from list of classes restricted to computer science entry-level majors. Rationale: CS 312H was never developed. The first programming honors course is CS 314H.
3. In Additional Coursework requirement #1, add M 408S to the alternate calculus sequence. Rationale: The Department of Statistics and Data Sciences is changing the prerequisite of SDS 321 to M 408C or 408N and 408S.
4. Note that M 341, Linear Algebra, may substitute for M 340L, Matrices and Matrix Calculations. Note that M 362K, Probability, may substitute for SDS 321, Introduction to Probability and Statistics. Rationale: M 341 and 362K cannot be added as degree requirements because the prerequisites consist of more calculus than is required for the BA CS major. Students in the BS in Computer Science degree may currently count M 341 and 362K toward the same requirement. This notation will allow students who have already completed M 341 or 362K to count the course(s) without filing a petition. It will also prevent students who have completed M 341 or 362K from erroneously enrolling in M 340L or SDS 321.
5. Clarify eligibility to enroll in CS 311 or 311H, 312, and 314 or 314H. Rationale: Due to enrollment pressures, the Department of Computer Science restricted enrollment in the CS entry-level courses to CS entry-level students. Prior to this restriction, it was difficult for students in CS entry-level to enroll in the courses they needed to apply to the major.

**Mathematics, both options:**

1. Calculus sequence expansion to require two semesters of calculus while providing more flexibility to meet the requirement. Rationale: The content of M 408D or 408M is not essential to the upper-division study in mathematics. Upper-division mathematics courses requiring calculus now have a prerequisite of M 408D, 408S, or 408L.
2. Allow students a choice between taking M 325K or 328K. Rationale: M 325K, Discrete Mathematics, and M 328K, Number Theory, provide similar depth of experience in proofs as preparation for more advanced math courses such as M 361K or 365C, both courses in real analysis.

**Mathematics, standard option:**

Add requirement 7 (nine hours of upper-division mathematics).

Rationale: This subtotal was implied through the first sentence under the major: "At least twenty-four semester hours of upper-division coursework in mathematics." The addition makes explicit the number of upper-division hours in mathematics that must be taken in addition to the specifically required courses.

**Mathematics, mathematics for middle grades and secondary school teaching option:**

2. Delete ability to count both M 325K and 328K toward the major. Rationale: Either proof-based course is sufficient to prepare for more advanced coursework in math.
3. Delete M 360M, Mathematics as Problem Solving. Require students to take either M 343K or 373K (courses in algebraic structures). Rationale: Students gain exposure to problem solving in math and science education in EDC 365C, Knowing and Learning in Math and Science. The removal of M 360M altogether and specifically requiring M 343K or 373K ensures that students build a strong foundation in algebraic structures without adding additional hours to the major. Algebraic structures are important concepts for future teachers to master.

**Physics**

1. Add the physics courses that are prerequisites to required PHY 315 and 115L. Rationale: Previously, these were hidden hours.
2. In Additional Coursework requirement #2, list the specific courses that contain differential equations. Rationale: Previously, students had to consult with advisers to see the list of acceptable courses.

**3. THIS PROPOSAL INVOLVES (Please check all that apply)**

- |  |   |  |
|--|---|--|
| <input checked="" type="checkbox"/> Courses in other colleges                    | <input type="checkbox"/> Courses in proposer's college that are frequently taken by students in other colleges  | <input type="checkbox"/> Flags   |
| <input type="checkbox"/> Course in the core curriculum                           | <input checked="" type="checkbox"/> Change in course sequencing for an existing program (math major)  | <input type="checkbox"/> Courses that have to be added to the inventory                              |
| <input type="checkbox"/> Change in admission requirements (external or internal) | <input checked="" type="checkbox"/> Requirements not explicit in the catalog language (e.g., lists of acceptable courses maintained by department office) | <input checked="" type="checkbox"/> update field of study requirements for mathematics certification |

**4. SCOPE OF PROPOSED CHANGE**

- a. Does this proposal impact other colleges/schools? Yes  No   
If yes, then how?
- b. Do you anticipate a net change in the number of students in your college? Yes  No   
If yes, how many more (or fewer) students do you expect?
- c. Do you anticipate a net increase (or decrease) in the number of students from outside of your college taking classes in your college? Yes  No   
If yes, please indicate the number of students and/or class seats involved.
- d. Do you anticipate a net increase (or decrease) in the number of students from your college taking courses in other colleges? Yes  No   
If yes, please indicate the number of students and/or class seats involved.

The chemistry and physics majors allowed students to choose from a variety of coursework, including geology (twelve hours in the Chemistry major; 6 hours, including three upper-division, in the Physics major). In recent years, the Jackson School of Geosciences restricted enrollment of its majors-level courses to those students who are in the Jackson School. At times, students are able to enroll in an introductory majors-level course. But it is problematic for CH and PHY majors who have partially completed the requirement with GEO to obtain enrollment in GEO courses needed to finish. The impact on GEO course enrollments will be minimal because: 1) students have other disciplines from which to choose; 2) the populations of CH and PHY majors are small; and 3) students have been actively discouraged during advising from enrolling in GEO courses. The removal of GEO as a choice will have little to no budgetary impact on the Jackson School of Geosciences.

**If 4 a, b, c, or d was answered with yes, please answer the following questions. If the proposal has potential budgetary impacts for another college/school, such as requiring new sections or a non-negligible increase in the number of seats offered, at least one contact must be at the college-level.**

How many students do you expect to be impacted? We estimate the Jackson School of Geosciences may lose ten seats per year spread across the GEO curriculum.

Impacted schools must be contacted and their response(s) included:

Person communicated with:

Date of communication:

Response:

- e. Does this proposal involve changes to the core curriculum or other basic education requirements (42-hour core, signature courses, flags)? **No.** If yes, explain:

**If yes, undergraduate studies must be informed of the proposed changes and their response included:**

Person communicated with:

Date of communication:

Response:

- f. Will this proposal change the number of hours required for degree completion? **No.** If yes, explain:

## 5. COLLEGE/SCHOOL APPROVAL PROCESS

Department approval date:	Astronomy:	September 8, 2015
	Chemistry:	September 8, 2015
	Computer Science:	May 20, 2015; September 8, 2015
	Mathematics:	September 9, 2015; October 1, 2015
	Physics:	September 9, 2015
College approval date:	September 9, 2015; October 7, 2015	
Dean approval date:	September 28, 2015; October 7, 2015, David Vanden Bout, Associate Dean	

### PROPOSED NEW CATALOG TEXT:

#### Bachelor of Arts, Plan I

The requirements for the Bachelor of Arts under Plan I are designed to give each student flexibility in the selection of courses to meet individual needs.

A total of 120 semester hours is required. Thirty-six hours must be in upper-division courses. At least sixty hours, including twenty-one hours of upper-division coursework, must be completed in residence at the University; at least twenty-four of the last thirty hours must be completed in residence at the University. Provided residence rules are met, credit may be earned by examination, by extension, by correspondence (up to 30 percent of the hours required for the degree), or, with the approval of the dean, by work transferred from another institution. Up to sixteen semester hours of classroom and/or correspondence coursework may be taken on the pass/fail basis; this coursework may be counted only as electives.

All students must complete the University's Core Curriculum. In the process of fulfilling the core curriculum and other degree requirements, all students must complete courses with content in the following areas:

1. Writing: two flagged courses, including one at the upper-division level, beyond Rhetoric and Writing 306 or its equivalent.
2. Quantitative reasoning: one flagged course

Courses in the major and ~~minor~~ additional coursework may also be used to fulfill prescribed work requirements unless expressly prohibited. A course in one prescribed work area may not also be used to fulfill the requirements of another prescribed work area; the only exception to this rule is that a course that fulfills one requirement may also be used to fulfill a flag requirement. Courses that fulfill these flag requirements will be identified in the *Course Schedule* by the appropriate flags.

The student must fulfill both the University General Requirements for graduation and the Requirements of the College of Natural Sciences. University graduation requirements include a grade point average of at least 2.00 in all courses taken at the University (including credit by examination, correspondence, and extension) for which a grade or symbol other than *Q*, *W*, *X*, or *CR* is recorded; for the Bachelor of Arts, Plan I, the student must also earn a grade point average of at least 2.00 in courses taken at the University and counted toward the major requirement. The student should also refer to the description of his or her major in the section "Majors and ~~Minors~~ Additional Coursework" below, since some majors include higher minimum scholastic requirements.

More information about grades and the grade point average is given in the *General Information Catalog*.

#### Prescribed Work

1. *Writing*: Two courses beyond Rhetoric and Writing 306 or the equivalent that carry a writing flag. One of these courses must be upper-division. Courses with a writing flag are identified in the *Course Schedule*. They may be used simultaneously to fulfill other requirements, unless otherwise specified.
2. *Foreign language*: ~~Four semesters or the equivalent in a single foreign language.~~ Proficiency in a language other than English is required.

~~[The foreign language requirement is the attainment of a certain proficiency, as well as the completion of a specified number of courses; however, the courses taken to gain proficiency are not electives and may not be taken on the pass/fail basis. Any part of the requirement may be fulfilled by credit by examination.]~~

~~[To achieve proficiency in a foreign language as rapidly as possible, qualified students are urged to take intensive foreign language courses. Information about these courses is available from the departments that offer them.]~~

~~[Courses used to fulfill the foreign language requirement must be language courses; literature in-translation courses, for example, may not be counted.]~~

The foreign language requirement is the attainment of an intermediate level of competency as determined by the completion of any one of the following options:

- a. Certified proficiency on a placement or credit-by-examination test.
- b. A passing grade in a language course listed below:

Requirements	Course titles	Hours
ASL 611C	Accelerated Second-Year American Sign Language	6
ASL 311D	American Sign Language III: Intermediate	3
ASL 312L	Second-Year American Sign Language II	3
ARA 611C	Intensive Arabic II	3
BEN 312L	Second-Year Bengali II	3
CHI 612	Accelerated Second-Year Chinese	6
CHI 412L	Second-Year Chinese II	4
CZ 611C	Intensive Czech II	6
CZ 412L	Second-Year Czech II	4
DAN 612	Accelerated Second-Year Danish	6
DCH 612	Accelerated Second-Year Dutch	6
FR 611C	Intermediate French	6
GER 612	Accelerated Second-Year German: Readings in Modern German	6
GK 312K	Intermediate Greek II	3
GK 312L	Intermediate Greek II: Biblical Greek	3
GK 610C	Intermediate Modern Greek	6
GK 310K	Second-Year Modern Greek II	3
HEB 612C	Intensive Biblical Hebrew II	6
HEB 611C	Intensive Hebrew II	6
HIN 312L	Second-Year Hindi II	3
ITL 611C	Intermediate Italian	6
JPN 611D	Intermediate Japanese	6
KOR 412L	Second-Year Korean II	4
LAT 311	Intermediate Latin I	3
MAL 312L	Second-Year Malayalam II	3
NOR 612	Accelerated Second-Year Norwegian	6
PSH 312L	Second-Year Pashto II	3
PRS 611C	Intensive Persian II	6
PRS 612C	Intensive Persian for Heritage Speakers	6
POL 611C	Intensive Polish II	6
POL 312L	Second-Year Polish II	3
POR 611D	Intermediate Portuguese II	6
RUS 611C	Intensive Russian II	6
RUS 412L	Second-Year Russian II	4

SAN 312L	Second-Year Sanskrit II	3
S C 312L	Second-Year Serbian/Croatian II	3
SEL 611C	Intensive Slavic and Eurasian Languages II	6
SEL 312L	Second-Year Slavic and Eurasian Languages II	3
SPN 611D	Intermediate Spanish II	6
SPN 612	Accelerated Intermediate Spanish for Heritage Learners	6
SWA 611C	Intensive Swahili II	6
SWE 612	Accelerated Second-Year Swedish	6
TAM 312L	Second-Year Tamil II	3
TEL 312L	Second-Year Telugu II	3
TUR 611C	Intensive Turkish II	6
URD 312L	Second-Year Urdu II	3
YID 612	Accelerated Second-Year Yiddish	6
YOR 312L	Second-Year Yoruba II	3
YOR 611C	Intermediate Yoruba	6

- c. Students who wish to meet the requirement with proficiency in a language not listed in the table above should contact the Texas Language Center.
3. *Social science*: Three semester hours chosen from a list of approved courses, in addition to the course used to fulfill the social and behavioral sciences requirement of the core curriculum. The course(s) must be in a field of study taught in the College of Liberal Arts and must be in a different field of study from the course used to fulfill the social and behavioral sciences requirement of the core.

Courses on the approved list are primarily in anthropology, economics, geography, linguistics, psychology, and sociology, but not every course in these fields is approved. Courses that are approved to count toward any core curriculum area other than social and behavioral sciences may not be counted toward this requirement.

The list is available each semester in the Student Division and on the College of Liberal Arts Web site.

4. *Mathematics*: Three semester hours in mathematics, excluding Mathematics 301, 316K, and 316L.
5. *Natural science*: Six semester hours in natural sciences, in addition to the courses counted toward the science and technology requirements of the core curriculum. Courses used to fulfill this requirement must be chosen from the fields of study listed below; no more than three hours may be in either the history of science or the philosophy of science.

To satisfy the mathematics and science and technology requirements of the core curriculum and the natural science requirement of the Bachelor of Arts, Plan I, a student may count (1) no more than twelve hours in mathematics, computer science, and statistics and data sciences combined; and (2) no more than nine hours in any single field of study.

- a. Astronomy
  - b. Biology
  - c. Chemistry
  - d. Geological sciences
  - e. Marine science
  - f. Nutrition
  - g. Physical science
  - h. Physics
  - i. Mathematics (excluding Mathematics 301), computer science, statistics and data sciences
  - j. Other alternative science courses approved by the dean
  - k. Approved alternative courses in history of science and philosophy of science
6. *Cultural expression, human experience, and thought*: Three semester hours chosen from a list of approved courses. The course(s) must be in a field of study taught in the College of Liberal Arts. A course counted toward any requirement of the core curriculum may not also be counted toward this requirement.

A list of approved courses is available each semester in the Student Division and on the College of Liberal Arts Web site.

### **Electives**

In addition to the core curriculum, prescribed work, and major and ~~[minor]~~ additional coursework, the student must complete enough elective coursework to provide the 120 semester hours required for the degree. These 120 hours may include no more than twelve semester hours of Bible courses; nine hours of designated coursework in air force science, military science, or naval science; sixteen hours completed on the pass/fail basis; thirty-nine hours in any one field of study offered in the College of Liberal Arts or the College of Natural Sciences, unless major requirements state otherwise; and thirty-nine hours in any other single college or school of the University.

### **Majors and ~~[Minors]~~ Additional Coursework**

#### **Major Requirements**

The Bachelor of Arts, Plan I, requires the completion of all requirements for one major.

The number of semester hours required in the major varies with the field selected. Unless the requirements of the major state otherwise, a major consists of at least twenty-four but no more than thirty-nine semester hours, with at least fifteen hours in upper-division courses. Of these fifteen hours, six must be completed in residence. At least eighteen hours of coursework in the major, including six hours of upper-division coursework, must be completed in residence at the University.

#### **~~[Minors]~~ Additional Coursework**

Students in most majors must also fulfill the requirements of additional coursework ~~[a minor]~~. The requirements of the ~~[minor]~~ additional coursework are established by the major department and are given with the major requirements. Additional restrictions may be imposed by the academic department(s) in which the student takes the courses used to fulfill the requirements of the ~~[minor]~~ additional coursework; before planning to use a course to fulfill the ~~[minor]~~ additional coursework requirement, the student should consult the department that offers the course.

### **Astronomy**

#### **Major**

The following coursework is required:

1. Physics 301 and 101L
2. Physics 316 and 116L (Prerequisites: Physics 301 and 101L)
3. Physics 315 and 115L (Prerequisites: Physics 316 and 116L)
4. Nine semester hours of upper-division coursework in astronomy, including at least two of the following courses: Astronomy 352KAstronomy 352LAstronomy 353Astronomy 358Astronomy 364
5. Six additional upper-division hours in astronomy and/or physics

#### **~~[Minors]~~ Additional Coursework**

~~[Six semester hours of coursework (other than astronomy, lower-division physics, lower-division mathematics, and Mathematics 427K) approved by the undergraduate adviser; and either six semester hours of upper-division physics in addition to the courses used to fulfill the major requirements or six semester hours of upper-division coursework approved by the undergraduate adviser.]~~

#### Completion of the following:

1. Six hours of coursework (other than astronomy, lower-division physics, lower-division mathematics, and Mathematics 427J or 427K) approved by the undergraduate adviser.
2. Six additional hours of upper-division physics, or six hours of upper-division coursework approved by



the undergraduate adviser.

Students must earn a grade of at least C- in each mathematics and science course required for the degree, and a grade point average in these courses of at least 2.00.

All astronomy majors should consult the astronomy undergraduate adviser regularly about the choice of appropriate courses in both the major and the additional coursework [~~minor~~]. Qualified students are encouraged to carry out a supervised research project by taking a conference course, such as Astronomy 375 or 379H. No more than six of the hours counted toward the major requirement may be earned in conference courses.

### **Biochemistry**

### **Biology**

{Proposed deletions of Biochemistry and Biology majors are addressed in a separate impact statement.}

### **Chemistry**

[In addition to the requirements below, chemistry majors must take Mathematics 408C and 408D or Mathematics 408N, 408S, and 408M; and eight semester hours of physics: either Physics 301, 101L, 316, and 116L; 303K, 103M, 303L, and 103N; or 317K, 117M, 317L, and 117N.]

### **Major (31 to 32 hours)**

1. Chemistry 301 or 301H
2. Chemistry 302 or 302H
3. Chemistry 204 or 317
4. One of the following sequences:
  - a. Chemistry 220C, 320M, and 320N; or
  - b. Chemistry 128K, 128L, 328M, and 328N
5. Chemistry 353
6. Chemistry 153K
7. Chemistry 354 or 354L
8. Chemistry 154K
9. Chemistry 456
10. Chemistry 376K

### **[Minors] Additional Coursework**

1. Mathematics 408C and 408D, or Mathematics 408N, 408S, and 408M.
2. Eight semester hours of physics chosen from one of the following sequences:
  - a. Physics 303K, 103M, 303L, and 103N
  - b. Physics 301, 101L, 316, and 116L
  - c. Physics 317K, 117M, 317L, and 117N
3. Completion of one of following sequences:
  - a. Twelve semester hours of majors-level coursework in biology, mathematics, or physics. Mathematics in requirement 1 or physics in requirement 2 may count toward the twelve hour total.
  - b. Computer Science 303E, 313E, and six hours chosen from Computer Science 323E, 324E, 326E, 327E, and 329E. Students choosing this option may simultaneously fulfill some of the requirements of the Elements of Computing Certificate.
  - c. With written consent of the department chair and approval of the dean, twelve semester hours in a field of study outside the College of Natural Sciences.

~~[Either (1) twelve semester hours of biology, geological sciences, mathematics, physics, or, with written consent of the department chair and approval of the dean, a field of study outside the College of Natural Sciences or the Jackson School of Geosciences; or (2) Computer~~

~~Science 303E, 313E, and six hours chosen from Computer Science 323E, 324E, 326E, 327E, and 329E. Students who complete the second option may simultaneously fulfill some of the requirements of the Elements of Computing Certificate.]~~

Students must earn a grade of at least C- in each mathematics and science course required for the degree, and a grade point average in these courses of at least 2.00.

## Computer Science

An undergraduate may not enroll in any computer science course more than once without written consent of an undergraduate adviser in computer science. No student may enroll in any computer science course more than twice. No student may take more than three upper-division computer science courses in a semester without written consent of an undergraduate adviser in computer science.

### Major:

The following courses in computer science:

1. *Theory*: Computer Science 311 or 311H\*, 331, or 331H\*, and three additional hours from an approved list available in the department.
2. *Programming*: Computer Science 312 ~~[or 312H\*]~~, 314 or 314H\*, and three additional hours from an approved list available in the department.
3. *Systems*: Computer Science 429 or 429H\*, 439 or 439H\*, and three additional hours from an approved list available in the department.
4. Twelve additional hours of upper-division courses in computer science.

Computer Science 370 may be counted toward the degree only once.

### ~~[Minor for Computer Science Majors]~~ Additional Coursework

~~[Mathematics 408C or 408N, and 340L or Statistics and Data Sciences 329C, and 321]~~

Completion of the following:

1. Mathematics 408C or 408N and 408S.
2. Mathematics 340L or Statistics and Data Sciences 329C. Mathematics 341 may substitute for 340L
3. Statistics and Data Sciences 321. Mathematics 362K may substitute for Statistics and Data Sciences 321.

Students must earn a grade of at least C- in each mathematics and science course required for the degree, and a grade point average in these courses of at least 2.00.

~~[With the exception of]~~ Enrollment in Computer Science 311 or 311H\*, 312 ~~[or 312H\*]~~, and 314 or 314H\*, ~~[all]~~ is restricted to computer science entry-level majors. All other computer science courses that may be counted toward a degree in computer science are restricted to students who have been admitted to the computer science major or have the consent of the undergraduate faculty adviser.

\* Computer science courses with numbers ending in *H* are intended for students pursuing the Bachelor of Science in computer science, option II, the Turing Scholars program, and option III, computer science honors. Students outside these options may enroll in these courses only with the special consent of the honors director.

## Human Ecology

{Proposed deletion of Human Ecology major is addressed in a separate impact statement.}

## Mathematics

Undergraduates seeking a Bachelor of Arts degree with a major in mathematics must choose either the standard

option or the middle grades or secondary school teaching option.

### Major: Standard Option

At least twenty-four semester hours of upper-division coursework in mathematics. Students must earn a grade of at least C- in each mathematics and science course required for the degree, and a University grade point average in these courses of at least 2.00.

The student must complete the following:

1. One of the following sequences:
  - a. Mathematics 408C and 408D
  - b. Mathematics 408N and 408S
  - c. Mathematics 408K and 408L

Mathematics 408N and 408S, or 408K and 408L, may substitute for 408C.

2. Mathematics 340L or 341
3. One course chosen from: Mathematics 325K or 328K, 343K, or 373K
4. Mathematics 361K or 365C
5. Mathematics 362K
6. To broaden the student's training, at least one course chosen from the following: Mathematics 333L, 339J, 339U, 343L, 343M, 344K, 348, 358K, 361, 367K, 368K, 372K, 374M, 376C, 378K
7. Nine additional hours of upper-division mathematics.

### Major: Options in Mathematics for Middle Grades and Secondary School Teaching:

At least twenty-four semester hours of upper-division coursework in mathematics. Students must earn a grade of at least C- in each mathematics and science course required for the degree, and a grade point average in these courses of at least 2.00.

The teaching options are designed to give students the mathematical background appropriate for teaching middle grades and secondary school mathematics, but students must meet additional requirements, including grade point average requirements, to obtain certification. Lists of the combined requirements of the UTeach-Natural Sciences certification programs and these options are available from the UTeach-Natural Sciences academic adviser and in the *Undergraduate Catalog*.

All students must complete the following:

1. One of the following sequences:
  - a. Mathematics 408C and 408D
  - b. Mathematics 408N and 408S
  - c. Mathematics 408K and 408L

Mathematics 408N and 408S, or 408K and 408L, may substitute for 408C.

2. Mathematics 340L or 341
3. Mathematics 315C, 325K or 328K, 333L, 358K, and 362K
4. Mathematics [~~360M or~~] 375D
5. Mathematics 361K or 365C
6. Mathematics [~~328K,~~] 343K[~~;~~] or 373K

Students pursuing teacher certification through the UTeach-Natural Sciences program must also complete the following:

7. Biology 337 (Topic 2: *Research Methods: UTeach*), Chemistry 368 (Topic 2: *Research Methods—UTeach*), or Physics 341 (Topic 7: *Research Methods—UTeach*)
8. History 329U or Philosophy 329U
9. Eighteen semester hours of professional development coursework consisting of:
  - a. Curriculum and Instruction 650S
  - b. Curriculum and Instruction 365C or UTeach-Natural Sciences 350

- c. Curriculum and Instruction 365D or UTeach-Natural Sciences 355
  - d. Curriculum and Instruction 365E or UTeach-Natural Sciences 360
  - e. UTeach-Natural Sciences 101, 110, and 170
10. For students seeking middle grades certification, the following courses: Educational Psychology 363M (Topic 3: *Adolescent Development*), or Psychology 301 and 304; and Curriculum and Instruction 339E

To graduate and be recommended for certification, students who follow the teaching option must have a University grade point average of at least 2.50. They must earn a grade of at least C- in the supporting course in requirement 8 and in each of the professional development courses listed in requirement 9 and must pass the final teaching portfolio review; those seeking middle grades certification must also earn a grade of at least C- in each of the courses listed in requirement 10. For information about the portfolio review and additional teacher certification requirements, students should consult the UTeach-Natural Sciences academic adviser.

## Physics

### Major

Physics 301, 101L, 316, 116L, 315, 115L, 355, and at least fifteen semester hours of upper-division coursework in physics, including Physics 336K, 352K, and 353L.

~~[Additionally, students majoring in physics must complete Chemistry 301 or 301H, 302 or 302H, and 204.]~~

### ~~[First Minor for Physics Majors]~~

~~[Twelve semester hours of mathematics, of which six must be in upper-division coursework; the upper-division coursework must include three hours in differential equations.]~~

### ~~[Second Minor for Physics Majors]~~

~~[Six semester hours, of which three must be in upper-division coursework, in any one of the following: biology, chemistry, geological sciences, philosophy, psychology; or in courses offered in the College of Education or the Cockrell School of Engineering. Courses used to fulfill specific degree requirements other than the writing requirement may not also be used to fulfill this requirement.]~~

### Additional Coursework

Completion of the following:

1. Chemistry 301 or 301H, 302 or 301H, and 204.
2. One of the following courses containing differential equations: Mathematics 427K, 427J, and 372.
3. Nine additional hours of mathematics, including three upper-division hours.
4. Six hours of majors-level coursework, including three upper-division hours, in one of the following: biology, chemistry, philosophy, psychology; or in courses offered in the College of Education or the Cockrell School of Engineering. Courses used to fulfill specific degree requirements other than flag requirements may not also be used to fulfill this requirement.

Students must earn a grade of at least C- in each mathematics and science course required for the degree, and a University grade point average in these courses of at least 2.00.