

# Physics

---

## Department Information

- **Department Location:**  
South Engineering
- **Department Phone:**  
701-231-8974
- **Department Web Site:**  
[www.ndsu.edu/physics/](http://www.ndsu.edu/physics/) (<http://www.ndsu.edu/physics/>)
- **Credential Offered:**  
B.S.; B.A.
- **Plan Of Study Sample:**  
[catalog.ndsu.edu/programs-study/undergraduate/physics/#planofstudytext](http://catalog.ndsu.edu/programs-study/undergraduate/physics/#planofstudytext) (<http://catalog.ndsu.edu/programs-study/undergraduate/physics/#planofstudytext>)

## Major Requirements

### Major: Physics - Standard

**Degree Type:** B.A. or B.S.

**Minimum Degree Credits to Graduate:** 120

### University Degree Requirements

1. Satisfactory completion of all requirements of the curriculum in which one is enrolled.
2. Earn a minimum total of 120 credits in approved coursework. Some academic programs exceed this minimum.
3. Satisfactory completion of the general education requirements as specified by the university.
4. A minimum institutional GPA of 2.00 based on work taken at NDSU.
5. At least 36 credits presented for graduation must be in courses numbered 300 or higher.
6. Transfer Students: Must earn a minimum of 60 credits from a baccalaureate-degree granting or professional institution.
  - a. Of these 60, at least 36 must be NDSU resident credits as defined in #7.
  - b. Within the 36 resident credits, a minimum of 15 must be in courses numbered 300 or higher and 15 credits in the major field of study.
7. At least 36 credits must be NDSU resident credits. Resident credits include credits registered and paid for at NDSU.

For complete information, please refer to the Degree and Graduation Requirements (<http://catalog.ndsu.edu/past-bulletin-archive/2021-22/academic-policies/undergraduate-policies/degree-and-graduation/>) section of this Bulletin.

### University General Education Requirements

| Code                                                   | Title                               | Credits   |
|--------------------------------------------------------|-------------------------------------|-----------|
| <b>Communication (C)</b>                               |                                     | <b>12</b> |
| ENGL 110                                               | College Composition I               |           |
| ENGL 120                                               | College Composition II              |           |
| COMM 110                                               | Fundamentals of Public Speaking     |           |
|                                                        | Upper Division Writing <sup>†</sup> |           |
| <b>Quantitative Reasoning (R) <sup>†</sup></b>         |                                     | <b>3</b>  |
| <b>Science and Technology (S) <sup>†</sup></b>         |                                     | <b>10</b> |
| <b>Humanities and Fine Arts (A) <sup>†</sup></b>       |                                     | <b>6</b>  |
| <b>Social and Behavioral Sciences (B) <sup>†</sup></b> |                                     | <b>6</b>  |
| <b>Wellness (W) <sup>†</sup></b>                       |                                     | <b>2</b>  |
| <b>Cultural Diversity (D) <sup>**†</sup></b>           |                                     |           |
| <b>Global Perspectives (G) <sup>**†</sup></b>          |                                     |           |
| <b>Total Credits</b>                                   |                                     | <b>39</b> |

- \* May be satisfied by completing courses in another General Education category.
- † General education courses may be used to satisfy requirements for both general education and the major, minor, and program emphases, where applicable. Students should carefully review major requirements to determine if specific courses can also satisfy these general education categories.
- A list of university approved general education courses and administrative policies are available here (<http://catalog.ndsu.edu/past-bulletin-archive/2021-22/academic-policies/undergraduate-policies/general-education/#genedcoursestext>).

## College Requirements

| Code | Title                                                                                                                                                                 | Credits   |
|------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
|      | <b>Bachelor of Arts (BA) Degree – An additional 12 credits Humanities and Social Sciences and proficiency at the second year level in a modern foreign language.*</b> | <b>12</b> |
|      | <b>Bachelor of Science (BS) Degree – An additional 6 credits in Humanities or Social Sciences*</b>                                                                    | <b>6</b>  |

- \* Humanities and Social Sciences may be fulfilled by any course having the following prefix: ADHM, ANTH, ARCH, ART, CJ, CLAS, COMM, ECON, ENGL, FREN, GEOG, GERM, HDFS, HIST, LA, LANG, MUSC, PHIL, POLS, PSYC, RELS, SOC, SPAN, THEA, WGS, or any course from the approved list of general education courses in humanities and social sciences (general education categories A and B). These credits must come from outside the department of the student's major.

## Major Requirements - Standard

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

| Code                                              | Title                                                                                                    | Credits |
|---------------------------------------------------|----------------------------------------------------------------------------------------------------------|---------|
| <b>Physics Major Requirements (Standard)</b>      |                                                                                                          |         |
| PHYS 171                                          | Introductory Projects in Physics                                                                         | 1       |
| PHYS 251<br>& 251L                                | University Physics I<br>and University Physics I Laboratory (May satisfy general education category S)   | 5       |
| PHYS 251R                                         | University Physics I Recitation                                                                          | 1       |
| PHYS 252<br>& 252L                                | University Physics II<br>and University Physics II Laboratory (May satisfy general education category S) | 5       |
| PHYS 252R                                         | University Physics II Recitation                                                                         | 1       |
| PHYS 350                                          | Modern Physics                                                                                           | 3       |
| PHYS 355                                          | Classical Mechanics                                                                                      | 3       |
| PHYS 360                                          | Modern Physics II                                                                                        | 3       |
| PHYS 361                                          | Electromagnetic Theory (or PHY 370: Electromagnetic Theory from MSUM)                                    | 3       |
| PHYS 370                                          | Introduction to Computational Physics                                                                    | 3       |
| PHYS 411<br>& 411L                                | Optics for Scientists & Engineers<br>and Optics for Scientists and Engineers Lab                         | 4       |
| PHYS 462                                          | Thermal and Statistical Physics                                                                          | 3       |
| PHYS 485                                          | Quantum Mechanics I                                                                                      | 3       |
| PHYS 486                                          | Quantum Mechanics II                                                                                     | 3       |
| PHYS 488                                          | Senior Project I                                                                                         | 1       |
| PHYS 489                                          | Senior Project II                                                                                        | 2       |
| Physics Electives: Select two from the following: |                                                                                                          | 6       |
| PHYS 215                                          | Research For Undergraduates                                                                              |         |
| PHYS 413                                          | Lasers for Scientists and Engineers                                                                      |         |
| PHYS 415                                          | Elements of Photonics                                                                                    |         |
| PHYS 481                                          | Condensed Matter Physics                                                                                 |         |
| MSUM AST                                          | Astronomy courses (300/400 level) with departmental approval                                             |         |
| <b>Related Required Courses</b>                   |                                                                                                          |         |
| CSCI 160<br>or ECE 173                            | Computer Science I<br>Introduction to Computing                                                          | 4       |
| CSCI 161                                          | Computer Science II                                                                                      | 4       |
| MATH 129<br>or MATH 329                           | Basic Linear Algebra<br>Intermediate Linear Algebra                                                      | 3       |

|                                                                           |                                                                         |   |
|---------------------------------------------------------------------------|-------------------------------------------------------------------------|---|
| MATH 165                                                                  | Calculus I (May satisfy general education category R)                   | 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 (MATH 488 & MATH 489 are recommended)                      |                                                                         |   |
| Select one of the following chemistry sequences (150/160 is recommended): |                                                                         | 4 |
| CHEM 150<br>& CHEM 160                                                    | Principles of Chemistry I<br>and Principles of Chemistry Laboratory I   |   |
| CHEM 121<br>& 121L                                                        | General Chemistry I<br>and General Chemistry I Laboratory               |   |
| Select one of the following chemistry sequences (151/161 recommended):    |                                                                         | 4 |
| CHEM 151<br>& CHEM 161                                                    | Principles of Chemistry II<br>and Principles of Chemistry Laboratory II |   |
| CHEM 122<br>& 122L                                                        | General Chemistry II<br>and General Chemistry II Laboratory             |   |

**Total Credits** **90**

### Program Notes

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