

PHYSICS, BACHELOR OF SCIENCE

Offered by Department of Physics and Astronomy (<https://catalog.unk.edu/undergraduate/departments-programs/physics-astronomy/>)

Code	Title	Credit Hours
General Education		
<i>Foundational Requirements (LOPERs 1-4)</i>		14
Including:		
LOPER 4: Mathematics, Statistics, and Quantitative Reasoning		
MATH 115	Calculus I with Analytic Geometry ¹	
<i>Broad Knowledge Requirements (LOPERs 5-8)</i>		11
Take any one course in LOPER 5, LOPER 6, or LOPER 7 that satisfies a Dispositional Requirement (LOPER 9 or LOPER 10) and a Broad Knowledge Requirement. The courses that meet these criteria are listed at https://catalog.unk.edu/undergraduate/general-studies/courses-satisfy-broad-knowledge-dispositional (https://catalog.unk.edu/undergraduate/general-studies/courses-satisfy-broad-knowledge-dispositional/). See advisor for assistance.		
LOPER 8: Natural Science		
PHYS 275	General Physics I (Calculus)	
PHYS 275L	General Physics I (Calculus) Laboratory	
<i>Dispositional Requirements (LOPERs 9-10)</i> ²		6
<i>Wellness (LOPER 11) Optional</i>		0
BS Science-related course requirements		8
MATH 202	Calculus II with Analytic Geometry	
MATH 305	Differential Equations	
Program Specified Requirements		5
PHYS 276	General Physics II (Calculus)	
PHYS 276L	General Physics II (Calculus) Laboratory	
Major Option		
Complete all required courses		34-36
Minor or 2nd Major		
Complete all required courses ³		24
Unrestricted Electives		
Needed to reach 120 credit hour minimum		16-18
Total Credit Hours		120

Major Option

Code	Title	Credit Hours
Physics Core Requirements		
PHYS 123	Freshman Physics Seminar	3
PHYS 346	Modern Physics I	4
Physics Math Requirement		
MATH 260	Calculus III	5
Physics Chemistry Requirement		
CHEM 160	General Chemistry	3

CHEM 160L	General Chemistry Laboratory	1
Physics Emphasis Requirements		
<i>Select one of the following:</i>		18-20
General Physics Emphasis		
Astronomy Emphasis		
Physical Science Emphasis		
Health Science Emphasis		
Total Credit Hours		34-36

General Physics Emphasis

Code	Title	Credit Hours
General Physics Emphasis Requirements		
<i>Physics Skill Courses</i>		
PHYS 360	Computational Methods in Physics and Astronomy	3
PHYS 410	Mathematical Techniques in Physics I	3
PHYS 420	Advanced Physics Laboratory	3
<i>Physics Electives</i>		
Select 11 credit hours from the following:		11
PHYS 402	Analytic Mechanics	
PHYS 407	Electricity & Magnetism	
PHYS 419	Quantum Mechanics	
PHYS 430	Optics	
PHYS 435	Solid State Physics	
PHYS 440	Thermodynamics and Statistical Mechanics	
PHYS 495	Research in Physics	
Total Credit Hours		20

Astronomy Emphasis

Code	Title	Credit Hours
Astronomy Emphasis Requirements		
<i>Required Physics and Astronomy Courses</i>		
PHYS 210	Astronomy	3
PHYS 350	Astrophysics I	3
PHYS 351	Astrophysics II	3
PHYS 360	Computational Methods in Physics and Astronomy	3
PHYS 361	Astronomy Methods II	3
PHYS 410	Mathematical Techniques in Physics I	3
Total Credit Hours		18

Physical Science Emphasis

Code	Title	Credit Hours
Physical Science Emphasis Requirements		
<i>Chemistry Requirement</i>		
CHEM 161	General Chemistry	3
CHEM 161L	General Chemistry Laboratory	1
<i>Physical Science Electives</i>		
Select 15 credit hours of the following: ⁴		15

CHEM 200-CHEM 499L

PHYS 200-PHYS 499

Total Credit Hours 19**Health Science Emphasis**

Code	Title	Credit Hours
------	-------	--------------

Health Science Emphasis Requirements*Required Physics Courses*

PHYS 370	Introduction to Biophysics	3
PHYS 372	Physics of the Body I	3
PHYS 430	Optics	3

Electives in Health Science Disciplines

Select 11 credit hours from the following: 11

BIOL 106	Biology II	
BIOL 211	Human Microbiology	
BIOL 225	Anatomy and Physiology	
BIOL 226	Anatomy and Physiology	
BIOL 360	Genetics	
CHEM 161	General Chemistry	
CHEM 161L	General Chemistry Laboratory	
CHEM 250	Fundamentals of Organic Chemistry	
CHEM 250L	Fundamentals of Organic Chemistry Lab	
CHEM 351	Biochemistry I	
CHEM 351L	Biochemistry Lab	
CHEM 352	Biochemistry II	
CHEM 352L	Advanced Biochemistry Lab	
CHEM 360	Organic Chemistry	
CHEM 360L	Organic Chemistry Laboratory	
CHEM 361	Organic Chemistry	
CHEM 361L	Organic Chemistry Laboratory	

Total Credit Hours 20

¹ Students without sufficient preparation will also need to take the following courses, increasing the total credit hours needed:

- MATH 102
- MATH 103

² Designated courses with the appropriate content approved to satisfy one of the Broad Knowledge requirements plus LOPER 9 or a Broad Knowledge requirement plus LOPER 10. Some courses approved satisfy LOPER 9 or LOPER 10 alone. Choosing a course that satisfies the Broad Knowledge requirement **AND** LOPER 9 or the Broad Knowledge Requirement **AND** LOPER 10 will reduce the total General Education hours.

³ A minor or second major is required for a complete degree program. The number of required electives needed to reach 120 total credit hours overall will depend upon the specific program chosen

⁴ Electives must include one advanced course (300-400 level) in BOTH Chemistry **AND** Physics.

can also help you plan other experiences to enrich your undergraduate education such as internships, education abroad, undergraduate research, learning communities, and service learning and community-based learning.

Code	Title	Credit Hours
------	-------	--------------

Semester 1

LOPER 1: First-year Seminar		3
PHYS 123	Freshman Physics Seminar	3
MATH 115	Calculus I with Analytic Geometry	5
LOPER 2: Writing Skills		3

Total Credit Hours 14

Code	Title	Credit Hours
------	-------	--------------

Semester 2

PHYS 275 & 275L	General Physics I (Calculus) and General Physics I (Calculus) Laboratory	5
MATH 202	Calculus II with Analytic Geometry	5
LOPER 3: Oral Communication Skills		3
LOPER 5: Visual or Performing Arts		3

Total Credit Hours 16

Code	Title	Credit Hours
------	-------	--------------

Semester 3

PHYS 276 & 276L	General Physics II (Calculus) and General Physics II (Calculus) Laboratory	5
MATH 260	Calculus III	5
CHEM 160 & 160L	General Chemistry and General Chemistry Laboratory	4

Total Credit Hours 14

Code	Title	Credit Hours
------	-------	--------------

Semester 4

PHYS 346	Modern Physics I	4
PHYS 410	Mathematical Techniques in Physics I	3
MATH 305	Differential Equations	3
LOPER 6: Humanities		3
LOPER 7: Social Science		3

Total Credit Hours 16

Code	Title	Credit Hours
------	-------	--------------

Semester 5

PHYS 360	Computational Methods in Physics and Astronomy	3
Major Elective		4
Minor or 2nd Major Course		3
LOPER 9: Civic Competency and Engagement		3

This document represents a sample 4-year plan for degree completion with this major. Actual course selection and sequence may vary and should be discussed individually with your academic advisor. Advisors

LOPER 10: Respect for Human Diversity	3
Total Credit Hours	16

Code	Title	Credit Hours
------	-------	--------------

Semester 6

Major Elective	4
PHYS 420 Advanced Physics Laboratory	3
Minor or 2nd Major Course	3
Minor or 2nd Major Course	3
Minor or 2nd Major Course	3
Total Credit Hours	16

Code	Title	Credit Hours
------	-------	--------------

Semester 7

Major Elective	3
Minor or 2nd Major Course	3
Minor or 2nd Major Course	3
Minor or 2nd Major Course	3
Minor or 2nd Major Course	3
Total Credit Hours	15

Code	Title	Credit Hours
------	-------	--------------

Semester 8

Unrestricted Elective	3
Unrestricted Elective	3
Unrestricted Elective	3
Unrestricted Elective	3
Unrestricted Elective	1
Total Credit Hours	13

This document represents a sample 4-year plan for degree completion with this major. Actual course selection and sequence may vary and should be discussed individually with your academic advisor. Advisors can also help you plan other experiences to enrich your undergraduate education such as internships, education abroad, undergraduate research, learning communities, and service learning and community-based learning.

Code	Title	Credit Hours
------	-------	--------------

Semester 1

LOPER 1: First-year Seminar	3
PHYS 123 Freshman Physics Seminar	3
MATH 115 Calculus I with Analytic Geometry	5
LOPER 2: Writing Skills	3
Total Credit Hours	14

Code	Title	Credit Hours
------	-------	--------------

Semester 2

PHYS 275 General Physics I (Calculus) & 275L and General Physics I (Calculus) Laboratory	5
--	---

MATH 202 Calculus II with Analytic Geometry	5
PHYS 210 Astronomy	3
LOPER 3: Oral Communication Skills	3

Total Credit Hours	16
---------------------------	-----------

Code	Title	Credit Hours
------	-------	--------------

Semester 3

PHYS 276 General Physics II (Calculus) & 276L and General Physics II (Calculus) Laboratory	5
CHEM 160 General Chemistry & 160L and General Chemistry Laboratory	4
MATH 260 Calculus III	5

Total Credit Hours	14
---------------------------	-----------

Code	Title	Credit Hours
------	-------	--------------

Semester 4

PHYS 346 Modern Physics I	4
PHYS 410 Mathematical Techniques in Physics I	3
MATH 305 Differential Equations	3
LOPER 5: Visual or Performing Arts	3
LOPER 6: Humanities	3

Total Credit Hours	16
---------------------------	-----------

Code	Title	Credit Hours
------	-------	--------------

Semester 5

PHYS 360 Computational Methods in Physics and Astronomy	3
LOPER 7: Social Science	3
LOPER 9: Civic Competency and Engagement	3
Minor or 2nd Major Course	3
Unrestricted Elective	4

Total Credit Hours	16
---------------------------	-----------

Code	Title	Credit Hours
------	-------	--------------

Semester 6

PHYS 361 Astronomy Methods II	3
LOPER 10: Respect for Human Diversity	3
Minor or 2nd Major Course	3
Minor or 2nd Major Course	3
Minor or 2nd Major Course	3

Total Credit Hours	15
---------------------------	-----------

Code	Title	Credit Hours
------	-------	--------------

Semester 7

PHYS 350 Astrophysics I	3
Minor or 2nd Major Course	3
Minor or 2nd Major Course	3
Minor or 2nd Major Course	3

Minor or 2nd Major Course	3
Total Credit Hours	15

Code	Title	Credit Hours
------	-------	--------------

Semester 8

PHYS 351	Astrophysics II	3
Unrestricted Elective		3
Unrestricted Elective		3
Unrestricted Elective		3
Unrestricted Elective		1
Total Credit Hours		13

This document represents a sample 4-year plan for degree completion with this major. Actual course selection and sequence may vary and should be discussed individually with your academic advisor. Advisors can also help you plan other experiences to enrich your undergraduate education such as internships, education abroad, undergraduate research, learning communities, and service learning and community-based learning.

Code	Title	Credit Hours
------	-------	--------------

Semester 1

LOPER 1: First-year Seminar		3
PHYS 123	Freshman Physics Seminar	3
MATH 115	Calculus I with Analytic Geometry	5
LOPER 2: Writing Skills		3
Total Credit Hours		14

Code	Title	Credit Hours
------	-------	--------------

Semester 2

PHYS 275 & 275L	General Physics I (Calculus) and General Physics I (Calculus) Laboratory	5
MATH 202	Calculus II with Analytic Geometry	5
LOPER 3: Oral Communication Skills		3
LOPER 5: Visual or Performing Arts		3
Total Credit Hours		16

Code	Title	Credit Hours
------	-------	--------------

Semester 3

PHYS 276 & 276L	General Physics II (Calculus) and General Physics II (Calculus) Laboratory	5
MATH 260	Calculus III	5
CHEM 160 & 160L	General Chemistry and General Chemistry Laboratory	4
Total Credit Hours		14

Code	Title	Credit Hours
------	-------	--------------

Semester 4

PHYS 346	Modern Physics I	4
----------	------------------	---

MATH 305	Differential Equations	3
CHEM 161 & 161L	General Chemistry and General Chemistry Laboratory	4
LOPER 6: Humanities		3
Unrestricted Elective		3
Total Credit Hours		17

Code	Title	Credit Hours
------	-------	--------------

Semester 5

PHYS Elective		3
CHEM Elective		3
LOPER 7: Social Science		3
LOPER 9: Civic Competency and Engagement		3
Unrestricted Elective		3
Total Credit Hours		15

Code	Title	Credit Hours
------	-------	--------------

Semester 6

LOPER 10: Respect for Human Diversity		3
Physical Science Elective		3
Minor or 2nd Major Course		3
Minor or 2nd Major Course		3
Unrestricted Elective		3
Total Credit Hours		15

Code	Title	Credit Hours
------	-------	--------------

Semester 7

Physical Science Elective		3
Minor or 2nd Major Course		3
Minor or 2nd Major Course		3
Minor or 2nd Major Course		3
Minor or 2nd Major Course		3
Total Credit Hours		15

Code	Title	Credit Hours
------	-------	--------------

Semester 8

Physical Science Elective		3
Minor or 2nd Major Course		3
Minor or 2nd Major Course		3
Unrestricted Elective		3
Unrestricted Elective		2
Total Credit Hours		14

This document represents a sample 4-year plan for degree completion with this major. Actual course selection and sequence may vary and should be discussed individually with your academic advisor. Advisors can also help you plan other experiences to enrich your undergraduate education such as internships, education abroad, undergraduate research, learning communities, and service learning and community-based learning.

Code	Title	Credit Hours
Semester 1		
LOPER 1: First-year Seminar		3
PHYS 123	Freshman Physics Seminar	3
MATH 115	Calculus I with Analytic Geometry	5
LOPER 2: Writing Skills		3
Total Credit Hours		14

Code	Title	Credit Hours
Semester 2		
PHYS 275 & 275L	General Physics I (Calculus) and General Physics I (Calculus) Laboratory	5
MATH 202	Calculus II with Analytic Geometry	5
Major Elective		3
LOPER 5: Visual or Performing Arts		3
Total Credit Hours		16

Code	Title	Credit Hours
Semester 3		
PHYS 276 & 276L	General Physics II (Calculus) and General Physics II (Calculus) Laboratory	5
MATH 260	Calculus III	5
CHEM 160 & 160L	General Chemistry and General Chemistry Laboratory	4
Total Credit Hours		14

Code	Title	Credit Hours
Semester 4		
PHYS 346	Modern Physics I	4
MATH 305	Differential Equations	3
Major Elective		3
LOPER 3: Oral Communication Skills		3
LOPER 6: Humanities		3
Total Credit Hours		16

Code	Title	Credit Hours
Semester 5		
PHYS 370	Introduction to Biophysics	3
Major Elective		3
Minor or 2nd Major Course		3
LOPER 7: Social Science		3
LOPER 9: Civic Competency and Engagement		3
Total Credit Hours		15

Code	Title	Credit Hours
Semester 6		
PHYS 372	Physics of the Body I	3

LOPER 10: Respect for Human Diversity	3
Minor or 2nd Major Course	3
Minor or 2nd Major Course	3
Minor or 2nd Major Course	3
Total Credit Hours	15

Code	Title	Credit Hours
Semester 7		
PHYS 430	Optics	3
Minor or 2nd Major Course		3
Minor or 2nd Major Course		3
Minor or 2nd Major Course		3
Minor or 2nd Major Course		3
Total Credit Hours		15

Code	Title	Credit Hours
Semester 8		
Major Elective		3
Unrestricted Elective		3
Unrestricted Elective		3
Unrestricted Elective		3
Unrestricted Elective		3
Total Credit Hours		15