Physics Major

Major Requirements

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Degree Type: B.A. or B.S.
Minimum Credits Required: 120
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University Degree Requirements

For complete details on these and other university degree requirements, refer to the Degree and Graduation Requirements (http://catalog.ndsu.edu/academic-policies/undergraduate-policies/degree-and-graduation/) section in the University Catalog.

1. Minimum of 120 semester credits (some programs may exceed this minimum).
2. Complete the University General Education requirements.
3. Minimum institutional GPA of 2.00 based on work taken at NDSU.
4. Minimum of 30 credits in resident at NDSU.
5. Minimum of 36 upper level credits (courses numbered 300 or higher).
6. Students with transfer credit must meet the NDSU 30 credits in residence (#4). Of these 30 credits in residence, a minimum of 15 credits must be in courses numbered 300 or above, and 15 credits must be in the student's declared major curricula.

University General Education Requirements

A list of university approved general education courses along with the administrative policies governing the requirement and the categories is available here (http://catalog.ndsu.edu/academic-policies/undergraduate-policies/general-education/).

Code	Title	Credits
Category C: Communication		**12**
Category R: Quantitative Reasoning		**3**
Category S: Science and Technology		**10**
Category A: Humanities and Fine Arts		**6**
Category B: Social and Behavioral Sciences		**6**
Category W: Wellness		**2**
Category D: Cultural Diversity		
Category G: Global Perspectives		
Category L: Digital Literacy		
Total Credits		**39**

Physics Major Requirements

A grade of 'C' or better is required for all PHYS and AST prefix courses.

Code	Title	Credits
Major Core Requirements		
PHYS 171	Introductory Projects in Physics	1
PHYS 251 & 251L	University Physics I and University Physics I Laboratory	5
PHYS 252 & 252L	University Physics II and University Physics II Laboratory	5
PHYS 350	Modern Physics	3
PHYS 355	Classical Mechanics	3
PHYS 361	Electromagnetic Theory (or PHY 370: Electromagnetic Theory from MSUM)	3
PHYS 485	Quantum Mechanics I	3
PHYS 488	Senior Project I	1
PHYS 489	Senior Project II	2
CSCI 160	Computer Science I	4
or ECE 173	Introduction to Computing	
MATH 129	Basic Linear Algebra	3
or MATH 329	Intermediate Linear Algebra	

MATH 165	Calculus I	4
MATH 166	Calculus II	4
MATH 265	Calculus III	4
MATH 266	Introduction to Differential Equations	3
MATH Electives - Select 6 credits from the following:		6
MATH 270	Introduction to Abstract Mathematics	
MATH 400 Level		
Select one of the following chemistry sequences (150/160 is recommended):		4
CHEM 150 & CHEM 160	Principles of Chemistry I and Principles of Chemistry Laboratory I	
CHEM 121 & 121L	General Chemistry I and General Chemistry I Laboratory	
Select one of the following chemistry sequences (151/161 recommended):		4
CHEM 151 & CHEM 161	Principles of Chemistry II and Principles of Chemistry Laboratory II	
CHEM 122 & 122L	General Chemistry II and General Chemistry II Laboratory	
Option Requirement		
Select either the Standard option or the Optical Science & Engineering option to complete this major (requirements outlined below).		19-20
Total Credits		**81-82**

Standard Option

Code	Title	Credits
CSCI 161	Computer Science II	4
Physics Electives: Select 15 credits from the following:		15
PHYS 215	Research For Undergraduates	
PHYS 360	Modern Physics II	
PHYS 370	Introduction to Computational Physics	
PHYS 411	Optics for Scientists & Engineers	
PHYS 411L	Optics for Scientists and Engineers Lab	
PHYS 413	Lasers for Scientists and Engineers	
PHYS 415	Elements of Photonics	
PHYS 430	Quantum Computation	
PHYS 486	Quantum Mechanics II	
PHYS 481	Materials Physics	
MSUM AST	Astronomy courses (300/400 level) with departmental approval	
PHYS 357	Concordia College Astrophysics	
PHYS 419	Concordia College Introduction to General Relativity	
Total Credits		**19**

Optical Science and Engineering Option

Code	Title	Credits
PHYS 411	Optics for Scientists & Engineers	3
PHYS 411L	Optics for Scientists and Engineers Lab	1
PHYS 413	Lasers for Scientists and Engineers	3
PHYS 415	Elements of Photonics	3
EE 206	Circuit Analysis I	4
Physics Electives: Select 6 credits from the following		6
PHYS 215	Research For Undergraduates	
PHYS 360	Modern Physics II	
PHYS 370	Introduction to Computational Physics	
PHYS 430	Quantum Computation	
PHYS 462	Thermal and Statistical Physics	

PHYS 481	Materials Physics	
PHYS 486	Quantum Mechanics II	
Total Credits		**20**

Program Notes

- Except for courses offered only as pass/fail grading, no course may be taken Pass/Fail.