PHYSICS B.A. - PHYSICS EDUCATION

- This concentration contains additional course requirements designed to meet state standards. Those interested in teaching in K-12 schools must complete the education/teaching concentration of a major in a teaching content area plus the Teacher Education Program through the Department of Teaching and Learning. Additional teaching areas can be added through completion of the education/teaching concentration of a major or education/teaching minor in that content area.
  - Secondary Education Licensure Program (https://www.umt.edu/education/departments/teaching-and-learning/tep/default.php)
  - Licensure Degree Requirements (https://catalog.umt.edu/colleges-schools-programs/education/teaching-learning/lic-secondary-licensure/)
- To complete this concentration, you need to contact the Teaching and Learning Department. Approvals for this concentration must come from the Teaching and Learning Department.
- This major and concentration do not qualify as a single-field endorsement. The demand for teaching in this field is limited. The required second endorsement (either a teaching major or a teaching minor) should be in a field in high demand.

General Degree Requirements

To earn a baccalaureate degree, all students must complete successfully, in addition to any other requirements, the University of Montana General Education Requirements. Please refer to the General Education Requirements page (https://catalog.umt.edu/academics/general-education-requirements/) for more information.

Additional requirements for graduation can be found on the Degree/Certificate Requirements for Graduation page (https://catalog.umt.edu/academics/graduation-requirements/).

Unless otherwise noted in individual program requirements, a minimum grade point average of 2.00 in all work attempted at the University of Montana-Missoula is required for graduation. Please see the Academic Policies and Procedures page (https://catalog.umt.edu/academics/policies-procedures/) for information on how your GPA is calculated.

Courses taken to satisfy the requirements of a major, minor, or certificate program must be completed with a grade of C- or better unless a higher grade is noted in the program requirements.

Bachelor of Arts - Physics; Physics Education Concentration

Course Requirements

Code	Title	Hours
Lower-Division Physics		
Complete one of the following Physics sequences:		10
Algebra- and Trigonometry-based Physics:		
PHSX 205N & PHSX 206N	College Physics I and College Physics I Laboratory	
PHSX 207N & PHSX 208N	College Physics II and College Physics II Laboratory	
Calculus-based Physics (strongly recommended):		
PHSX 215N & PHSX 216N	Fundamentals of Physics with Calculus I and Physics Laboratory I with Calculus	
PHSX 217N & PHSX 218N	Fundamentals of Physics with Calculus II and Physics Laboratory II with Calculus	
Upper-Division Physics		
Complete all of the following courses:		
PHSX 301	Intro to Theoretical Physics	3
PHSX 311	Oscillations and Waves	2
PHSX 320	Classical Mechanics	3
PHSX 323	Intermediate Physics Lab	3
PHSX 343	Modern Physics	3
PHSX 423	Electricity & Magnetism I	3
PHSX 444	Advanced Physics Lab	3
PHSX 461	Quantum Mechanics I	3
PHSX 499	Senior Capstone Seminar	1
Complete two of the following courses:		6
PHSX 425	Electricity & Magnetism II	
PHSX 446	Thermodynamics & Statistical Mechanics	
PHSX 462	Quantum Mechanics II	
Physics Electives [1]		
Complete two of the following courses:		6
PHSX 141N	Einstein's Relativity	
or ASTR 142	The Evolving Universe	
PHSX 327	Optics	
PHSX 330	Communicating Physics	
PHSX 333	Computational Physics	
PHSX 425	Electricity & Magnetism II	
or PHSX 446	Thermodynamics & Statistical Mechanics	
or PHSX 462	Quantum Mechanics II	
Math Requirements [2]		
Complete all of the following courses:		
M 171	Calculus I	4
M 172	Calculus II	4
M 221	Introduction to Linear Algebra	4
M 273	Multivariable Calculus	4
Computer Science Requirements		
Complete one of the following courses:		3
CSCI 150	Introduction to Computer Science	
CSCI 151	Interdisciplinary Computer Science I	
PHSX 333	Computational Physics	
Writing in the Disciplines Requirement [3]		
Complete the following course:		
PHSX 330	Communicating Physics	3
Physics Education Concentration Additional Science Requirements		
Complete all of the following courses:		
ASTR 131N	Planetary Astronomy	3
ASTR 132N	Stars, Galaxies, and the Universe	3
CHMY 121N	Introduction to General Chemistry	4
CHMY 485	Laboratory Safety	1
GEO 101N	Introduction to Physical Geology	3
or ERTH 101N	Earth Systems Science	
GEO 102N	Introduction to Physical Geology Lab	1

or ERTH 103N	Earth Systems Science Lab	
Complete one of the following courses:		3-4
BIOB 160	Principles of Living Systems	
BIOB 170N	Principles of Biological Diversity	
BIOE 172N	Introductory Ecology	
BIOO 105N	Introduction to Botany	
Complete one of the following courses:		3
GEO 105N	Oceanography	
ENSC 105N	Environmental Science	
ENST 472	General Science: Conservation Education	
Teaching Science Methods Course		
Complete the following course:		
EDU 497	Teaching and Assessing (Methods: 5-12 Science)	3
Total Hours		**92-93**

[1] Other PHSX courses may be substituted with adviser approval.
[2] M 412 and M 418 are also recommended.
[3] Students may substitute another advanced writing course with the approval of the department chair.

Secondary Teaching Licensure

For endorsement to teach this subject, a student also must gain admission to the Teacher Education Program and meet all the requirements for secondary teaching licensure (https://catalog.umt.edu/colleges-schools-programs/education/teaching-learning/lic-secondary-licensure/). For more information, see the Teaching and Learning Department webpage (https://www.umt.edu/education/departments/currinst/default.php).