

BACHELOR OF SCIENCE IN PHYSICS CURRICULUM GUIDE

Requirements effective for Fall 2023

The BS degree requires a minimum of **55 credits of physics** (3 of which are elective) above PHY 100, **18 credits of mathematics** (3 of which are elective) and **7 credits of chemistry and computer science courses**. In addition, the student must take ENG 101, at least 18 credits of courses that satisfy the University's General Education requirements, and additional (free choice) electives, for a total of 120 credits. First-year students must take PHY 100.

The following course schedule represents the suggested curriculum for a typical student in the Bachelor of Science in Physics Curriculum. Courses listed by number and name are required for the BS degree. Substitutions may be made for some courses on approval of the student's advisor and the Chair of the Department of Physics and Astronomy.

FIRST YEAR

FALL SEMESTER			SPRING SEMESTER		
Course		Credits	Course		Credits
PHY 121	Physics for Engineers & Physical Scientists I	4	PHY 122	Physics for Engineers & Physical Scientists II	4
ENG 101	College Composition	3	COS 125	Intro. to Problem Solving Using Computer Programming	4
MAT 126	Calculus I	4	MAT 127	Calculus II	4
PHY 100	Intro to Physics & Astronomy	1		HV/SC & E Elective II ¹	3
	HV/SC & E Elective I ¹	3			
	Total Credits	15		Total Credits	15

SECOND YEAR

FALL SEMESTER			SPRING SEMESTER		
Course		Credits	Course		Credits
PHY 200	Career Prep in Phys & EP I	1	PHY 223	Special Relativity	1
PHY 236	Intro. Quantum Physics	3	PHY 231	Mathematical Methods in Physics	3
PHY 261	Physical Measurements Laboratory	2	PHY 241	Computational Physics	3
MAT 228	Calculus III	4	PHY 262	Electronics	2
CHY 121	Intro. to Chemistry	3	MAT 259	Differential Equations	3
CHY 123	Intro. to Chemistry Lab.	1		HV/SC & E Elective ¹ or Elective	3
	Total Credits	14		Total Credits	15

THIRD YEAR

FALL SEMESTER			SPRING SEMESTER		
Course		Credits	Course		Credits
PHY 364	Modern Experimental Physics	2	PHY 365	Mechanics Laboratory	2
PHY 451	Mechanics	3	PHY 455	Electricity & Magnetism II	3
PHY 454	Electricity & Magnetism I	3		MAT Elective	3
PHY 472	Geometric and Fourier Optics	3		HV/SC & E Elective(s) ¹ and/or	7-9
	HV/SC & E Elective ¹ or Elective	3-4		Elective(s) and/or Physics Elective	
	Total Credits	14-15		Total Credits	15-17

FOURTH YEAR

FALL SEMESTER			SPRING SEMESTER		
Course		Credits	Course		Credits
PHY 400	Career Prep in Phys & EP II	1	PHY 463	Statistical Mechanics	3
PHY 469	Quantum & Atomic Physics	3		HV/SC & E Elective(s) ¹ and/or	12
PHY 480	Physics of Materials	3		Elective(s) and/or Physics Elective	
PHY 481	Project Lab in Physics I	3			
	HV/SC & E Elective(s) ¹ and/or	5-6			
	Elective(s) and/or Physics Elective				
	Total Credits	15-16		Total Credits	15

Minimum Total Credits in the BS in Physics Program: 120

Notes

- Human Values / Social Contexts and Ethics (HV/SC & E), part of the University General Education Requirement, can be satisfied by a careful selection of at least six three-credit courses.

PHYSICS ELECTIVES (minimum of 3 credits)

Course		FALL SEMESTER	Credits
PHY 473	Modern Optics Laboratory		1-2
PHY 496	Field Experience in Physics		1-6
PHY 501	Mechanics (graduate)		3
PHY 574	Methods of Mathematical Physics (graduate)		3
AST 451	Astrophysics I (typically offered in the spring semester)		1-3
Course		SPRING SEMESTER	Credits
PHY 224	Special Relativity Laboratory		1-3
PHY 447	Molecular Biophysics		3
PHY 470	Nuclear Physics		2
PHY 471	Nuclear Physics Laboratory		1
PHY 496	Field Experience in Physics		1-6
AST 451	Astrophysics I (typically offered in the spring semester)		1-3

PHY 574 may be used as the math elective, provided it is not also used as a physics elective. The three physics elective credits must be chosen from AST 451, PHY 447, PHY 470, PHY 471, PHY 473, PHY 482, PHY 496, PHY 501, and PHY 574 (provided it is not used as a mathematics elective).

MATHEMATICS or STATISTICS ELECTIVES (minimum of 3 credits)

Students in the BS are required to take 3 credits of mathematics or statistics beyond MAT 259, Differential Equations.

Suggested Mathematics Electives

The following courses cover topics that are useful to physics majors. Other mathematics courses can be chosen with advisor approval to satisfy this elective requirement. Either PHY 231 or PHY 574 can be used to fulfill a mathematics minor, but **not both**.)

MAT 262 Linear Algebra
 MAT 453 Partial Differential Equations I
 MAT 452 Complex Analysis
 MAT 454 Partial Differential Equations II
 MAT 471 Differential Geometry
 STS 434 Introduction to Statistics

Note about Mathematics minor: A minor in Mathematics requires 24 credits. The Physics BS requirements for mathematics courses include 18 credits of mathematics. PHY 472 may be used as one of the courses toward the minor, provided it is the only non-MAT course used for the minor (i.e., STS courses will not count in addition to PHY 472). Thus it is possible for BS majors to earn a minor in Mathematics with one additional, *400-level* mathematics course (3 additional credits) beyond the elective requirement above. Check the Mathematics minor for details.

BACHELOR OF SCIENCE IN PHYSICS STUDENT RECORD

PHYSICS COURSES

	<u>CR</u>	<u>DATE</u>	<u>GRADE</u>
PHY 100	1	___	___
PHY 121	4	___	___
PHY 122	4	___	___
PHY 200	1	___	___
PHY 223	1	___	___
PHY 231	3	___	___
PHY 236	3	___	___
PHY 241	3	___	___
PHY 261	2	___	___
PHY 262	2	___	___
PHY 364	2	___	___
PHY 365	2	___	___
PHY 400	1	___	___
PHY 451	3	___	___
PHY 454	3	___	___
PHY 455	3	___	___
PHY 463	3	___	___
PHY 469	3	___	___
PHY 472	3	___	___
PHY 480	3	___	___
PHY 481	3	___	___
PHY ___	___	___	___
PHY ___	___	___	___

SUBTOTAL (55 credits minimum without PHY 100)

ELECTIVES


___	___	___	___
___	___	___	___
___	___	___	___
___	___	___	___
___	___	___	___
___	___	___	___
___	___	___	___
___	___	___	___
___	___	___	___
___	___	___	___

SUBTOTAL

DEGREE REQUIREMENTS

Total credits must be 120 or greater.

TOTAL ALL = 

TOTAL GPA IN MAJOR =
(2.00 MINIMUM) 

MATHEMATICS COURSES

	<u>CR</u>	<u>DATE</u>	<u>GRADE</u>
MAT 126	4	___	___
MAT 127	4	___	___
MAT 228	4	___	___
MAT 259	3	___	___
MAT ___	-	___	___
MAT ___	3	___	___
(or PHY 574	3	___	___)

SUBTOTAL (18 credits minimum)

HV/SC & E REQUIREMENTS (AREA)

	<u>CR</u>	<u>DATE</u>	<u>GRADE</u>
1	___	___	___
2	___	___	___
3	___	___	___
4	___	___	___
5	___	___	___
6	___	___	___
7	___	___	___

SUBTOTAL (18 credits minimum)

Human Values / Social Contexts & Ethics Areas

- Western Cultural Tradition
- Social Contexts & Institutions
- Cultural Diversity & International Perspectives
- Population & the Environment
- Artistic and Creative Expression
- Ethics

OTHER COURSES

	<u>CR</u>	<u>DATE</u>	<u>GRADE</u>
CHY 121	3	___	___
CHY 123	1	___	___
COS 125	4	___	___
ENG 101	3	___	___
___	___	___	___
___	___	___	___
___	___	___	___
___	___	___	___
___	___	___	___
___	___	___	___
___	___	___	___

SUBTOTAL

TOTAL GPA =
(2.00 MINIMUM) 