

Electrical Engineering & Physics

Department Information

- **Department Location:**
Electrical and Computer Engineering or South Engineering
- **Department Phone:**
701-231-7019
- **Department Web Site:**
www.ndsu.edu/ece/ or www.ndsu.edu/physics/ (<http://www.ndsu.edu/ece/> or www.ndsu.edu/physics/)
- **Credential Offered:**
B.S.E.E.
- **Plan Of Study Sample:**
bulletin.ndsu.edu/programs-study/undergraduate/electrical-engineering-physics/#planofstudytext (<http://bulletin.ndsu.edu/programs-study/undergraduate/electrical-engineering-physics/#planofstudytext>)

Major Requirements

Double Major: Electrical Engineering & Physics

Degree Type: B.S.E.E.

Minimum Degree Credits to Graduate: 136

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/academic-policies/undergraduate-policies/degree-and-graduation/>) section of this Bulletin.

University General Education Requirements

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

* 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/academic-policies/undergraduate-policies/general-education/#genedcoursestext>).

Major Requirements

| Code | Title | Credits |
|--|--|---------|
| Electrical Engineering Core Requirements | | |
| ECE 111 | Introduction to Electrical and Computer Engineering | 3 |
| ECE 173 | Introduction to Computing * | 4 |
| ECE 275 | Digital Design * | 4 |
| ECE 311 | Circuit Analysis II | 4 |
| ECE 320 | Electronics I | 3 |
| ECE 321 | Electronics II | 2 |
| ECE 331 | Energy Conversion | 4 |
| ECE 341 | Random Processes | 3 |
| ECE 343 | Signals & Systems | 4 |
| ECE 351 | Applied Electromagnetics | 4 |
| ECE 376 | Embedded Systems | 4 |
| ECE 401 | Design I | 1 |
| ECE 403 | Design II | 2 |
| ECE 405 | Design III | 3 |
| ECE Electives | | |
| Select 6 credits of ECE 400 level electives (excluding 494 & 496). | | 6 |
| Physics Core Requirements | | |
| PHYS 171 | Introductory Projects in Physics * | 1 |
| PHYS 251 | University Physics I * | 4 |
| PHYS 251L | University Physics I Laboratory * | 1 |
| PHYS 251R | University Physics I Recitation * | 1 |
| PHYS 252 | University Physics II * | 4 |
| PHYS 252L | University Physics II Laboratory * | 1 |
| PHYS 252R | University Physics II Recitation * | 1 |
| PHYS 350 | Modern Physics * | 3 |
| PHYS 355 | Classical Mechanics * | 3 |
| PHYS 360 | Modern Physics II * | 3 |
| PHYS 370 | Introduction to Computational Physics * | 3 |
| PHYS 462 | Thermal and Statistical Physics * | 3 |
| PHYS 485 | Quantum Mechanics I * | 3 |
| Select one from the following: * | | 3-4 |
| PHYS 411 & 411L | Optics for Scientists & Engineers and Optics for Scientists and Engineers Lab (or ECE 411 & ECE 411L)) | |
| PHYS 413 | Lasers for Scientists and Engineers | |
| PHYS 415 | Elements of Photonics | |
| Physics Electives: Select one from the following * | | 3 |
| PHYS 215 | Research For Undergraduates (2 credit minimum) | |
| PHYS 481 | Condensed Matter Physics | |
| PHYS 486 | Quantum Mechanics II | |
| PHYS 489 | Senior Project II | |
| MSUM Astronomy Courses (AST 300-400 level - with dept. permission) | | |
| Mathematics Courses Required | | |

| | | |
|---|--|----------|
| MATH 129 | Basic Linear Algebra * | 3 |
| MATH 165 | Calculus I * | 4 |
| MATH 166 | Calculus II * | 4 |
| MATH 265 | Calculus III * | 4 |
| MATH 266 | Introduction to Differential Equations * | 3 |
| Other Required Courses | | |
| EE 206 | Circuit Analysis I * | 4 |
| ENGR 402 | Engineering Ethics and Social Responsibility | 1 |
| Select one upper division writing course from the following: | | 3 |
| ENGL 320 | Business and Professional Writing | |
| ENGL 321 | Writing in the Technical Professions | |
| ENGL 324 | Writing in the Sciences | |
| ENGL 459 | Researching and Writing Grants and Proposal | |

Total Credits**114-115**

* No grade less than a 'C' accepted in these courses and before enrolling in ECE 300 level courses, excluding ECE 311.

Degree Requirements and Notes:

- In order to graduate, an EE/PHYS student must have at least a 2.00 GPA in all required EE, ECE, and PHYS courses taken at NDSU. Elective ECE and PHYS courses are not included in this GPA requirement.
- Transfer Students: Transfer courses with grades less than a 'C' in Biology, Chemistry, Computer Science, Mathematics, Physics, and any type of engineering class will not be accepted as a major in this program.
- All Students: See footnote regarding a grade of 'C' required in identified courses.