Computer Engineering

Department Information

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

Major Requirements

Major: Computer Engineering

Degree Type: B.S.Cpr.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
Computer 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 341	Random Processes	3
ECE 343	Signals & Systems	4
ECE 374	Computer Organization	4
ECE 375	Digital Design 2	3
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	3
MATH 165	Calculus I (May satisfy general education category R)	4
MATH 166	Calculus II	4
MATH 265	Calculus III (w/ vectors)	4
MATH 266	Introduction to Differential Equations	3
CSCI Courses Required		
CSCI 161	Computer Science II (May satisfy general education category S for Computer Engineering majors only))	4
CSCI 222	Discrete Mathematics	3
Other Courses Required		
CHEM 121	General Chemistry I (May satisfy general education category S)	3
CHEM 121L	General Chemistry I Laboratory (May satisfy general education category S)	1
or PHYS 251L	University Physics I Laboratory	
EE 206	Circuit Analysis I	4
PHYS 251	University Physics I (May satisfy general education category S)	4
ENGR 327	Ethics, Engineering, and Technology	3
Select one from 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	
Core Electives		**12**
Select 4 courses from the following:		
ECE 423	VLSI Design	
ECE 425	Introduction to Semiconductor Devices	
ECE 474	Computer Architecture	
ECE 477	Hardware Design for Machine Learning	
CSCI 467	Algorithm Analysis	
CSCI 474	Operating Systems Concepts	
ECE Electives		**6**
Select 6 credits from the following. A Core Elective from the section above may be used in this section if not taken as an ECE Core Elective.		
ECE 321	Electronics II	
ECE 424	Analog VLSI	
ECE 444	Applied Digital Signal Processing	

ECE 448	Image Analysis I	
ECE 461	Control Systems I	
ECE 463	Modern Control	
ECE 470	Fault Tolerant Digital Systems	
ECE 472	Design Automation of VLSI Circuits	
ECE 476	Advanced Embedded Systems	
ECE 483	Instrumentation for Engineers	
ECE 485	Biomedical Engineering	
CSCI 459	Foundations of Computer Networks	
CSCI 413	Principles of Software Engineering	
Tech Electives		**3**
Select 3 credits from the following:		
CSCI 336	Theoretical Computer Science	
CSCI 366	Database Systems	
CSCI 372	Comparative Programming Languages	
CSCI 4XX	Any CSCI 400 level didactic course	
ECE 351	Applied Electromagnetics	
ECE 4XX	Any ECE 400 level didactic course	
ECE 494	Individual Study	
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 460	Evaluation of Engineering Data	
IME 470	Operations Research I	
PHYS 252	University Physics II	
Total Credits		**102**

Degree Requirements and Notes

- In order to graduate, an ECE student must have at least a 2.0 GPA in all required EE and ECE courses. Elective ECE courses are not included in this GPA requirement.
- All Students – Students are required to attain a grade of 'C' or better in ECE 173 Introduction to Computing, ECE 275 Digital Design, EE 206 Circuit Analysis I, and all required MATH courses.