

# APPLIED PHYSICS

## Degree: B.S., Physics

Department of Chemistry and Physics (<https://cas.umw.edu/physics/>)

The study of physics provides the basis for understanding the fundamental laws of the physical universe. The principles of physics underlie other natural sciences and are essential to many applied sciences and technical programs. The physics program's goal is to expose students to a broad range of physical phenomena. In doing so, the program strives to meet the needs of students who will become specialists in physics, as well as numerous related fields. A secondary aim is to satisfy the interest of students who take physics to fulfill a general education requirement.

The Physics Department offers two major tracks towards a Bachelor of Science degree, Physics, and Applied Physics. Senior majors in either track may participate in undergraduate research, which could qualify as an honor thesis and/or result in a presentation at a local or national conference. The Society of Physics Students and its honorary society, Sigma Pi Sigma, have sponsored guest speakers and field trips to national laboratories and conferences.

The Applied Physics track is designed for students who have an interest and ability in the experimental and quantitative approaches to physics. This track provides a solid preparation for almost any technical career, because it teaches students how to analyze complex problems and it gives students a strong quantitative background that can be applied in any technical field. Applied Physics students work with the latest high-tech equipment and are prepared for in-demand careers in industry. UMW's curriculum reflects that practical approach, preparing students for a seamless transition from college to industry.

Credit for only one introductory physics sequence below can be counted toward the degree requirement.

Code	Title	Credits
PHYS 101 & PHYS 102	General Physics w/Lab and General Physics w/Lab	8
PHYS 101 & PHYS 108	General Physics w/Lab and General Physics	7
PHYS 103A & PHYS 104	Elementary Astronomy w/Lab and Elementary Astronomy	7
PHYS 105 & PHYS 106	University Physics, w/lab and University Physics w/Lab	8
PHYS 105 & PHYS 110	University Physics, w/lab and University Physics	7

## Major Requirements

Code	Title	Credits
PHYS 105	University Physics, w/lab	4
PHYS 106	University Physics w/Lab	4
PHYS 211	Modern Physics	3
PHYS 317	Methods of Mathematical Physics	3
PHYS 384	Advanced Physics Laboratory	4
PHYS 482	Physics Seminar	2
DATA 219	Foundations for Data Science	3
CPSC 420	Modeling & Simulation	3
Select 7-8 credits of the following:		7-8

PHYS 201	Thermodynamics and Statistical Mechanics	
PHYS 283	Electronics w/Lab	
PHYS 292	Optics w/Lab	
PHYS 320	Classical Mechanics I w/Lab	
PHYS 330	Electricity and Magnetism I w/Lab	
Select 3-4 credits of the following:		3-4
MATH 224A	Multivariable Calculus	
MATH 300	Linear Algebra	
MATH 312	Differential Equations	
MATH 325	Discrete Mathematics	
MATH 351A	Numerical Analysis I	
MATH 411	Chaotic Dynamical Systems	
PHYS 491 or PHYS 499	Individual Study <sup>1</sup> Internship	1-3
Total Credits		37-41

<sup>1</sup> The final credits, up to three (3) come from an approved capstone experience.

## General Education Requirements

The general education requirements for Bachelor of Arts/Bachelor of Science degrees (<https://catalog.umw.edu/undergraduate/general-education/requirements-bachelor-arts-bachelor-science-degrees/>) apply to all students who are seeking to earn an undergraduate B.A. or B.S. degree.

Students seeking a Bachelor of Liberal Studies degree have a separate set of BLS general education requirements (<https://catalog.umw.edu/undergraduate/general-education/requirements-bachelor-liberal-studies-degrees/>).

## Electives

Elective courses are those that are not needed to fulfill a general education requirement or major program requirement but are chosen by the student to complete the 120 credits required for graduation with a B.A./B.S. degree or the BLS degree. These courses may be taken graded or pass/fail (or S/U in the case of physical education and 100-level dance). No student in a regular B.A./B.S. program may count more than 60 credits in a single discipline toward the 120 credits required for graduation.

**Total Credits Required for the Degree:** 120 credits

## Chemistry and Physics Department

Janet A. Asper, Chair  
Janet A. Asper, Career Advisor

(The person's subject field is indicated in parentheses.)

### Faculty

#### Professors

Janet A. Asper (Chemistry)  
K. Nicole Crowder (Chemistry)  
Kelli M. Slunt (Chemistry)

#### Associate Professors

Leanna C. Giancarlo (Chemistry)  
E. Davis Oldham (Chemistry)

Randall D. Reif (Chemistry)

**Assistant Professor**

Varun Suresh Makhija (Physics)