

# APPLIED PHYSICS

Apply physics concepts to develop technology, systems and devices; bridge physics and engineering.

Hands-on, practical education in physics, the study of solving problems and modeling complex systems.

## SCIENTISTS IN THE FIELD OF APPLIED PHYSICS

- Are technical problem solvers
- Ask basic questions about causal issues that drive industrial processes
- Study materials on the atomic scale
- Create mathematical models to simplify complex problems

## GRADUATES CAN BECOME

The coursework, hands-on laboratories, instrumentation training, and research experiences of our students prepare them to work and be productive in a variety of fields.

- Electrical/Optical/Laser Engineer
- Mechanical/Manufacturing Engineer
- Programmer/Web Developer/IT Consultant

## OR CONTINUE EDUCATION

Some majors decide go to professional or graduate school after completing their bachelor's degree.

- Physics/Optical Science/Materials Science
- Mechanical/Manufacturing/Materials Engineering
- Aerospace/Civil/Geotechnica/Environmental Engineering
- Geology/Geophysics/Astronomy/Astrophysics

## CURRENT RESEARCH TOPICS

- Laser probing of atomic structure
- Plasma processing and thin films
- Modeling of molecular and gravitational systems

## GET YOUR HANDS ON INSTRUMENTATION AND FACILITIES

Students learn to use and work with high tech equipment not accessible to undergraduates elsewhere. These facilities and instruments are incorporated into the laboratories of several courses.

- Optical table and breadboards
- Helium Neon laser
- Laser diodes
- Plasmon resonance reflective intensity monitor
- Thin film vacuum coaters

## APPLIED SCIENCE CURRICULUM

Prepare for direct entry into exciting and rewarding science careers. All students are required to complete 120 credits including:

- Science courses
- Mathematics courses
- General education requirements
- Science Professions I and II
- A Co-op or Field Experience

## ORIGINAL RESEARCH EXPERIENCE

Students in Applied Physics will work with faculty on cutting edge research projects that will develop scientific skills and teach them the technical skills to succeed in their chosen profession. These research opportunities will also develop their problem-solving skills which are highly valued by employers.

Applied Physics will prepare students for summer opportunities at research institutions, government labs, or internships with scientific companies. Students will have opportunities to present their research at local, regional, and national conferences such as the American Physical Society Conference or the National Conference of Undergraduate Research.

## CORE APPLIED PHYSICS COURSES

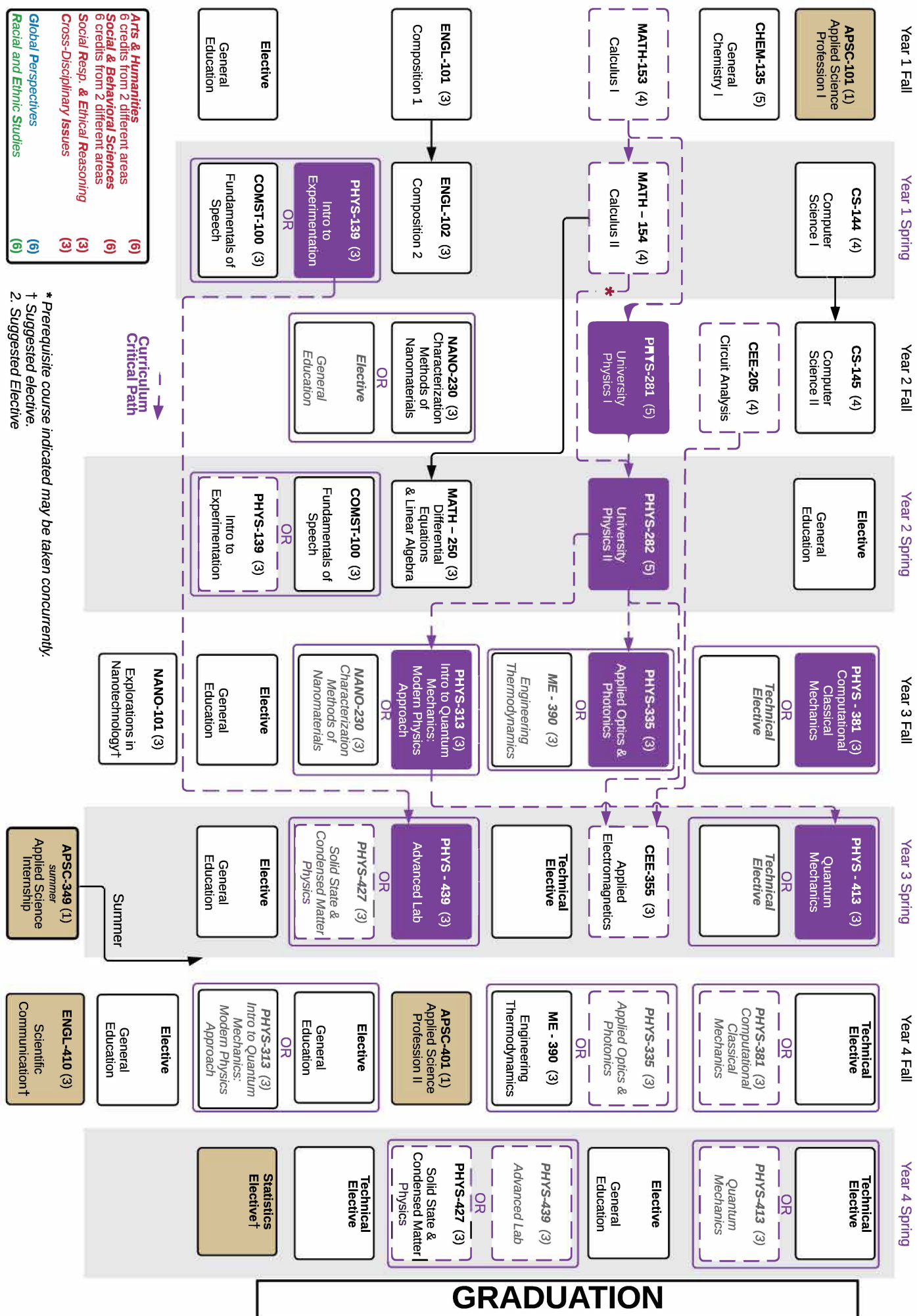
- Intro to Quantum Mechanics
- Quantum Mechanics
- Condensed Matter and Solid State Physics
- Applied Optics and Photonics
- Advanced Physics Lab
- Introduction to Research Methods in the Physical Sciences
- Computational Classical Mechanics

## TECHNICAL ELECTIVE EXAMPLES

- Numerical Methods
- Signals & Systems
- Physical Chemistry
- Modern Algebra
- Data Structures
- Nanostructures
- Control Theory

Learn more at [www.uwstout.edu/programs/bsas](http://www.uwstout.edu/programs/bsas)

## Applied Physics (APP)





Year 1 Fall		Year 1 Winterm	Year 1 Spring	Year 1 Summer
CHEM-135 Chemistry I	5		CS-144 Computer Science I	4
MATH-153 (4cr.) or MATH-156 (5cr.) Calculus I	4		MATH-154 (4cr.) or MATH-157 (5cr.) Calculus II	4
ENGL-101 or equivalent Composition I	3		ENGL-102 or equivalent Composition II	3
APSC-101 Science Professions I	1		COMST-100 Speech or PHYS-139 Intro to Exp	3
Gen Ed Elective (SRER)	3			
	16			14
Year 2 Fall		Year 2 Winterm	Year 2 Spring	Year 2 Summer
PHYS-281 Physics I or PHYS-291 Statics (3 cr.) If double major	5		PHYS-282 Physics II or ENGR-292 Dynamics (3 cr.) If double major	5
CS-145 Computer Science II	4		MATH-250 or [MATH-255 (3cr.) + MATH-275 (3cr.)] Differential Eq	3
NANO-230 Microscopy or PHYS-313 Intro to Quantum	3		PHYS-139 Intro to Physics Research or COMST-100 Spe	3
Gen Ed or MATH-275 Linear Algebra (3 cr.) If planning MATH-255	3		Gen Ed Elective (ARHU + RES A)	3
	15			14
follow 5 year plan from here if double major				
Year 3 Fall		Year 3 Winterm	Year 3 Spring	Year 3 Summer
PHYS-381 Classical Mechanics or PHYS-413 Quantum Mech.	3		APSC-401 Science Professions II	1
PHYS-313 Intro to Quantum or NANO-230 Microscopy	3		PHYS-427 Solid State Physics or PHYS-439 Advanced Lab	3
ME-390/ENGR-275 Thermodynamics or PHYS-335 Optics	3		CEE-205/ENGR-290 Circuits	4
Gen Ed Elective (SBSS + RES)	3		Tech Elective	3
STAT-330 Prob. & Stats for Sci. Eng. suggested tech elect	3		Gen Ed Elective (SBSS + GLP)	3
	15			14
Year 4 Fall		Year 4 Winterm	Year 4 Spring	Year 4 Summer
Tech Elective	3		PHYS-439 Advanced Physics Lab or PHYS-427 Solid State	3
PHYS-335 Optics & Photonics or ME-390/ENGR-275 Thermo	3		CEE-355 Applied Electromagnetics	4
PHYS-413 Quantum Mechanics or PHYS-381 Classical Mech.	3		ENGL-410 Scientific Communication suggested tech elect	3
Tech Elective	3		Tech Elective	3
Gen Ed Elective (CISS)	3		Gen Ed Elective (any)	3
	15			16
				Credit Total
				120

Revision Date: 10/6/19

APPLIED PHYSICS (B.S. in APPLIED SCIENCE)  
(APP Concentration of the APSC Program at UW-Stout)

PROGRAM PLAN SHEET  
2019-2020

UNIVERSITY AND GENERAL EDUCATION REQUIREMENTS		APPLIED PHYSICS REQUIREMENTS	
I. Credit and GPA		I. Concentration Core	
120 credits minimum		Circuits - Choose either course.	4
32 resident credits minimum		CEE-205 Circuit Analysis and Design	
2.00 UW-Stout GPA minimum		ENGR-290 Circuits and Devices	
II. University Requirement Categories		CEE-355 Applied Electromagnetics	3
A. Racial and Ethnic Studies (RES 6 cr.)		CS-144 Computer Science I	4
Racial and Ethnic Studies A - Choose a gen ed with RESA attribute.		CS-145 Computer Science II	4
Racial and Ethnic Studies A or B- Choose with RESA or RESB attribute.		Thermodynamics - Choose one option.	
B. Global Perspectives (GLP 6 cr.)		ENGR-275 Thermodynamics & Heat Transfer (3 cr.)	3-4
Global Perspectives Elective 1- Choose a gen ed with a GLP attribute.		ME-390 Engineering Thermodynamics (3 cr.)	
Global Perspectives Elective 2- Choose a gen ed with a GLP attribute.		CHEM-301, -303 Physical Chemistry (4 cr)	
III. General Education Categories	CR	Calculus II - Choose one option.	
A. Communication Skills (9 cr.)		MATH-154 Calculus II (4 cr.) P: MATH-153/6	4-5
ENGL-101 Comp I OR ENGL-111 English Honors I, P: PI Test	3	MATH-157 Calculus II (5 cr.) P: MATH-153/6	
ENGL-102 Comp II OR ENGL-112 OR ENGL-113, P: ENGL-101 or -111	3	Differential Equations - Choose either course.	
COMST-100 Fundamentals of Speech	3	MATH-250 Diff Eq with Linear Algebra P: MATH-154	3
B. Analytical Reasoning and Natural Sciences (ARNS 10 cr.)		MATH-255 Differential Equations (3 cr.) + MATH-275 Linear Algebra (3 cr.)	
MATH-153 Calculus I (4 cr.), P: MATH-120 or Math PL L4		NANO-230 Characterization Methods of Nanomaterials	3
(if MATH-153 chosen, 1 cr. from CHEM-136 College Chemistry II or PHYS-281 added)	5	PHYS-139 Introduction to Research Methods in Physics	3
OR MATH-156 (5 cr.) Calc Ana Geo I, P: MATH-121 or PL L5		Physics I - Choose either option	
CHEM-135 College Chemistry I	5	PHYS-281 University Physics I (5 cr.) P: MATH-151/3/6	5-6
C. Arts and Humanities (ARHU 6 cr.)		PHYS-291 Statics (3 cr.) and ENGR-292 Dynamics (3 cr.)	
ARHU Elective in area 1	3	PHYS-282 University Physics II P: PHYS-281, MATH-154/7	5
ARHU Elective in area 2	3	PHYS-313 Intro to Quant Mech: A Mod Phys Approach	3
D. Social and Behavioral Sciences (SBSS 6 cr.)		PHYS-335 Applied Optics and Photonics	3
SBSS Elective in area 1	3	PHYS-381 Computational Classical Mechanics	3
SBSS Elective in area 1	3	PHYS-413 Quantum Mechanics	3
E. Cross-Disciplinary Issues (CISS 3 cr.)	3	PHYS-427 Solid State and Condensed Matter Physics	3
F. Social Responsibility and Ethical Reasoning (SRER 3 cr.)	3	PHYS-439 Advanced Physics Laboratory	3
G. General Education elective from any category	3	Total Core Requirement Credits	59-65
Total General Education Requirements	40		
APPLIED SCIENCE PROGRAM REQUIREMENTS		II. Applied Physics Technical Electives	15-21
I. Science Profession Courses		CEE-215 Circuits	3
APSC-101 Applied Science Profession I	1	CEE-235 Signals and Systems	3
APSC 349 Applied Science Internship	1	CEE-, CS-, CHEM-, ENGR-, MATH-, MSCS-, ME-3XX +	
APSC-401 Applied Science Profession II	1	CS-244 Data Structures	4
Statistics (STAT-330 or STAT-331) (recommended tech elective)	3	CHEM-136 College Chemistry II	5
ENGL-410 Scientific Communication (recommended tech elective)	3	CHEM-201 Organic Chemistry I	3
II Concentration Requirement - Choose one of the following.		CHEM-204 Organic Chemistry II Lecture	3
Applied Physics (APP)		CHEM-206 Organic Chemistry II Laboratory	1
Biology (BIO)		ENGL-410 Scientific Communication , P: ENGL-102	3
Industrial Chemistry (INC)		MATH-158 Calculus III	3
Interdisciplinary Science (IDS)		MATH-262 Modern Geometry	3
Materials and Nanoscience (MNS)		MATH-270 Discrete Mathematics	3
III. Fundamental Science Requirements		MSCS-280 Graph Theory w/ Applications in Computer Science	3
A. Chemistry		NANO-101 Explorations in Nanotechnology	3
CHEM-136 College Chemistry II (recommended tech elective)	5	NANO-110 Introduction to Vacuum Technology	2
B. Physics		NANO-301 Nanostructures , P: NANO-230	3
PHYS-241 College Physics I or PHYS-281 University Physics I	5	NANO-401 Nanotechnology Applications , P: NANO-230	3
or PHYS 291 Statics (3 cr.) + ENGR-292 Dynamics (3 cr.)		PHYS-489 Advanced Physics Experience	1-3
PHYS-242 College Physics II or PHYS-282 University Physics II	5	Total General Education Requirements	40
Program Credit Total (not including concentration requirements)	24	Total Program (including concentration requirements)	80
		TOTAL CREDITS FOR GRADUATION	120

Revision Date: 10/8/19