Duluth Campus

Physics B.A.

UMD-Physics & Astronomy

Swenson College of Science and Engineering

- Program Type: Baccalaureate
- Requirements for this program are current for Spring 2021
- Required credits to graduate with this degree: 120
- Required credits within the major: 55 to 82
- Degree: Bachelor of Arts

The bachelor of arts degree in physics is a liberal arts degree that allows considerable freedom in the planning of upper level courses and can easily be combined with other majors and interests. The physics courses emphasize conceptual foundations, problem-solving skills, and experimental techniques.

Honors requirements: To graduate with honors, students must complete and present a research project, and are suggested to maintain a GPA above 3.50 overall and in the major. They are also expected to attend department colloquia. Interested students should contact the physics honors program coordinator.

Program Delivery

This program is available:

- via classroom (the majority of instruction is face-to-face)

Admission Requirements

For information about University of Minnesota admission requirements, visit the Office of Admissions website.

Required prerequisites

Learning In Community (1 cr)

Transfer students with 24 or more credits and current students who change from a BS degree or change colleges may request to be waived from this requirement. New first-year students with 24 or more PSEO credits may request to be waived from this requirement.

UST 1000 - Learning in Community (1.0 - 2.0 cr)

General Requirements

The Board of Regents, on recommendation of the faculty, grants degrees from the University of Minnesota. Requirements for an undergraduate degree from University of Minnesota Duluth include the following:

1. Students must meet all course and credit requirements of the departments and colleges or schools in which they are enrolled including an advanced writing course. Students seeking two degrees must fulfill the requirements of both degrees. However, two degrees cannot be awarded for the same major.
2. Students must complete all requirements of the Liberal Education Program.
3. Students must complete a minimum of 120 semester credits.
4. At least 30 of the last 60 degree credits earned immediately before graduation must be awarded by UMD.
5. Students must complete at least half of their courses at the 3xxx-level and higher at UMD. Study-abroad credits earned through courses taught by UM faculty and at institutions with which UMD has international exchange programs may be used to fulfill this requirement.
6. If a minor is required, students must take at least three upper division credits in their minor field from UMD.
7. The minimum cumulative UM GPA required for graduation will be 2.00 and will include only University of Minnesota coursework. A minimum UM GPA of 2.00 is required in each UMD undergraduate major and minor. No academic unit may impose higher grade point standards to graduate.
8. Diploma, transcripts, and certification will be withheld until all financial obligations to the University have been met.

Program Requirements

1. A subplan is not required.
   a. Students interested in broadening analytical thinking through computer science may consider the Computational Physics subplan (see SCSE Advising to declare this subplan).
   b. Students interested in develops skills in analytical thinking, and data analysis are encouraged to add a Business Administration

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minor (see LSBE Advising to declare this minor).
c. Student who do not chose a subplan are required a second field of study (either a minor or another major).

2. Students interested in teaching 9-12 physics may enroll concurrently in secondary licensure requirements in the Department of Education and apply for admission to the Secondary Teacher Education Program.

3. Taking the "Honors" General Physics I course and General Physics II is recommended but not required for physics majors.

Physics (22 cr)
Topics in Physics
PHYS 1021 - Exploring Current Topics in Physics (1.0 cr)
General Physics I
PHYS 2013 - General Physics I [LE CAT, NAT SCI] (4.0 cr)
or PHYS 2017 - Honors: General Physics I [NAT SCI] (4.0 cr)
General Physics I lab
PHYS 2014 - General Physics Lab I [NAT SCI] (1.0 cr)
General Physics II
PHYS 2015 - General Physics II (4.0 cr)
or PHYS 2018 - Honors General Physics II (4.0 cr)
General Physics II lab
PHYS 2016 - General Physics Lab II (1.0 cr)
Physics
PHYS 2021 - Relativity and Quantum Physics (4.0 cr)
PHYS 2022 - Classical Physics (4.0 cr)
PHYS 2033 - Classical and Quantum Physics Lab (2.0 cr)
Physics Seminar
PHYS 4090 - Undergraduate Physics Seminar (1.0 cr)

Electives (11 cr)
Take 11 or more credit(s) from the following:
•LIM 5101 - Physical Limnology (3.0 cr)
•AST 3xxx
•AST 4xxx
•PHYS 3xxx
•PHYS 4xxx
•PHYS 5xxx

Mathematics (18 cr)
Calculus I
MATH 1296 - Calculus I [LE CAT, LOGIC & QR] (5.0 cr)
Calculus II
MATH 1297 - Calculus II [LOGIC & QR] (5.0 cr)
Advanced Mathematics
MATH 3280 - Differential Equations with Linear Algebra (4.0 cr)
MATH 3298 - Calculus III (4.0 cr)

Advanced Writing (3 cr)
WRIT 3130 - Advanced Writing: Engineering (3.0 cr)
or WRIT 3150 - Advanced Writing: Science (3.0 cr)

Program Sub-plans
A sub-plan is not required for this program.

Computational Physics
This sub-plan is ideal for students who seek a strong grounding in physics and the computational techniques used in physics research. Computational physics connects physics, computer science, and applied mathematics to provide scientific solution to realistic and other complex problems. Students who will find this sub-plan valuable are interested in moving directly into a quantitative career after graduation and students double majoring with another science or engineering major and considering graduate school.

Computational Physics (25 cr)
Take all of the following courses, PHYS 4052 counts toward the electives in the main part of the program.
Computer Science I

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CS 1511 - Computer Science I [LE CAT] (5.0 cr)
or CS 1581 - Honors: Computer Science I [LE CAT] (5.0 cr)
Computer Science II
CS 1521 - Computer Science II (5.0 cr)
Additional Computer Science
CS 2511 - Software Analysis and Design (4.0 cr)
CS 2531 - Discrete Structures for Computer Science (4.0 cr)
or MATH 3355 - Discrete Mathematics (4.0 cr)
Mathematics
MATH 4810 - Applied Mathematics: Numerical Methods (4.0 cr)
Physics
PHYS 4052 - Computational Methods in Physics (3.0 cr)

Business Administration

By adding a subplan in Business Administration, students can apply practical computing, data analysis, and logical thinking learned through physics to enhance their foundation of business knowledge.

An overall UM GPA of 2.60 is required for automatic admission to this specialty, along with completion of the Pre-Sub-plan core.

Pre Sub-Plan Core (12 cr)
ACCT 2005 - Survey of Accounting [LE CAT] (3.0 cr)
ECON 1003 - Economics and Society [LE CAT, SOC SCI] (3.0 cr)
ECON 2030 - Applied Statistics for Business and Economics [LOGIC & QR] (3.0 cr)
MIS 2201 - Information Technology in Business (3.0 cr)
Upper Division Requirements (15 cr)
FIN 3601 - Corporate Finance (3.0 cr)
MGTS 3301 - Production and Operations Management (3.0 cr)
MGTS 3401 - Organizational Behavior and Management (3.0 cr)
MGTS 3801 - Human Resource Management (3.0 cr)
MKTG 3701 - Principles of Marketing (3.0 cr)

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