

**MAJOR: APPLIED PHYSICS, B.S.**

DEPARTMENT OF PHYSICS

The applied physics major is primarily for students planning to work in industry. The physics courses emphasize conceptual foundation, problem-solving skills, and experimental and computational techniques.

TYPICAL PROGRAM OF STUDY			
FIRST YEAR			
FALL SEMESTER		SPRING SEMESTER	
PHYS 1021 Exploring Current Topics in Physics	1 cr	PHYS 2011 General Physics I	4 cr
MATH 1296 Calculus I ^	5 cr	CS 1131 Introduction to Programming in FORTRAN	
WRIT 1120 College Writing	3 cr	or CS 1511 Computer Science I	3-5 cr
Liberal Education courses	<u>6 cr</u>	MATH 1297 Calculus II	5 cr
	Total: 15 cr	Liberal Education course	3 cr
		<i>PHYS 2111 Solving Physics Problems (recommended)</i>	1 cr
			Total: 16-18cr
SECOND YEAR			
PHYS 2012 - General Physics II	4 cr	PHYS 2021 Relativity and Quantum Physics	4 cr
MATH 3298 - Calculus III	4 cr	PHYS 2022 Classical Physics	4 cr
<i>PHYS 2112 Solving Physics Problems II (recommended)</i>	1 cr	PHYS 2033 Classical and Quantum Physics Lab	2 cr
Liberal education or minor field courses	<u>6 cr</u>	MATH 3280 Differential Equations with Linear Algebra	<u>4 cr</u>
	Total: 15 cr		Total: 14 cr
THIRD YEAR*			
PHYS 5052 Computational Methods in Physics		TECHNICAL elective <sup>3</sup>	3 cr
or PHYS 5053 Data Analysis Methods in Physics	3 cr	TECHNICAL elective <sup>3</sup>	3 cr
PHYS elective <sup>1</sup>	4 cr	Liberal education or minor field courses	<u>7 cr</u>
CHEM 1151 General Chemistry I <sup>2</sup>	5 cr		Total: 13 cr
Liberal education or minor field courses	<u>4 cr</u>		
	Total: 16 cr		
FOURTH YEAR*			
PHYS 3061 Instrumentation	3 cr	PHYS 5061 Experimental Methods	3 cr
PHYS elective <sup>1</sup>	4 cr	PHYS 5090 Physics Seminar	1 cr
WRIT 3150 Advanced Writing Science	3 cr	TECHNICAL elective <sup>3</sup>	3 cr
Liberal education or minor field courses	<u>6 cr</u>	Liberal education or minor field courses	<u>8 cr</u>
	Total: 16 cr		Total: 15 cr

^First math course is determined by math placement exam. This schedule presupposes placement into MATH 1296. Students may take MATH 1596 and 1597, Honors Calculus I and II, in place of MATH 1296 and 1297.

<sup>1</sup>Take 8 or more elective credits from the following: PHYS 4001, PHYS 4011, PHYS 4021, OR PHYS 4031

<sup>2</sup>Or Chem 1161 Honors General Chemistry I. A second semester of chemistry is recommended (Chem 1152 or Chem 1162.)

<sup>3</sup>Take 9 or more credits from the following: AST 4110, LIM 5101, PHYS 5041, PHYS 5531, PHYS 5541, (PHYS 3561 or 5561). Students may also use an engineering course approved by the department or PHYS 5052 or PHYS 5053 if not used as the computational elective.

\*Courses numbered above 3000 will be offered in alternate years only. Some courses listed for years 3 and 4 may need to be interchanged to match the course offerings.

FOR ADDITIONAL INFORMATION:

Department of Physics  
371 Marshall W. Alworth Hall  
218.726.7124  
phys@d.umn.edu  
<http://www.d.umn.edu/physics>

## APPLIED PHYSICS, B.S.

MAJOR COURSE REQUIREMENTS	CREDITS	PREREQUISITES	SEMESTER TO BE COMPLETED	GRADE
<b>FIRST YEAR</b>				
WRIT 1120 College Writing	3			
CS 1131 Intro to Programming in Fortran or CS 1511 Computer Science I	3 5	3.5 yrs HS algebra or MATH 1250 3.5 yrs HS algebra		
PHYS 1021 Exploring Current Topics in Physics	1			
PHYS 2011 General Physics I	4	MATH 1290, 1296 or 1596		
PHYS 2111 Solving Physics Problems I (recommended)	1	MATH 1290, 1296 or 1596; concurrent reg in 2011		
MATH 1296 Calculus I <sup>^</sup>	5	Math ACT $\geq$ 25 or Math placement or MATH 1250		
MATH 1297 Calculus II	5	MATH 1290, 1296 or 1596 with at least a 'C-'		
<b>SECOND YEAR</b>				
MATH 3280 Diff Equations w/ Linear Algebra	4	MATH 1297 or 1597 with at least a 'C-'		
MATH 3298 Calculus III	4	MATH 1297 or 1597 with 'C-' at least a 'C-'		
PHYS 2012 General Physics II	4	PHYS 2011; MATH 1297 or 1597		
PHYS 2021 Relativity and Quantum Physics	4	PHYS 2012		
PHYS 2022 Classical Physics	4	PHYS 2012		
PHYS 2033 Classical & Quantum Physics lab	2	PHYS 2021, 2022 (concurrent registration OK)		
PHYS 2112 Solving Physics Problems II (recommended)	1	MATH 1297 or 1597; concurrent reg in PHYS 2012		
<b>THIRD YEAR*</b>				
CHEM 1151 General Chemistry I <sup>2</sup>	5	High School chemistry and High School algebra.		
PHYS 5052 Computational Methods <b>OR</b>	3	PHYS 2021, MATH 3280, & 1 sem. programming		
PHYS 5053 Data Analysis Methods	3	PHYS 2012, lab/field exp beyond 2012; 1 sem prog		
Physics electives <sup>1</sup>	4			
Technical elective <sup>3</sup>	3			
Technical elective <sup>3</sup>	3			
<b>FOURTH YEAR*</b>				
WRIT 3150 Advanced Writing: Science	3	WRIT 1120; 60 credits		
PHYS 3061 Instrumentation	3	PHYS 2022 or 1203 or 1205, 1 sem programming		
PHYS 5061 Experimental Methods	3	PHYS 2033; PHYS 3061		
PHYS 5090 Seminar	1	Senior or graduate student		
Physics elective <sup>1</sup>	4			
Technical elective <sup>3</sup>	3			

<sup>^</sup> First math course is determined by math placement exam. This schedule presupposes placement into MATH 1296. Students may take MATH 1596 and 1597, Honors Calculus I and II, in place of MATH 1296 and 1297.

\*Courses numbered above 3000 will be offered in alternate years only. Some courses listed for years 3 and 4 may need to be interchanged to match the course offerings.

<sup>1</sup>Take 8 or more elective credits from the following: PHYS 4001, PHYS 4011, PHYS 4021, OR PHYS 4031

<sup>2</sup>or CHEM 1161 Honors General Chemistry I. A second semester of chemistry is recommended (CHEM 1152 or CHEM 1162.)

<sup>3</sup>Take 9 or more credits from the following: AST 4110, LIM 5101, PHYS 5041, PHYS 5531, PHYS 5541, (PHYS 3561 or 5561). Students may also use an engineering course approved by the department or PHYS 5052 or PHYS 5053 if not used as the computational elective.

\*Courses numbered above 3000 will be offered in alternate years only. Some courses listed for years 3 and 4 may need to be interchanged to match the course offerings.

NOTE: In addition to the above requirements, students must complete the liberal education program and a minor (or a second major) to earn a B.S. degree.