

Table of Contents

LaGrange College.....	1
Course Catalog - Physics.....	1
Minor in Physics - Minor in Physics.....	1
PHYS 1101 - Introductory Physics I.....	2
PHYS 1102 - Introductory Physics II.....	2
PHYS 2121 - General Physics I.....	2
PHYS 2122 - General Physics II.....	3
PHYS 3201 - Introduction to Modern Physics.....	3
PHYS 3302 - Introduction to Quantum Mechanics.....	4
PHYS 3401 - Classical Mechanics.....	4
PHYS 3411 - Thermal Physics.....	5
PHYS 3501 - Electromagnetic Theory.....	5

LaGrange College

Course Catalog - Physics

Minor in Physics - Minor in Physics

Type:Minor

LaGrange College offers a minor in Physics, which will help prepare students for a career in industry, data analysis, engineering, biomechanics, medicine, and virtually any other field. Physics is all about solving problems, often in a creative way, and this skill is valuable for any vocation. Studying physics trains students to think creatively and approach problems from different perspectives, and it often instills a sense of appreciation in understanding how exquisitely the universe works. There is also an opportunity to do undergraduate research as a part of Introduction to Modern Physics.

A minor in Physics requires at least 14 semester hours, with at least a C average.

The required courses include

- [PHYS 2121](#) General Physics I (4 semester hours)
- [PHYS 2122](#) General Physics II (4 semester hours)

and at least 2 of the following:

- [PHYS 3201](#) Introduction to Modern Physics (4 semester hours)
- [PHYS 3302](#) Introduction to Quantum Mechanics (3 semester hours)
- [PHYS 3401](#) Classical Mechanics (3 semester hours)
- [PHYS 3411](#) Thermal Physics (3 semester hours)
- [PHYS 3501](#) Electromagnetic Theory (3 semester hours)

Prerequisites and co-requisites include

- [MATH 2222](#) Analytic Geometry and Calculus II (4 semester hours)
 - [MATH 2223](#) Analytic Geometry and Calculus III (4 semester hours)
-

PHYS 1101 - Introductory Physics I

A non-calculus-based introduction to kinematics, dynamics, energy, momentum, rotational dynamics, fluid mechanics, wave mechanics, and thermodynamics. Physics is a science of measurement, testing, and experimentation—inquiry-based laboratories make physics come to life!

Grade Basis: L

Credit hours: 4.0

Lecture hours: 3.0

Lab hours: 3.0

Prerequisites:

- [MATH 1221](#) - Precalculus
-

PHYS 1102 - Introductory Physics II

A continuation of PHYS 1101 and an introduction to electricity and magnetism, electric circuits, and light and optics. Physics is a science of measurement, testing, and experimentation—inquiry-based laboratories make physics come to life!

Grade Basis: L

Credit hours: 4.0

Lecture hours: 3.0

Lab hours: 3.0

Prerequisites:

- [PHYS 1101](#) - Introductory Physics I

Restrictions:

- Offered in Spring terms
-

PHYS 2121 - General Physics I

A calculus-based introduction to dynamics, energy, momentum, rotational dynamics, fluid mechanics, wave mechanics, and thermodynamics. Physics is a science of measurement, testing, and experimentation—inquiry-based laboratories make physics come to life!

Grade Basis: L

Credit hours: 4.0

Lecture hours: 3.0

Lab hours: 3.0

Prerequisites:

- [MATH 2222](#) - Analytic Geometry and Calculus II

Restrictions:

- Offered in Fall terms
-

PHYS 2122 - General Physics II

A continuation of PHYS 2121, covering electricity and magnetism, electric circuits, and light and optics. Physics is a science of measurement, testing, and experimentation— inquiry-based laboratories make physics come to life!

Grade Basis: L

Credit hours: 3.0

Lecture hours: 3.0

Lab hours: 3.0

Prerequisites:

- [PHYS 2121](#) - General Physics I

Restrictions:

- Offered in Spring terms
-

PHYS 3201 - Introduction to Modern Physics

During the early twentieth century, two momentous theories were proposed: the theory of relativity and quantum theory. This course introduces these theories and supporting experimental evidence, as well as many of the theories developed in the twentieth century. Topics to be studied include the birth of modern physics, special relativity, quantum theory, atomic physics, general relativity, and cosmology. An undergraduate research project explores the relativistic and quantum nature of matter and energy.

Grade Basis: L

Credit hours: 4.0

Lecture hours: 3.0

Lab hours: 3.0

Prerequisites:

- [PHYS 2122](#) - General Physics II

Restrictions:

- Offered in Fall terms
 - PHYS 2122 with a grade of C or higher
 - Co-requisite: MATH 2223
-

PHYS 3302 - Introduction to Quantum Mechanics

A study of basic principles of quantum mechanics, including the origins of quantum mechanics, the Schrodinger Equation, angular momentum, and solution approximation methods. CHEM 3302 may be substituted for this course.

Grade Basis: L**Credit hours:** 3.0**Lecture hours:** 3.0**Prerequisites:**

- [MATH 2223](#) - Analytic Geometry and Calculus III
- [PHYS 3201](#) - Introduction to Modern Physics

Restrictions:

- Offered in Spring terms
-

PHYS 3401 - Classical Mechanics

An advanced study of classical mechanics and the detailed dynamics of particles, systems, and rigid bodies. Equations of motion are derived from the fundamental differential equations governing a system, applicable to any physical system. Students will study the powerful methods of Lagrangian and Hamiltonian mechanics.

Grade Basis: AL**Credit hours:** 3.0**Lecture hours:** 3.0**Prerequisites:**

- [MATH 2223](#) - Analytic Geometry and Calculus III
- [MATH 2224](#) - Differential Equations
- [PHYS 2121](#) - General Physics I

Restrictions:

- Offered on demand
-

PHYS 3411 - Thermal Physics

An advanced study of thermodynamics and statistical mechanics. Students will study in detail the ideal gas, interacting systems, entropy, chemical thermodynamics, Boltzmann statistics, and quantum statistics.

Grade Basis: AL

Credit hours: 3.0

Lecture hours: 3.0

Prerequisites:

- [MATH 2223](#) - Analytic Geometry and Calculus III
- [MATH 2224](#) - Differential Equations
- [PHYS 2122](#) - General Physics II

Restrictions:

- Offered on demand
-

PHYS 3501 - Electromagnetic Theory

An advanced study of electromagnetic theory using vector calculus. Students will study in detail electrostatics, Maxwell's equation in different settings and coordinate systems, electrodynamics, electric and magnetic fields in matter, and radiation.

Grade Basis: AL

Credit hours: 3.0

Lecture hours: 3.0

Prerequisites:

- [PHYS 3401](#) - Classical Mechanics

Restrictions:

- Offered on demand
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