

Electrical Engineering & Physics Dual Major

Major Requirements

Degree Type: B.S.E.E.

Minimum Credits Required: 135

University Degree Requirements

For complete details on these and other university degree requirements, refer to the Degree and Graduation Requirements (<https://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 residence 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 (<https://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

Major Requirements

Code	Title	Credits
Electrical Engineering Core Requirements ¹		
ECE 111	Introduction to Electrical and Computer Engineering	3
ECE 173	Introduction to Computing ²	4
ECE 275	Digital Design ²	4
ECE 311	Circuit Analysis II	4
ECE 320	Electronics I	4
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 4XX level prefix electives (excluding 494 & 496). 6

Physics Core Requirements

PHYS 171	Introductory Projects in Physics ²	1
PHYS 251	University Physics I ²	4
PHYS 251L	University Physics I Laboratory ²	1
PHYS 252	University Physics II ²	4
PHYS 252L	University Physics II Laboratory ²	1
PHYS 350	Modern Physics ²	3
PHYS 355	Classical Mechanics ²	3
PHYS 485	Quantum Mechanics I ²	3

Select one from the following: ² 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 9 credits from the following ² 9

PHYS 215	Research For Undergraduates (2 credit minimum)	
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	
PHYS 489	Senior Project II	
MSUM Astronomy Courses (AST 300-400 level - with dept. permission)		

Mathematics Courses Required

MATH 129	Basic Linear Algebra ²	3
MATH 165	Calculus I ²	4
MATH 166	Calculus II ²	4
MATH 265	Calculus III ²	4
MATH 266	Introduction to Differential Equations ²	3

Other Required Courses

EE 206	²	
ENGR 327	Ethics, Engineering, and Technology	3

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 108-109

¹ Students must complete all of the courses listed in the Electrical Engineering Core Requirements section with a 2.00 GPA.

² No grade less than a 'C' is accepted in these course and before enrolling in ECE 3XX level prefix courses, excluding ECE 311.