Electrical Engineering

Department Information

- **Department Web Site:**
  www.ndsu.edu/ece/ (http://www.ndsu.edu/ece/)
- **Credential Offered:**
  B.S.E.E.
- **Sample Program Guide:**
  catalog.ndsu.edu/programs-study/undergraduate/electrical-engineering/#planofstudytext (http://catalog.ndsu.edu/programs-study/undergraduate/electrical-engineering/#planofstudytext)

Major Requirements

Major: Electrical Engineering

Degree Type: B.S.E.E.
Minimum Degree Credits to Graduate: 126

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 30 credits must be NDSU resident credits. Resident credits include credits registered and paid for at NDSU.
6. At least 36 credits presented for graduation must be in courses numbered 300 or higher.
7. Students presenting transfer credit must meet the NDSU residence credits and the minimum upper level credit. Of the 30 credits earned in residence, a minimum of 15 semester credits must be in courses numbered 300 or above, and 15 semester credits must be in the student's curricula for their declared major.

For complete information, please refer to the Degree and Graduation Requirements (http://catalog.ndsu.edu/past-bulletin-archive/2023-24/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**

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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/2023-24/academic-policies/undergraduate-policies/general-education/#genedcoursestext).

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	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 (capstone)	1
ECE 403	Design II (capstone)	2
ECE 405	Design III (capstone)	3
MATH Courses Required		
MATH 129	Basic Linear Algebra [2]	3
MATH 165	Calculus I (May satisfy general education category R) [2]	4
MATH 166	Calculus II [2]	4
MATH 265	Calculus III (w/ vectors) [2]	4
MATH 266	Introduction to Differential Equations [2]	3
Other Courses Required		
CHEM 121	General Chemistry I (May satisfy general education category S)	3
EE 206	Circuit Analysis I [2]	4
ENGR 327	Ethics, Engineering, and Technology	3
PHYS 251	University Physics I (May satisfy general education category S)	4
PHYS 252	University Physics II (May satisfy general education category S)	4
Select one of the following: (May satisfy general education category C)		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	
Select one of the following lab courses (May satisfy general education category S):		1
CHEM 121L	General Chemistry I Laboratory	
PHYS 251L	University Physics I Laboratory	
PHYS 252L	University Physics II Laboratory	
ECE Electives		
Select 9 credits of ECE 4XX level prefix electives. Includes the cross listed courses of ECE 427/IME 427; ECE 429/IME 429; ECE 411/PHYS 411; & ECE 411L/PHYS 411L (excluding 494 and 496).		9
Tech Electives		
Select 12 credits from the following:		12
ABEN 456	Biobased Energy	
BIOL 150 & 150L	General Biology I and General Biology I Laboratory	
BIOL 220 & 220L	Human Anatomy and Physiology I and Human Anatomy and Physiology I Laboratory	
BIOL 221 & 221L	Human Anatomy and Physiology II and Human Anatomy and Physiology II Laboratory	

BIOL 315 & 315L	Genetics and Genetics Laboratory
CE 309 & CE 310	Fluid Mechanics and Fluid Mechanics Laboratory
CE/ME 486	Nanotechnology and Nanomaterials
CHEM 122 & 122L	General Chemistry II and General Chemistry II Laboratory
CHEM 341 & 341L	Organic Chemistry I and Organic Chemistry I Laboratory
CHEM 342 & 342L	Organic Chemistry II and Organic Chemistry II Laboratory
CHEM 364	Physical Chemistry I
CHEM 365 & CHEM 471	Physical Chemistry II and Physical Chemistry Laboratory
CHEM 425 & CHEM 429	Inorganic Chemistry I and Inorganic Chemistry Laboratory
CSCI 161	Computer Science II
CSCI 222	Discrete Mathematics
CSCI 336	Theoretical Computer Science
CSCI 366	Database Systems
CSCI 372	Comparative Programming Languages
CSCI 426	Introduction to Artificial Intelligence
CSCI 458	Computer Graphics
CSCI 459	Foundations of Computer Networks
CSCI 467	Algorithm Analysis
CSCI 474	Operating Systems Concepts
CSCI 477	Object-Oriented Systems
ECE 374	Computer Organization
ECE 494	Individual Study (max. of 6 cr.)
ECE 4XX	Any ECE 400 level didactic course
ECE 496	Field Experience (max. of 3 cr.)
ENGR 310	Entrepreneurship for Engineers and Scientists
IME 440	Engineering Economy
IME 456	Program and Project Management
IME 461	Quality Assurance and Control
MATH 270	Introduction to Abstract Mathematics
MATH 420	Abstract Algebra I
MATH 421	Abstract Algebra II
MATH 429	Topics in Linear Algebra
MATH 450	Real Analysis I
MATH 451	Real Analysis II
MATH 452	Complex Analysis
MATH 480	Applied Differential Equations
MATH 481	Fourier Analysis
MATH 483	Partial Differential Equations
MATH 488	Numerical Analysis
ME 221	Engineering Mechanics I
ME 222	Engineering Mechanics II
ME 223	Mechanics of Materials
ME 350	Thermodynamics and Heat Transfer
ME 470	Renewable Energy Technology
MICR 445	Animal Cell Culture Techniques
PHYS 350	Modern Physics

PHYS 360	Modern Physics II	
PHYS 413	Lasers for Scientists and Engineers	
PHYS 415	Elements of Photonics	
PHYS 485	Quantum Mechanics I	
STAT 450	Stochastic Processes	
STAT 468	Probability and Mathematical Statistics II	
Total Credits		**106**

[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 courses and before enrolling in ECE 3XX level prefix courses, excluding ECE 311.

Degree Requirements and Notes

- For students interested in pursuing one of the areas of specialization, lists of recommendations for specific electives are available from the ECE Department (https://www.ndsu.edu/ece/).