

# APPLIED PHYSICS

## Degree: B.S., Physics

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

The study of physics involves a basis for understanding more deeply all arenas of the physical universe. Because the discipline also provides a framework for problem-solving, studying physics also imports into other fields in/out of STEM disciplines where stubborn problems persist. An understanding of physics also transfers to every technical discipline that involves modern computation and instrumentation. In total, majoring in physics supplies undergraduates with a firm footing to better understand current STEM foundations while also feeding one's curiosity for solving future unforeseen problems.

The Applied Physics major at UMW is part of a nationally recognized program that emphasizes faculty accessibility and student collaboration. The program is keenly aware of the lack of equitable representation in physics and participates in a national cohort to address historical inequities. The whole program, from students to faculty, elevates awareness for physics education from grades K–12 through informal programming and partnership with UMW's College of Education. Our graduates have a high success rate of moving forward with their expected plans, which mirrors the national statistics for physics majors. Our faculty are contributing members of science abroad, while also collaborating with student majors. This process begins as early as a student's first year. UMW physics facilities are among the best, on-campus and beyond. The Margaret Duke ('44) Endowed Fund supports students in all facets of their journey toward aspiring scientists, including a monthly colloquium series that allows students to interact personally with disciplinary experts.

The Applied Physics track is designed for students who have an interest in the experimental and quantitative aspects of physics. This track provides a solid preparation for almost any technical career, including engineering, because it teaches students the origin of many approximations in other disciplines. Students are encouraged to explore other STEM fields including education, leading to a minor or possible double-major. Applied Physics majors work within well-supported laboratory spaces and are prepared for in-demand, diverse STEM careers.

## Major Requirements

Code	Title	Credits
Required courses:		
PHYS 105	University Physics, w/Lab	4
PHYS 106	University Physics w/Lab	4
PHYS 201	Thermodynamics and Statistical Mechanics	3
PHYS 211	Modern Physics	3
PHYS 283	Electronics w/Lab	4
PHYS 317	Methods of Mathematical Physics	3
PHYS 482	Physics Seminar	2
<b>Major electives: Choose 6-8 credits</b>		<b>6-8</b>
PHYS 210	Nuclear Physics	
PHYS 292	Optics w/Lab	
PHYS 319	Astrophysics	
PHYS 320	Classical Mechanics I w/Lab	
PHYS 330	Electricity and Magnetism I w/Lab	
PHYS 384	Advanced Physics Laboratory	

PHYS 410	Quantum Mechanics I w/Lab	
PHYS 471	Selected Topics in Physics	
<b>Outside the Major Electives: Choose 3 credits</b>		<b>3</b>
MATH 224A	Multivariable Calculus	
MATH 312	Differential Equations	
MATH 330	Foundations of Advanced Mathematics	
MATH 411	Chaotic Dynamical Systems	
CPSC 110	Introduction to Computer Science	
<b>Total Credits</b>		<b>32-34</b>

## 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., B.S. or B.S.Ed. 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./B.S.Ed. 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./B.S.Ed. 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

Matthew C. Fleenor, Program Coordinator (Physics)

### Faculty

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

#### Professors

Janet A. Asper (Chemistry)

K. Nicole Crowder (Chemistry)

Matthew C. Fleenor (Physics)

Kelli M. Slunt (Chemistry)

#### Associate Professors

Leanna C. Giancarlo (Chemistry)

E. Davis Oldham (Chemistry)

Randall D. Reif (Chemistry)

#### Assistant Professor

Desmond R. Villabla (Physics)

Sarah E. Smith (Chemistry)

Varun Suresh Makhija (Physics)