Duluth Campus

Physics B.S.

UMD-Physics & Astronomy

Swenson College of Science and Engineering

- Program Type: Baccalaureate
- Requirements for this program are current for Fall 2019
- Required credits to graduate with this degree: 120
- Required credits within the major: 66
- Degree: Bachelor of Science

The bachelor of science degree in physics is primarily for students planning to work toward an advanced degree in physics or a related area. The physics courses emphasize conceptual foundations, problem-solving skills, and experimental techniques.

Students are encouraged to participate in research. The department also offers courses required for other science and engineering programs.

Honors requirements: To graduate with honors, students must participate in the department honors program, complete and present a research project, and maintain a GPA above 3.00 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.

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 minor or a second major in a different program.

2. The first math course is determined by ACT math score. The sample plan presupposes placement into MATH 1296.

3. Courses numbered above 3xxx may be offered in alternate years only. Some courses suggested in the sample plans in the junior and senior years may need to be switched to match the course offerings.

4. Students interested in teaching 9-12 physics may enroll concurrently in the Department of Education and apply for admission to the

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Secondary Teacher Education Program.

5. Taking the Honors General Physics I course (PHYS 2017) is recommended but not required.

6. Recommended courses from other programs include CHEM 1153 - General Chemistry I; CHEM 1154 - General Chemistry Lab I; and one Computer Science course either - CS 1411 - Introduction to Programming in Mathlab or CS 1511 - Computer Science I or CS 1581 - Honors: Computer Science I

Required Courses (36 cr)

Physics I course

PHYS 2013 - General Physics I [LE CAT, NAT SCI] (4.0 cr)
or PHYS 2017 - Honors: General Physics I [NAT SCI] (4.0 cr)

Physics I lab

PHYS 2014 - General Physics Lab I [NAT SCI] (1.0 cr)

Physics II course

PHYS 2015 - General Physics II (4.0 cr)
or PHYS 2018 - Honors General Physics II (4.0 cr)

Physics II lab

PHYS 2016 - General Physics Lab II (1.0 cr)

Core Courses

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)
PHYS 3033 - Analytical Methods in Physics (3.0 cr)
PHYS 4001 - Classical Mechanics (4.0 cr)
PHYS 4011 - Electromagnetic Theory (4.0 cr)
PHYS 4021 - Quantum Physics II (4.0 cr)
PHYS 4090 - Undergraduate Physics Seminar (1.0 cr)

Electives (9 cr)

Take 9 or more credit(s) from the following:

- AST 4110 - Observational Astronomy (3.0 cr)
- PHYS 3061 - Instrumentation (3.0 cr)
- PHYS 3091 - Independent Study (1.0 - 3.0 cr)
- PHYS 3094 - Physics Research (1.0 - 6.0 cr)
- PHYS 3561 - Astrophysics I Stellar Astrophysics (3.0 cr)
- PHYS 4031 - Thermal and Statistical Physics (4.0 cr)
- PHYS 5033 - Introduction to Particle Physics (3.0 cr)
- PHYS 5041 - Optics (3.0 cr)
- PHYS 5052 - Computational Methods in Physics (3.0 cr)
- PHYS 5053 - Data Analysis Methods in Physics (3.0 cr)
- PHYS 5061 - Experimental Methods (3.0 cr)
- PHYS 5063 *{Inactive}*(3.0 cr)

Required Courses From Other Programs (21 cr)

Mathematics

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

Advanced Writing

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

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