PHYSICS (PHYS)

PHYS A110 **3 Units (54 lecture hours)**
Conceptual Physics
Advisory: Successful completion of a course at the level of beginning algebra or Appropriate OCC math placement.

Grading Mode: Standard Letter, Pass/No Pass
Transfer Credit: CSU; UC: Credit Limitation: No credit for PHYS A110, PHYS A111 if taken after PHYS A120, PHYS A130 or PHYS A185.

A brief, but complete presentation of the fundamental phenomena and laws in physics, with experimental illustrations, enhancing the development of conceptual scientific thinking. This course may also be offered online. Graded or Pass/No Pass option.

PHYS A111 **1 Unit (54 lab hours)**
Introductory Physics Laboratory
Prerequisite(s): PHYS A110 or concurrent enrollment.

Grading Mode: Standard Letter, Pass/No Pass
Transfer Credit: CSU; UC: Credit Limitation: No credit for PHYS A110, PHYS A111 if taken after PHYS A120, PHYS A130 or PHYS A185.

Introductory physics laboratory to complement PHYS A110. Not open to those who hold credit for any other physics laboratory course. Graded or Pass/No Pass option.

PHYS A120 **4 Units (54 lecture hours; 54 lab hours)**
Algebra-Based Physics 1: Mechanics with Lab
Prerequisite(s): MATH A120, prior completion of a course covering Trigonometry (

Grading Mode: Standard Letter, Pass/No Pass
Transfer Credit: CSU; UC: Credit Limitation: PHYS A120, PHYS A125, PHYS A130, PHYS A135 and PHYS A185, PHYS A280, PHYS A285 combined: maximum credit, 1 series.

The first semester of a two-semester sequence with lab (PHYS A120/A125) covering an algebra/trigonometry-based study of all topics in basic physics. Core topics for this first semester include: classical mechanics, including waves and fluids, and thermodynamics. Intended for CSU transfer biology majors as well as students needing a one-year sequence in algebra/trigonometry-based physics as a requirement for their major program. Students needing calculus-based physics (e.g. UC transfer biology majors) should enroll in the PHYS A130/A135 or PHYS A185/A280/A285 sequence. Graded or Pass/No Pass option. **C-ID:** PHYS 105.

PHYS A125 **4 Units (54 lecture hours; 54 lab hours)**
Algebra-Based Physics 2: Electricity/Magnetism with Lab
Prerequisite(s): PHYS A120.

Grading Mode: Standard Letter, Pass/No Pass
Transfer Credit: CSU; UC: Credit Limitation: PHYS A120, PHYS A125, PHYS A130, PHYS A135 and PHYS A185, PHYS A280, PHYS A285 combined: maximum credit, 1 series.

The second semester of a two-semester sequence with lab (PHYS A120/A125) covering an algebra/trigonometry-based study of all topics in basic physics. Core topics for this second semester include: electromagnetism, optics, and modern physics. Graded or Pass/No Pass option. **C-ID:** PHYS 110.

PHYS A130 **4 Units (72 lecture hours; 54 lab hours)**
University Physics 1 (non-majors)
Prerequisite(s): MATH A185, MATH A185H, or MATH A182H.

Grading Mode: Standard Letter
Transfer Credit: CSU; UC: Credit Limitation: PHYS A120, PHYS A125, PHYS A130, PHYS A135 and PHYS A185, PHYS A280, PHYS A285 combined: maximum credit, 1 series.

A study of general principles of mechanics, waves, and thermodynamics. Emphasis will be on Newton's three laws of motion, theory of gravity, conservation laws, laws of thermodynamics, generation and propagation of mechanical waves. The first semester of a two-semester sequence (with Physics A135) requiring calculus.

PHYS A135 **4 Units (72 lecture hours; 54 lab hours)**
University Physics 2 (non-majors)
Prerequisite(s): PHYS A130; and MATH A182H, or MATH A185 or MATH A185H.

Grading Mode: Standard Letter
Transfer Credit: CSU; UC: Credit Limitation: PHYS A120, PHYS A125, PHYS A130, PHYS A135 and PHYS A185, PHYS A280, PHYS A285 combined: maximum credit, 1 series.

A study of general principles of electricity, electromagnetism, optics, theory of relativity, and quantum theory with applications to atoms, nuclei and elementary particles.

PHYS A185 **4 Units (72 lecture hours; 54 lab hours)**
Calculus Based Physics: Mechanics
Prerequisite(s): MATH A180 or MATH A180H, and MATH A185 or MATH A185H or concurrent enrollment; or MATH A182H or concurrent enrollment or appropriate OCC placement.

Advisory: One year of high school physics or a semester of college physics.

Grading Mode: Standard Letter
Transfer Credit: CSU; UC: Credit Limitation: PHYS A120, PHYS A125, PHYS A130, PHYS A135 and PHYS A185, PHYS A280, PHYS A285 combined: maximum credit, 1 series.

The PHYS A185, PHYS A280, PHYS A285 sequence is required for students planning to major in physics, chemistry or engineering. Newton's laws of motion, dynamics of particles in a given force field. gravitation, conservation laws of energy, momentum, angular momentum, and the kinematics of rigid body rotation. Propagation of mechanical waves in different elastic medium, waves on the string, water waves, sound waves. **C-ID:** PHYS 205.

PHYS A185H 4 Units (72 lecture hours; 54 lab hours; 0 other hours)
Calculus-Based Physics: Mechanics Honors
Prerequisite(s): MATH A180 or MATH A180H, and MATH A185 or MATH A185H or concurrent enrollment; or MATH A182H or concurrent enrollment.

Advisory: One year of high school physics or a semester of college physics.

Grading Mode: Standard Letter
Transfer Credit: CSU; UC: Credit Limitation: PHYS A120, PHYS A125, PHYS A130, PHYS A135 and PHYS A185, PHYS A280, PHYS A285 combined: maximum credit, 1 series.

The PHYS A185, PHYS A280, PHYS A285 sequence is required for students planning to major in physics, chemistry or engineering. Newton's laws of motion, dynamics, gravitation, energy, momentum, angular momentum, the kinematics of rigid body rotation, fluids, oscillations and waves. **C-ID:** PHYS 205.

PHYS A280 4 Units (72 lecture hours; 54 lab hours)
Calculus Based Physics: Electricity/Magnetism
Prerequisite(s): PHYS A185; and Calculus 1 and 2 completed as MATH A182H only or both MATH A180 or MATH A180H and MATH A185 or MATH A185H or appropriate OCC placement.

Grading Mode: Standard Letter
Transfer Credit: CSU; UC: Credit Limitation: PHYS A120, PHYS A125, PHYS A130, PHYS A135 and PHYS A185, PHYS A280, PHYS A285 combined: maximum credit, 1 series.

Continuation of PHYS A185. Coulomb’s law, electrostatics fields, conductors and insulators. Gauss’s law and electromagnetic fields. Magnetic fields and Ampere’s law. Faraday’s law of induction and Maxwell’s equations of electromagnetic fields. Electromagnetic energy transfer by means of cables, transmission lines and transparent media. Four hours lecture, three hours laboratory. **C-ID:** PHYS 210.

PHYS A285 4 Units (72 lecture hours; 54 lab hours)
Calculus Based Physics: Modern
Prerequisite(s): PHYS A185.

Grading Mode: Standard Letter
Transfer Credit: CSU; UC: Credit Limitation: PHYS A120, PHYS A125, PHYS A130, PHYS A135 and PHYS A185, PHYS A280, PHYS A285 combined: maximum credit, 1 series.

Heat, Light, Modern Physics. The dynamics of the transformation of thermal energy into mechanical work, heat engines, heat pumps and refrigerators. Light laws viewed in terms of geometric optics and physical optics. The relevance of special theory of relativity to modern physics. Introduction to quantum mechanics. **C-ID:** PHYS 215.