

Physics

Overview

The Folsom Lake College physics program offers an array of transferable courses that fulfill both major and general education requirements. The physics program consists of a three semester calculus-based physics sequence and a two semester trigonometry-based sequence. These sequences are designed to meet transfer requirements for students in the physical and life sciences, engineering, architecture, and computer information science. A preparatory physics course is also offered.

The PHYS 310 and PHYS 312 classes are meant to give liberal arts students a comprehensive breadth of the field of physics and a hands-on learning experience. Both courses are an excellent way for liberal arts students to gain an appreciation of scientific knowledge and methods.

PHYS 311 is a preparatory class for prospective PHYS 350 and PHYS 411 students who have the required math, but lack physics and problem solving skills needed for success in future physics classes.



Career Options

Calculus-Based Physics

- Architect
- Astronomer
- Chemist
- Computer Scientist
- Engineer
- Geologist
- Meteorologist
- Oceanographer
- Physical Scientist
- Physicist

Trigonometry-Based Physics

- Allied Health
- Life Science Fields
- Pre-Med

Highlights

- Modern and well-equipped laboratories
- Small class size

Program Maps

[Science, Technology, Engineering, and Mathematics Undecided Major \(/fkc/main/doc/instruction/program-maps/STEM-Undecided-major.pdf\)](/fkc/main/doc/instruction/program-maps/STEM-Undecided-major.pdf)

[Physics, A.S.-T Degree \(/fkc/main/doc/instruction/program-maps/Physics-AST.pdf\)](/fkc/main/doc/instruction/program-maps/Physics-AST.pdf)

[Interdisciplinary Studies: Math and Science, A.A. Degree \(/fkc/main/doc/instruction/program-maps/IS-Math-Science.pdf\)](/fkc/main/doc/instruction/program-maps/IS-Math-Science.pdf)

Dean [Greg McCormac \(/about-us/contact-us/faculty-and-staff-directory/greg-mccormac\)](/about-us/contact-us/faculty-and-staff-directory/greg-mccormac)

Department Chair [Daniel Hale \(/about-us/contact-us/faculty-and-staff-directory/daniel-hale\)](/about-us/contact-us/faculty-and-staff-directory/daniel-hale)

Meta-Major [Science, Technology, Engineering, and Mathematics \(/academics/meta-majors/science-technology-engineering-and-mathematics\)](/academics/meta-majors/science-technology-engineering-and-mathematics)

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Associate Degrees for Transfer

A.S.-T. in Physics

The Associate in Science in Physics for Transfer Degree program provides students with a major that fulfills the general requirements for transfer to the California State University. Students with this degree will receive priority admission with junior status to the California State University system. Students should work closely with their Folsom Lake College counselor to ensure that they are taking the appropriate coursework to prepare for majoring in Physics at the institution they wish to transfer to because major and general education requirements may vary for each CSU and the degree may only transfer to specific institutions.

This program has the following completion requirements:

- (1) Completion of 60 semester units or 90 quarter units that are eligible for transfer to the California State University, including both of the following:
 - (A) The Intersegmental General Education Transfer Curriculum (IGETC) or the California State University General Education – Breadth Requirements.
 - (B) A minimum of 18 semester units or 27 quarter units in a major or area of emphasis, as determined by the community college district.
- (2) Obtainment of a minimum grade point average of 2.0.

ADTs also require that students must earn a C or better in all courses required for the major or area of emphasis.

Catalog Date: June 1, 2020

Degree Requirements

COURSE CODE	COURSE TITLE	UNITS
PHYS 411	Mechanics of Solids and Fluids	4
PHYS 421	Electricity and Magnetism	4
PHYS 431	Heat, Waves, Light and Modern Physics	4
MATH 400	Calculus I	5
MATH 401	Calculus II	5
MATH 402	Calculus III	5
Total Units:		27

The Associate in Science in Physics for Transfer (AS-T) degree may be obtained by completion of 60 transferable, semester units with a minimum 2.0 GPA, including (a) the major or area of emphasis described in the Required Program, and (b) either the Intersegmental General Education Transfer Curriculum (IGETC) or the California State University General Education-Breadth Requirements.

Student Learning Outcomes

Upon completion of this program, the student will be able to:

- recall fundamental principles and basic definitions from the topics of physics.
- solve conceptual problems from the topics of physics.
- solve calculus, trigonometry and algebra based problems from the topics of physics and clearly communicate steps taken in the solution.
- analyze experimental data from the topics of physics.

Associate Degrees

A.A. in Interdisciplinary Studies: Math and Science

The Interdisciplinary Studies degree is designed for students who wish to obtain a broad knowledge of arts and sciences plus additional coursework in a prescribed "Area of Emphasis". This program is a good choice for students planning on transferring to the California State University or University of California. The student will be able to satisfy general education requirements, plus focus on transferable course work that relates to a specific major and/or individual interest. This degree will have an "Area of Emphasis" in Math and Science. These courses emphasize the natural sciences which examine the physical universe, its life forms and its natural phenomena. Courses in math emphasize the development of mathematical and quantitative reasoning skills beyond the level of intermediate algebra. Students will be able to demonstrate an understanding of the methodologies of science as investigative tools. Students will also examine the influence that the acquisition of scientific knowledge has on the development of the world's civilizations. Possible majors at a four-year institution include, but are not limited to: mathematics, biology, chemistry, and physical science.

It is highly recommended that students consult a counselor to determine the classes within each area that will best prepare them for their intended transfer major.

Catalog Date: June 1, 2020

Degree Requirements

COURSE CODE	COURSE TITLE	UNITS
A minimum of 18 units from the following:		18
You must select courses from at least three different disciplines and complete courses from both math and science. If a course is cross-listed with another on the list, only one may apply to the degree.		
ANTH 300	Biological Anthropology (3)	
ANTH 301	Biological Anthropology Laboratory (1)	
ANTH 303	Introduction to Forensic Anthropology (3)	
ASTR 300	Introduction to Astronomy (3)	
ASTR 400	Astronomy Laboratory (1)	
BIOL 300	The Foundations of Biology (3)	
BIOL 307	Biology of Organisms (4)	
BIOL 310	General Biology (4)	
BIOL 323	Plants and People (4)	
BIOL 350	Environmental Biology (3)	
BIOL 400	Principles of Biology (5)	
BIOL 410	Principles of Botany (5)	
BIOL 420	Principles of Zoology (5)	
BIOL 430	Anatomy and Physiology (5)	
BIOL 431	Anatomy and Physiology (5)	
BIOL 440	General Microbiology (4)	
BIOL 442	General Microbiology and Public Health (5)	
CHEM 305	Introduction to Chemistry (5)	
CHEM 306	Introduction to Organic and Biological Chemistry (5)	
CHEM 400	General Chemistry I (5)	
CHEM 401	General Chemistry II (5)	
CHEM 410	Quantitative Analysis (5)	
CHEM 420	Organic Chemistry I (5)	
CHEM 421	Organic Chemistry II (5)	
GEOG 300	Physical Geography: Exploring Earth's Environmental Systems (3)	
GEOG 301	Physical Geography Laboratory (1)	
GEOG 306	Weather and Climate (3)	
GEOL 300	Physical Geology (3)	
GEOL 301	Physical Geology Laboratory (1)	
GEOL 305	Earth Science (3)	
GEOL 306	Earth Science Laboratory (1)	
GEOL 310	Historical Geology (3)	
GEOL 311	Historical Geology Laboratory (1)	
GEOL 330	Introduction to Oceanography (3)	
GEOL 345	Geology of California (3)	
MATH 300	Introduction to Mathematical Ideas (3)	
MATH 310	Mathematical Discovery (3)	
MATH 335	Trigonometry with College Algebra (5)	
MATH 341	Calculus for Business and Economics (4)	
MATH 343	Modern Business Mathematics (4)	
MATH 355	Calculus for Biology and Medicine I (4)	
MATH 356	Calculus for Biology and Medicine II (4)	
MATH 370	Pre-Calculus Mathematics (5)	
MATH 400	Calculus I (5)	
MATH 401	Calculus II (5)	
MATH 402	Calculus III (5)	
MATH 410	Introduction to Linear Algebra (3)	
MATH 420	Differential Equations (4)	
NUTRI 300	Nutrition (3)	

COURSE CODE	COURSE TITLE	UNITS
NUTRI 340	Nutrition and Metabolism (3)	
PHYS 310	Conceptual Physics (3)	
PHYS 311	Basic Physics (3)	
PHYS 350	General Physics (4)	
PHYS 360	General Physics (4)	
PHYS 411	Mechanics of Solids and Fluids (4)	
PHYS 421	Electricity and Magnetism (4)	
PHYS 431	Heat, Waves, Light and Modern Physics (4)	
PS 302	Introduction to Physical Science (4)	
PSYC 312	Biological Psychology (4)	
PSYC 330	Introductory Statistics for the Behavioral Sciences (3)	
STAT 300	Introduction to Probability and Statistics (4)	
Total Units:		18

The Interdisciplinary Studies: Math and Science Associate in Arts (A.A.) degree may be obtained by completion of the required program, plus general education requirements, plus sufficient electives to meet a 60-unit total. See FLC graduation requirements.

Student Learning Outcomes

Upon completion of this program, the student will be able to:

- reason quantitatively and empirically (Math and Science).

Physics (PHYS) Courses

PHYS 310 Conceptual Physics

Units:	3
Hours:	54 hours LEC
Prerequisite:	None.
Advisory:	ENGRD 110 and MATH 100
Transferable:	CSU; UC (UC credit limitation: PHYS 310 and 311 combined: maximum credit, one course. No credit for PHYS 310 or PHYS 311 if taken after PHYS 350, PHYS 360, PHYS 411, PHYS 421 or PHYS 431 No credit for PHYS 310 or 311 if taken after PHYS 350, 360, 411, 421 or 431)
General Education:	AA/AS Area IV; CSU Area B1; IGETC Area 5A
Catalog Date:	June 1, 2020

This course provides a conceptual overview of Newtonian and modern physics for non-science students. The conceptual or non-mathematical approach to physics is tied to the student's personal experience in their everyday life. The student learns to see physics not as a classroom or laboratory activity, but as a part of his or her surroundings. The class is open to all students with no previous physics course.

Student Learning Outcomes

Upon completion of this course, the student will be able to:

- provide the non-science major with a coherent concept of physical reality by the introduction of the central ideas, principles, and relationships of physics and relating them to everyday experience.
- provide a stimulating intellectual experience which can promote interest and motivation for continued inquiry into science, its methods, and value to modern society.
- bolster scientific understanding using the scientific method, deduction and application to the physical world.

PHYS 311 Basic Physics

Units:	3
Hours:	54 hours LEC
Prerequisite:	MATH 335 with a grade of "C" or better; or a high school course in trigonometry with a grade of "C" or better
Transferable:	CSU; UC (UC credit limitation: PHYS 310 and 311 combined: maximum credit, one course. No credit for PHYS 310 or PHYS 311 if taken after PHYS 350, PHYS 360, PHYS 411, PHYS 421 or PHYS 431 No credit for PHYS 310 or 311 if taken after PHYS 350, 360, 411, 421 or 431)
General Education:	AA/AS Area IV; CSU Area B1; IGETC Area 5A
Catalog Date:	June 1, 2020

This course is a survey course for science, engineering, mathematics, architecture, and computer science majors who have had no previous physics courses and plan to continue with PHYS 350 or 411. The course will develop the math and science background and the problem-solving skills necessary for success in Physics 350 or 411. Material covered will include math review, vectors, and basic mechanics (kinematics, Newton's Laws, and energy).

Student Learning Outcomes

Upon completion of this course, the student will be able to:

- describe fundamental principles and basic definitions in classical mechanics.
- solve conceptual problems in classical mechanics.
- solve trigonometry and algebra-based problems in classical mechanics and clearly communicate steps taken in the solution.
- solve problems with vector decomposition and recombination.
- lay out the scientific method and its application to physics and physics problems.

PHYS 312 Conceptual Physics Laboratory

Units:	1
Hours:	54 hours LAB
Prerequisite:	None.
Corequisite:	PHYS 310
Advisory:	MATH 100 with a grade of "C" or better
Transferable:	CSU; UC
General Education:	CSU Area B3; IGETC Area 5C
Catalog Date:	June 1, 2020

This laboratory course provides hands-on observation activities and interpretation of data in a variety of experimental situations. Topics include motion, sound, light, heat, electricity, and magnetism.

Student Learning Outcomes

Upon completion of this course, the student will be able to:

- collect, analyze, and present experimental data.
- tabulate, graph, and interpret various experimental measurements and calculated results.
- apply dimensions and units correctly for various physical quantities.
- use instruments such as a protractor, mass balance, timer, ammeter, and voltmeter.
- write a well organized and complete lab report.

PHYS 350 General Physics

Units:	4
Hours:	54 hours LEC; 54 hours LAB
Prerequisite:	MATH 335 with a grade of "C" or better; or a high school course in trigonometry with a grade of "C" or better.
Transferable:	CSU; UC (UC credit limitation: PHYS 350, 360 and 411, 421, 431 combined: maximum credit, one series)
General Education:	AA/AS Area IV; CSU Area B1; CSU Area B3; IGETC Area 5A; IGETC Area 5C
C-ID:	C-ID PHYS 105; Part of C-ID PHYS 100S
Catalog Date:	June 1, 2020

This is the first course of the trigonometry-based general physics sequence designed for life science majors. Topics will include classical mechanics, fluids, mechanical waves and thermodynamics.

Student Learning Outcomes

Upon completion of this course, the student will be able to:

- understand and apply fundamental principles and basic definitions in classical mechanics, fluids, mechanical waves and thermodynamics.
- solve conceptual problems in classical mechanics, fluids, mechanical waves and thermodynamics.
- solve trigonometry and algebra based problems in classical mechanics, fluids, mechanical waves and thermodynamics and clearly communicate steps taken in the solution.
- analyze experimental data in classical mechanics, fluids, mechanical waves and thermodynamics.

PHYS 360 General Physics

Units:	4
Hours:	54 hours LEC; 54 hours LAB
Prerequisite:	PHYS 350 with a grade of "C" or better
Transferable:	CSU; UC (UC credit limitation: PHYS 350, 360 and 411, 421, 431 combined: maximum credit, one series)
General Education:	CSU Area B1; CSU Area B3; IGETC Area 5A; IGETC Area 5C
C-ID:	C-ID PHYS 110; Part of C-ID PHYS 100S
Catalog Date:	June 1, 2020

This is the second course of the trigonometry-based general physics sequence designed for life science majors. Topics will include classical electricity and magnetism, AC and DC circuits, electromagnetism, optics, wave theory and modern physics.

Student Learning Outcomes

Upon completion of this course, the student will be able to:

- understand and apply fundamental principles and basic definitions in classical electricity and magnetism, AC and DC circuits, electromagnetism, optics, wave theory and modern physics.
- solve conceptual problems in classical electricity and magnetism, AC and DC circuits, electromagnetism, optics, wave theory and modern physics.
- solve trigonometry- and algebra-based problems in classical electricity and magnetism, AC and DC circuits, electromagnetism, optics, wave theory and modern physics and clearly communicate steps taken in the solution.
- analyze experimental data in classical electricity and magnetism, AC and DC circuits, electromagnetism, optics, wave theory and modern physics.

PHYS 411 Mechanics of Solids and Fluids

Units:	4
Hours:	54 hours LEC; 54 hours LAB

Prerequisite:	MATH 400 with a grade of "C" or better; See Corequisite
Corequisite:	MATH 401. May be taken previously with a grade of "C" or better.
Transferable:	CSU; UC (UC credit limitation: PHYS 350, 360 and 411, 421, 431 combined: maximum credit, one series)
General Education:	AA/AS Area IV; CSU Area B1; CSU Area B3; IGETC Area 5A; IGETC Area 5C
C-ID:	C-ID PHYS 205; Part of C-ID PHYS 200S
Catalog Date:	June 1, 2020

This is the first course of the calculus-based physics sequence designed for students studying engineering, physics, chemistry, architecture, and computer science. This course offers a detailed examination of topics from the mechanics of particles, rigid bodies and fluids.

Student Learning Outcomes

Upon completion of this course, the student will be able to:

- understand and apply fundamental principles and basic definitions from the mechanics of particles, rigid bodies and fluids.
- solve conceptual problems in the mechanics of particles, rigid bodies and fluids.
- solve calculus, trigonometry and algebra-based problems in the mechanics of particles, rigid bodies and fluids and clearly communicate steps taken in the solution.
- analyze experimental data in the mechanics of particles, rigid bodies and fluids.

PHYS 412 Mechanics of Solids and Fluids: Problem Solving

Units:	1
Hours:	18 hours LEC
Prerequisite:	None.
Corequisite:	PHYS 411
Transferable:	CSU
Catalog Date:	June 1, 2020

This will be a one unit discussion and application class devised to accompany PHYS411. This class will meet one hour a week to specifically work on problems and problem solving methods for Mechanics of Solids and Fluids.

Student Learning Outcomes

Upon completion of this course, the student will be able to:

- test the validity of a hypothesis using the scientific method.
- identify the basic physical principles that apply in a particular situation (such as Newton's laws, energy conservation and momentum conservation).
- identify the basic physical principles that apply in a particular situation (such as Newton's laws, energy conservation and momentum conservation).
- solve problems requiring the application of physics and mathematics up through calculus.
- interpret the results of physics calculations.
- define common physics terms and physical laws.

PHYS 421 Electricity and Magnetism

Units:	4
Hours:	54 hours LEC; 54 hours LAB
Prerequisite:	MATH 401 and PHYS 411 with grades of "C" or better
Transferable:	CSU; UC (UC credit limitation: PHYS 350, 360 and 411, 421, 431 combined: maximum credit, one series)
General Education:	CSU Area B1; CSU Area B3; IGETC Area 5A; IGETC Area 5C
C-ID:	C-ID PHYS 210; Part of C-ID PHYS 200S
Catalog Date:	June 1, 2020

This is the second course of the calculus-based physics sequence designed for students studying engineering, physics, chemistry, architecture, and computer science. This course offers a detailed examination of topics from electricity and magnetism.

Student Learning Outcomes

Upon completion of this course, the student will be able to:

- understand and apply fundamental principles and basic definitions from electricity and magnetism.
- solve conceptual problems in electricity and magnetism.
- solve calculus, trigonometry- and algebra-based problems in electricity and magnetism and clearly communicate steps taken in the solution.
- analyze experimental data in electricity and magnetism.

PHYS 422 Electricity and Magnetism: Problem Solving

Units:	1
Hours:	18 hours LEC
Prerequisite:	MATH 401 and PHYS 411 with grades of "C" or better
Corequisite:	PHYS 421
Transferable:	CSU
Catalog Date:	June 1, 2020

This is a discussion and applications class devised to accompany PHYS 421. This class will meet one hour a week to specifically work on problems and problem solving methods for PHYS 421: Electricity and Magnetism.

Student Learning Outcomes

Upon completion of this course, the student will be able to:

- apply fundamental principles and basic definitions from electricity and magnetism and solve problems in this area.
- solve conceptual problems in electricity and magnetism.
- solve calculus, trigonometry- and algebra-based problems in electricity and magnetism and clearly communicate steps taken in the solution.

PHYS 431 Heat, Waves, Light and Modern Physics

Units:	4
Hours:	54 hours LEC; 54 hours LAB
Prerequisite:	MATH 401 and PHYS 411 with grades of "C" or better
Transferable:	CSU; UC (UC credit limitation: PHYS 350, 360 and 411, 421, 431 combined: maximum credit, one series)
General Education:	CSU Area B1; CSU Area B3; IGETC Area 5A; IGETC Area 5C
C-ID:	C-ID PHYS 215; Part of C-ID PHYS 200S
Catalog Date:	June 1, 2020

This is the third course of the calculus-based physics sequence designed for students studying engineering, physics, chemistry, architecture, and computer science. This course offers a detailed examination of topics from thermodynamics, waves, optics, and modern physics.

Student Learning Outcomes

Upon completion of this course, the student will be able to:

- understand and apply fundamental principles and basic definitions from thermodynamics, waves, optics, and modern physics.
- solve conceptual problems in thermodynamics, waves, optics, and modern physics.
- solve calculus, trigonometry and algebra-based problems in thermodynamics, waves, optics, and modern physics and clearly communicate steps taken in the solution.
- analyze experimental data in thermodynamics, waves, optics, and modern physics.

PHYS 432 Heat, Waves, Light and Modern Physics: Problem Solving

Units:	1
Hours:	18 hours LEC
Prerequisite:	MATH 401 and PHYS 411 with grades of "C" or better
Corequisite:	PHYS 431
Transferable:	CSU
Catalog Date:	June 1, 2020

This is a discussion and application class devised to accompany PHYS 431. This class will meet one hour a week to specifically work on problems and problem solving methods for Heat, Waves, Light and Modern Physics.

Student Learning Outcomes

Upon completion of this course, the student will be able to:

- understand and apply fundamental principles and basic definitions from thermodynamics, waves, optics, and modern physics.
- solve conceptual problems in thermodynamics, waves, optics, and modern physics.
- solve calculus, trigonometry and algebra-based problems in thermodynamics, waves, optics, and modern physics and clearly communicate steps taken in the solution.

PHYS 495 Independent Studies in Physics

Units:	1 - 3
Hours:	54 - 162 hours LAB
Prerequisite:	None.
Transferable:	CSU
Catalog Date:	June 1, 2020

This course offers a student or a small group of students the opportunity to study areas of physics that go beyond what is normally covered in physics department courses. It is meant to be an extension of a particular topic of a specific physics department course, and so to be eligible, students must have completed a physics course at Folsom Lake College. They must also gain approval from a department faculty member for the topic of study.

Student Learning Outcomes

Upon completion of this course, the student will be able to:

- demonstrate an understanding of the fundamental principles and basic definitions in the area of study.
- demonstrate the ability to solve conceptual problems in the the area of study.
- demonstrate the ability to solve problems of the appropriate mathematical level in the area of study.

PHYS 499 Experimental Offering in Physics

Units: 0.5 - 4
Prerequisite: None.
Transferable: CSU
Catalog Date: June 1, 2020

Faculty

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Science, Technology, Engineering, and Mathematics

[\(/academics/meta-majors\)](#)

This program is part of the Science, Technology, Engineering, and Mathematics meta-major.

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