

School of Natural Sciences and Mathematics

Physics (B.A., B.S.)

The science of physics seeks understanding of the behavior of matter and energy at the most general and fundamental level. The physicist is trained to explore the physical universe in which people live and seek interpretations of the natural phenomena found there. While much is known about the physical universe, many phenomena still remain to be investigated, understood, and exploited to the ultimate benefit of humankind. This is the challenge that a modern physicist faces.

Faculty

Cecil and Ida Green Chair in Physics: Roderick A. Heelis

Distinguished Chair in Physics: Myron B. Salamon

Green Distinguished Chair in Academic Leadership: B. Hobson Wildenthal

Professors: Phillip Anderson, Roy C. Chaney, Austin J. Cunningham, Robert Glosser, John H. Hoffman, Joseph M. Izen, Mark Lee, Xinchou Lou, Wolfgang A. Rindler, Robert H. Wallace (Electrical Engineering), Anvar A. Zakhidov

Associate Professors: Yuri Gartstein, Mustapha Ishak-Boushaki, Lindsay King, David Lary

Assistant Professors: Anton Malko, Jason Slinker

Senior Lecturers: Paul MacAlevey, Beatrice Rasmussen

Affiliated Faculty: Cyrus D. Cantrell (Engineering), John Ferraris (Chemistry), Wenchuang Hu (Engineering), Stephen Levene (Biology), Dean Sherry (Chemistry), Mary Urquhart (Science/Math Education), Du-Chuan Yang (Chemistry)

The Degrees

The student majoring in Physics must meet the general university requirements for admission and for the specific degree the student is seeking. The Physics Program offers both the Bachelor of Arts and the Bachelor of Science degrees.

Bachelor of Science

The Bachelor of Science is intended for students interested in a professional career in physics or closely related fields. It provides an excellent background for graduate programs in physics, biophysics, geophysics, engineering, medicine and other health related degree programs.

Bachelor of Arts

The Bachelor of Arts program provides an opportunity for a strong base in physics for students wishing to pursue graduate studies (non-physics) in, for example, business administration, economics, finance, oceanography, and patent or high technology law. Additionally, students seeking certification as high school teachers with physics as a major specialization and those seeking employment in industry, government service, and computer technology have the opportunity to obtain the necessary physics background through the B.A. program. The lower-division course requirements for the B.A. degree are the same as those for the B.S. degree. At the upper-division level, 15 semester credit hours of advanced physics courses are required with 15 semester credit hours of science electives.

UTeach Option

The [UTeach option](#) may be added to the BA degree in Physics. 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 preparing to enter graduate school and to work in discipline related industry.

Graduate Studies Track

The recommended course of study toward a Bachelor of Science degree for those students who intend to pursue graduate studies in Physics begins with a two-semester Honors sequence of fundamentals of physics that gives the student a more extensive foundation in basic physics. The remainder of the program is the same as the regular B.S. program. A total of 122 semester credit hours are required.

Algebra Based Physics

An algebra based general physics course ([PHYS 1301](#), 1302) with lab ([PHYS 2125](#), 2126) is offered for students interested in the health sciences and those curious about the physical world in which we live. It stresses understanding the workings of nature and the physical processes and phenomena occurring therein.

Minor in Physics (20 semester credit hours)

A minor is offered that consists of [PHYS 2325/2125](#) and [2326/2126](#), 3411, and three other upper-division physics courses.

Fast Track Baccalaureate/Master's Degrees

For students interested in pursuing graduate studies in physics, the Physics Department offers an accelerated B.S. / M.S. Fast Track that involves taking graduate courses in lieu of several advanced undergraduate courses. Acceptance into the Fast Track is based on the student's attaining a GPA of 3.000 on a minimum of 30 semester credit hours of upper-division courses that include [PHYS 3411](#), [3330](#), [3416](#) and [4311](#). Eligible students may take up to 15 semester credit hours of selected graduate courses that may be used to complete the baccalaureate degree and also satisfy requirements for the master's degree. These credits will partially satisfy the M.S. degree requirements when the student completes the B.S. degree. Interested students should contact their advisor during their junior year to the Fast Track program.

Bachelor of Arts in Physics

Degree Requirements (121 semester credit hours)

I. Core Curriculum Requirements¹: 42 semester credit hours

Communication (6 semester credit hours)

3 semester credit hours Communication ([RHET 1302](#))

3 semester credit hours Communication Elective ([NATS 4310](#), [PHYS 4390](#) or [PHYS 4399](#))

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 Behavioral 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](#) or [MATH 2417](#) and [MATH 2414](#) or [MATH 2418](#))

Science (9 semester credit hours)

8 semester credit hours Chemistry ([CHEM 1311/1111](#), [CHEM 1312/1112](#))³

1 semester credit hour Physics ([PHYS 2125](#))³

II. Major Requirements: 67 semester credit hours

Major Preparatory Courses (25 semester credit hours)

[MATH 2413](#) Differential Calculus

or [MATH 2417](#) Calculus I

[MATH 2414](#) Integral Calculus

or [MATH 2419](#) Calculus II²

[MATH 2415](#) Calculus of Several Variables

or [MATH 2451](#) Multivariable Calculus with Applications

[MATH 2418](#) Linear Algebra

[MATH 2420](#) Differential Equations with Applications⁴

[PHYS 1100](#) The Fun of Physics

[PHYS 2303](#) Contemporary Physics⁴

[PHYS 2325/2125](#)⁵ Mechanics with Laboratory⁴

or [PHYS 2421/2125](#) Honors Physics I - Mechanics and Heat with Laboratory⁴

[PHYS 2326/2126](#) Electromagnetism and Waves with Laboratory⁴

or [PHYS 2422/2126](#) Honors Physics II - Electromagnetism and Waves with Laboratory⁴

Major Core Courses (27 semester credit hours)

[PHYS 3125](#) Electronics Laboratory

[PHYS 3312](#) Classical Mechanics

[PHYS 3325](#) Electronics

[PHYS 3330](#) Numerical Methods in Physics and Computational Techniques

[PHYS 3411](#) Theoretical Physics

[PHYS 3416](#) Electricity and Magnetism

[PHYS 4311](#) Thermodynamics and Statistical Mechanics

[PHYS 4373](#) Physical Measurements Laboratory

PHYS XXXX Physics Elective

Major Related Courses (15 semester credit hours)

15 semester credit hours of upper division Science Electives

Advanced Writing⁵

[PHYS 4390](#) Senior Research and Advanced Writing

or [PHYS 4399](#) Senior Honors in Physics

or [NATS 4310](#) Advanced Writing in the Natural Sciences and Mathematics

or Summer Research Project

or COOP program with written final report

III. Elective Requirements: 12 semester credit hours

Advanced Electives (6 semester credit hours)

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

Free Electives (6 semester credit hours)

Both lower- and upper-division courses may count as electives, but the student must complete at least 51 semester credit hours of upper-division credit to qualify for graduation.

Physics Electives

[PHYS 3324](#) Scientific Computing

[PHYS 3317](#) Physics of the Human Body

[PHYS 3380](#) Astronomy

[PHYS 4301](#) Quantum Mechanics I

[PHYS 4302](#) Quantum Mechanics II

[PHYS 4352](#) Concepts of Modern Physics

[PHYS 4371](#) Solid State Physics

[PHYS 4381](#) Space Science

[PHYS 4383](#) Plasma Physics

[PHYS 4395](#) Cosmology

[PHYS 4386](#) Elementary Particle Physics

[PHYS 4V07](#) Senior Projects Laboratory

[PHYS 4V10](#) Special Topics in Physics

Other Courses

[PHYS 1101](#) College Physics Laboratory I

[PHYS 1102](#) College Physics Laboratory II

[PHYS 1301](#) College Physics I

Bachelor of Science in Physics

Degree Requirements (121 semester credit hours)

I. Core Curriculum Requirements¹: 42 semester credit hours

Communication (6 semester credit hours)

3 semester credit hours Communication ([RHET 1302](#))

3 semester credit hours Communication Elective ([NATS 4310](#), [PHYS 4390](#) or [PHYS 4399](#))

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 Behavioral 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](#) or [MATH 2417](#) and [MATH 2414](#) or [MATH 2415](#))

Science (9 semester credit hours)

8 semester credit hours Chemistry ([CHEM 1311/1111](#), [CHEM 1312/1112](#))³

1 semester credit hour Physics ([PHYS 2125](#))³

II. Major Requirements: 67 semester credit hours

Major Preparatory Courses (25 semester credit hours)

[MATH 2413](#) Differential Calculus

or [MATH 2417](#) Calculus I

[MATH 2414](#) Integral Calculus

or [MATH 2419](#) Calculus II

[MATH 2415](#) Calculus of Severable Variables

or [MATH 2451](#) Multivariable Calculus with Applications

[MATH 2418](#) Linear Algebra

[MATH 2420](#) Differential Equations with Applications⁴

[PHYS 1100](#) The Fun of Physics

[PHYS 2303](#) Contemporary Physics⁴

[PHYS 2325/2125](#)⁵ Mechanics with Laboratory⁴

or [PHYS 2421/2125](#) Honors Physics I - Mechanics with Laboratory⁴

[PHYS 2326/2126](#) Electromagnetism and Waves with Laboratory⁴

or [PHYS 2422/2126](#) Honors Physics II - Electromagnetism and Waves with Laboratory⁴

Major Core Courses (24 semester credit hours)

[PHYS 3125](#) Electronics Laboratory

[PHYS 3312](#) Classical Mechanics

[PHYS 3325](#) Electronics

[PHYS 3330](#) Numerical Methods in Physics and Computational Techniques

[PHYS 3411](#) Theoretical Physics

[PHYS 3416](#) Electricity and Magnetism

[PHYS 4311](#) Thermodynamics and Statistical Mechanics

[PHYS 4373](#) Physical Measurements Laboratory

Major Related Courses (18 semester credit hours)

[PHYS 4301](#) Quantum Mechanics I

[PHYS 4302](#) Quantum Mechanics II

[PHYS 4328](#) Optics

[PHYS 4352](#) Concepts of Modern Physics

6 semester credit hours Physics Electives

Advanced Writing (fulfills 3 semester credit hours of Core Communications requirement)⁵

[PHYS 4390](#) Senior Research and Advanced Writing

or [PHYS 4399](#) Senior Honors in Physics

or [NATS 4310](#) Advanced Writing in the Natural Sciences and Mathematics

or Summer Research Project

or COOP program with written final report

III. Elective Requirements: 12 semester credit hours

Advanced Electives (6 semester credit hours)

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

Free Electives (6 semester credit hours)

Both lower- and upper-division courses may count as electives, but the student must complete at least 51 semester credit hours of upper-division credit to qualify for graduation.

Physics Electives

[PHYS 3324](#) Scientific Computing

[PHYS 3345](#) Physics of the Human Body

[PHYS 3380](#) Astronomy

[PHYS 4385](#) Cosmology

[PHYS 4386](#) Elementary Particle Physics

[PHYS 4371](#) Solid State Physics

[PHYS 4381](#) Space Science

[PHYS 4383](#) Plasma Physics

[PHYS 4V07](#) Senior Projects Laboratory

[PHYS 4V10](#) Special Topics in Physics

Other Courses

[PHYS 1101](#) College Physics Laboratory I

[PHYS 1102](#) College Physics Laboratory II

[PHYS 1301](#) College Physics I

[PHYS 1302](#) College Physics II

Bachelor of Arts in Physics with UTeach Option

Degree Requirements (124-126 semester credit hours)

I. Core Curriculum Requirements¹: 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](#))

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 Behavioral 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](#))^{3, 6}

Science (9 semester credit hours)

8 semester credit hours Chemistry ([CHEM 1311/1111](#), [CHEM 1312/1112](#))³

1 semester credit hour Physics ([PHYS 2125](#))³

II. Major Requirements: 67-69 semester credit hours

Major Preparatory Courses (25-27 semester credit hours beyond core curriculum)

[MATH 2413](#) Differential Calculus

or [MATH 2417](#) Calculus I

[MATH 2414](#) Integral Calculus⁶

or [MATH 2419](#) Calculus II

[MATH 2415](#) Calculus of Several Variables

or [MATH 2451](#) Multivariable Calculus with Applications

[MATH 2418](#) Linear Algebra⁴

[MATH 2420](#) Differential Equations with Applications⁴

[PHYS 1100](#) The Fun of Physics

[PHYS 2303](#) Contemporary Physics⁴

[PHYS 2325/2125](#) Mechanics with Laboratory⁴

or [PHYS 2421/2125](#) Honors Physics I - Mechanics and Heat with Laboratory⁴

[PHYS 2326](#)/2126 Electromagnetism and Waves with Laboratory⁴

or [PHYS 2422](#)/2126 Honors Physics II - Electromagnetism and Waves with Laboratory⁴

Major Core Courses (27 semester credit hours)

[PHYS 3125](#) Electronics Laboratory

[PHYS 3411](#) Theoretical Physics

[PHYS 3312](#) Classical Mechanics

[PHYS 3325](#) Electronics

[PHYS 3330](#) Numerical Methods in Physics and Computational Techniques

[PHYS 3416](#) Electricity and Magnetism

[PHYS 4311](#) Thermodynamics and Statistical Mechanics

[PHYS 4373](#) Physical Measurements Laboratory

PHYS Elective

Major Related Courses (15 semester credit hours)

15 semester credit hours of upper division Science Electives

[NATS 4694](#)/4696 UTeach Student Teaching can fulfill 6 of these semester credit hours.

III. Elective Requirements: 15 semester credit hours

Advanced Electives (6 semester credit hours)

All students are required to take at least six semester credit hours of advanced electives in their major field of study. These must be either upper-division classes or lower-division classes that have prerequisites. UTeach courses can be used to fulfill these requirements.

UTeach Requirements (9 semester credit hours beyond core curriculum, science electives, and advanced electives)

[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 Methods⁷

[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 Mathematics⁸

NATS 4141 UTeach Student Teaching Seminar

Both lower- and upper-division courses may count as electives, but the student must complete at least 51 semester credit hours of upper-division credit to qualify for graduation.

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. Two semester credit hours of Calculus are counted as Major Preparatory credit; six semester credit hours are counted in Core Curriculum. Students may choose either calculus sequence MATH 2413, 2414, and 2415 or MATH 2417, 2419 and 2451.
3. Required preparatory coursework.
4. Indicates a prerequisite class to be completed before enrolling for upper-division classes.
5. Counted in Core Curriculum
6. Two semester credit hours of Calculus are counted as Major Preparatory credit; six semester credit hours are counted in Core Curriculum.
7. NATS 4390/4399 fulfills Core Communication requirement.
8. Counts as 6 semester credit hours of Science Electives Both lower- and upper-division courses may count as electives, but the student must complete at least 51 semester credit hours of upper-division credit to qualify for graduation.

Updated: April 6, 2014 - Visitor: 1115