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LaGrange College

Course Catalog - Chemistry and Physics

Minor in Chemistry - Minor in Chemistry

Type: Minor

A **minor** in Chemistry shall consist of General Chemistry I & II (CHEM 1101 & 1102) , Organic Chemistry I & II (CHEM 3201 & 3202) and two (2) additional Chemistry courses from the following:

Elements of Physical Chemistry (CHEM 3311), Advanced Organic Chemistry (CHEM 4201), Biochemistry (CHEM 4421, 4422) or Instrumental Analysis (CHEM 4451)

Pre-professional students should consider Advanced Organic Chemistry, Instrumental Analysis and Biochemistry as their options.

Total: 22-24 semester hours

Students must demonstrate proficiency in chemistry by appropriate scores on the American Chemical Society (ACS) Exams for one of the following year-long sequences: (1) General Chemistry, (2) Organic Chemistry and/or (3) Biochemistry. The passing score will be at or above the 40^{th} percentile of the national norms for these exams or at an appropriate level, as determined by the Department of Chemistry, based on the accumulated data of the performance of LaGrange College students on these exams. The results that are in the best interest of the students will be used. These exams will be given at the end of the appropriate courses and will be offered to students up to three (3) additional times prior to the time of the student's scheduled graduation.

CHEM 1101 - General Chemistry I

A study of the foundations of chemistry, including stoichiometry, atomic structure and periodicity, molecular structure and bonding models, and thermochemistry.

Grade Basis: L
Credit hours: 4.0
Lecture hours: 3.0
Lab hours: 3.0

Prerequisites:

- MATH 1101 - College Algebra

Restrictions:

- Offered in Fall terms
- MATH 1101 or placement into MATH 1221

CHEM 1101L - General Chemistry I Lab

Lab course to be taken with CHEM 1101.

Grade Basis: L
Lab hours: 3.0

CHEM 1102 - General Chemistry II

A continuation of CHEM 1101; a study of the gas, liquid, and solid phases, chemical thermodynamics, kinetics, general equilibria, acid/base equilibria, ionic equilibrium, oxidation-reduction reactions, and electrochemistry.

Grade Basis: L

Credit hours: 4.0
Lecture hours: 3.0
Lab hours: 3.0

Prerequisites:

- CHEM 1101 - General Chemistry I

Restrictions:

- Offered in Spring terms

CHEM 1102L - General Chemistry II Lab

Lab course to be taken with CHEM 1102.

Grade Basis: L
Lab hours: 3.0

Prerequisites:

- CHEM 1102L - General Chemistry II Lab

CHEM 2550 - Internship in Chemistry

(1-6 Hours) An opportunity for students to gain added applied experience and insight in approved off-campus settings. Internships consist of at least 40 working hours per credit hour in areas related to the discipline. Assignments may include selected readings, public presentation, and a final portfolio containing essays, weekly journal, and supporting material. Advisors, program coordinators, department chairs, and the internship coordinator (or designee) must approve the internship before a student begins their work. Internships will be taken as pass/no credit.

Grade Basis: P
Credit hours: 1.0
Lecture hours: 3.0

CHEM 3201 - Organic Chemistry I

A study of the fundamentals of organic chemistry with respect to the bonding, structure, nomenclature, and reactivity of various classes of organic compounds, including aromatic compounds.

Grade Basis: L
Credit hours: 4.0
Lecture hours: 3.0
Lab hours: 3.0

Prerequisites:

- CHEM 1102 - General Chemistry II

Restrictions:

- Offered in Fall terms

CHEM 3202 - Organic Chemistry II

A continuation of CHEM 3201, including spectroscopy, synthesis, carbonyls, and biomolecules.

Grade Basis: L
Credit hours: 4.0
Lecture hours: 3.0
Lab hours: 3.0

Prerequisites:

- CHEM 3201 - Organic Chemistry I

Restrictions:

- Offered in Spring terms

CHEM 3311 - Elements of Physical Chemistry

An overview of chemical thermodynamics, equilibrium and chemical dynamics taught at the algebra level and including applications to biological systems.

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

Prerequisites:

- CHEM 3202 - Organic Chemistry II
- MATH 1221 - Precalculus
- PHYS 1101 - Introductory Physics I

Restrictions:

- Offered in Spring terms (Odd Years)
- Permission of instructor may replace CHEM 3202 as prerequisite
- MATH 1221 or placement in MATH 2221
- PHYS 2121 may replace PHYS 1101 as pre-requisite

CHEM 4201 - Advanced Organic Chemistry

CHEM4201 is an extension of the study of organic chemistry as begun in the CHEM3201-3202 series, with the addition of special topics of interest for organic chemists not covered in that series.

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

Prerequisites:

- CHEM 3202 - Organic Chemistry II

Restrictions:

- Offered in Fall terms

CHEM 4421 - Biochemistry I

An introductory course in the principles of biochemistry, with emphasis on the structure and function of biomolecules, membrane structure and function, and an introduction to metabolism and bioenergetics.

Grade Basis: L
Credit hours: 4.0
Lecture hours: 3.0
Lab hours: 3.0

Prerequisites:

- CHEM 3202 - Organic Chemistry II

Restrictions:

- Offered in Fall terms

CHEM 4422 - Biochemistry II

A continuation of CHEM 4421, with emphasis on cellular metabolism, fundamentals of molecular genetics, and current topics in biochemistry.

Grade Basis: L
Credit hours: 4.0
Lecture hours: 3.0
Lab hours: 3.0

Prerequisites:

- CHEM 4421 - Biochemistry I

Restrictions:

- Offered in Spring terms

CHEM 4451 - Instrumental Analysis

A study of the basic instrumentation used for the quantitative and qualitative analysis of organic and inorganic compounds. This course examines the major instrument types used for this purpose, highlighting instrument design and operation, sampling and the interpretation of output.

Grade Basis: L
Credit hours: 4.0
Lecture hours: 3.0
Lab hours: 3.0

Prerequisites:

- CHEM 3201 - Organic Chemistry I

Restrictions:

- Offered on Demand

CHEM 4475 - Chemistry Seminar

A capstone course for Biochemistry majors. This course will address searching the chemical/biochemical literature, the procedure by which literature papers are submitted, reviewed and approved for publication. Assignments will research using the chemical literature, reading and interpreting papers from the chemical literature. A chemical literature review project or an undergraduate research effort will culminate in an oral presentation and paper.

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

Restrictions:

- Junior or Senior Standing or Approval of the Program Coordinator
- This course will be offered in alternating years beginning 2024-25.

CHEM 4550 - Internship in Chemistry

(1-6 Hours) An opportunity for students to gain added applied experience and insight in approved off-campus settings. Internships consist of at least 40 working hours per credit hour in areas related to the discipline. Assignments may include selected

readings, public presentation, and a final portfolio containing essays, weekly journal, and supporting material. Advisors, program coordinators, department chairs, and the internship coordinator (or designee) must approve the internship before a student begins their work. Internships will be taken as pass/no credit.

Grade Basis: P
Credit hours: 1.0
Lecture hours: 3.0

CHEM 4800 - Special Topics

A “special topic” course that may be designed to provide the student with exposure to topics and concepts not covered in the regular course offerings.

Grade Basis: L
Credit hours: 1.0
Lecture hours: 1.0

Restrictions:

- Offered on demand
- 1-4 Credit Hours

CHEM 4900 - Independent Study

This course may have various topics and may be used for credit for undergraduate research. This course can be taken multiple times.

Grade Basis: L
Credit hours: 1.0
Lecture hours: 1.0

Restrictions:

- Offered on demand
- 1-4 Credit Hours

PHYS 1101 - Introductory Physics I

A non-calculus-based introduction to kinematics, dynamics, energy, momentum, rotational dynamics, fluid mechanics, periodic motion, wave mechanics, and thermodynamics.

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

Prerequisites:

- MATH 1221 - Precalculus

PHYS 1101L - Introductory Physics I Lab

A laboratory to accompany PHYS1101. Physics is a science of measurement, testing, and experimentation—inquiry-based laboratories make physics come to life!

Grade Basis: L
Credit hours: 1.0
Lecture hours: 3.0

Restrictions:

- PHYS1101 must be taken as corequisite.

PHYS 1102L - Introductory Physics II

A continuation of PHYS 1101 and an introduction to electricity and magnetism, electric circuits, and light and optics.

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

Prerequisites:

- PHYS 1101 - Introductory Physics I

Restrictions:

- Offered in Spring terms

PHYS 1102L - Introductory Physics II Lab

A laboratory to complement PHYS1102. Physics is a science of measurement, testing, and experimentation—inquiry-based laboratories make physics come to life!

Grade Basis: L
Credit hours: 1.0
Lecture hours: 3.0

Prerequisites:

- PHYS 1101L - Introductory Physics I Lab

Restrictions:

- PHYS1102 must be taken as corequisite.
- Offered in Spring terms

PHYS 2121 - General Physics I

A calculus-based introduction to dynamics, energy, momentum, rotational dynamics, fluid mechanics, periodic motion, wave mechanics, and thermodynamics.

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

Restrictions:

- MATH2222 must be taken as pre-requisite or co-requisite.

PHYS 2121L - General Physics I Lab

A calculus-based introduction to dynamics, energy, momentum, rotational dynamics, fluid mechanics, periodic motion, wave mechanics, and thermodynamics.

Grade Basis: L
Credit hours: 1.0
Lecture hours: 3.0
Lab hours: 3.0

Restrictions:

- MATH2222 must be Prerequsite or Corequisite
- Offered in Fall terms

PHYS 2122 - General Physics II

A continuation of PHYS 2121, covering electricity and magnetism, electric circuits, and light and optics.

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

Prerequisites:

- PHYS 2121 - General Physics I

Restrictions:

- Offered in Spring terms

PHYS 2122L - General Physics II Lab

As physics is an experimental science with a focus on measurement, testing and experimentation, this course provides an inquiry-based laboratory experience.

Grade Basis: L
Credit hours: 1.0
Lecture hours: 1.0
Lab hours: 3.0

Prerequisites:

- PHYS 2121L - General Physics I Lab

Restrictions:

- PHYS2122 must be taken as corequisite.
- Offered in Spring terms

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