

COMPUTER ENGINEERING, B.S. (ENGINEERING)

Begin Campus: Any Penn State Campus

End Campus: University Park

Degree Requirements

For the Bachelor of Science degree in Computer Engineering, a minimum of 128 credits is required:

Requirement	Credits
General Education	45
Requirements for the Major	110

27 of the 45 credits for General Education are included in the Requirements for the Major. This includes: 9 credits of GN courses; 6 credits of GQ courses; 3 credits of GS courses; 9 credits of GWS courses.

Requirements for the Major

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (<https://senate.psu.edu/students/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/>).

Code	Title	Credits
Prescribed Courses		
CMPEN 362	Communication Networks	3
CMPEN 482W	Computer Engineering Project Design	3
CMPSC 473	Operating Systems Design & Construction	3
MATH 220	Matrices	2-3
MATH 231	Calculus of Several Variables	2
PHYS 214	General Physics: Wave Motion and Quantum Physics	2
STAT/MATH 418	Introduction to Probability and Stochastic Processes for Engineering	3
<i>Prescribed Courses: Require a grade of C or better</i>		
CHEM 110	Chemical Principles I	3
CMPEN 331	Computer Organization And Design	3
CMPEN 431	Introduction to Computer Architecture	3
CMPSC 221	Object Oriented Programming with Web-Based Applications	3
CMPSC 311	Introduction to Systems Programming	3
CMPSC 360	Discrete Mathematics for Computer Science	3
CMPSC 465	Data Structures and Algorithms	3
EE 210	Circuits and Devices	4
EE 310	Electronic Circuit Design I	4
EE 353	Signals and Systems: Continuous and Discrete-Time	3
ENGL 202C	Effective Writing: Technical Writing	3
MATH 140	Calculus With Analytic Geometry I	4
MATH 141	Calculus with Analytic Geometry II	4
MATH 250	Ordinary Differential Equations	3
PHYS 211	General Physics: Mechanics	4

PHYS 212 General Physics: Electricity and Magnetism 4

Additional Courses

Select 1 credit of First-Year Seminar 1

Select 3 credits of the following: 3

ECON 14 Principles of Economics

ECON 102 Introductory Microeconomic Analysis and Policy

ECON 104 Introductory Macroeconomic Analysis and Policy

Select 6 credits from the following: 6

CMPEN 411 VLSI Digital Circuits

CMPEN 416 Digital Integrated Circuits

CMPEN 417 Digital Design Using Field Programmable Devices

CMPEN 454 Fundamentals of Computer Vision

CMPEN 455 An Introduction to Digital Image Processing

CMPEN 471

CMPEN 472 Microprocessors and Embedded Systems

CMPEN 473 Microcomputer Laboratory

CMPEN 475 Functional Verification

EE 453 Fundamentals of Digital Signal Processing

EE 456 Introduction to Neural Networks

Select 6 credits from any 400-level CMPEN or CMPSC course 6

Additional Courses: Require a grade of C or better

CAS 100A Effective Speech 3

or CAS 100B Effective Speech

CMPSC 121 Introduction to Programming Techniques 3

or CMPSC 131 Programming and Computation I: Fundamentals

CMPSC 122 Intermediate Programming¹ 3

or CMPSC 132 Programming and Computation II: Data Structures

ENGL 15 Rhetoric and Composition 3

or ENGL 30H Honors Rhetoric and Composition

Select 4 credits from the following: 4

CMPEN 270 Digital Design: Theory and Practice

CMPEN 271 Introduction to Digital Systems & CMPEN 275 and Digital Design Laboratory²

Supporting Courses and Related Areas

Select 6 credits from department list³ 6

¹ CMPSC 122 does not require a grade of C or better.

² CMPEN 275 does not require a grade of C or better.

³ Students may apply up to 3 credits of Co-op. Students who complete ROTC may apply up to 3 credits of ROTC as department list credits and 3 credits of ROTC as GHW credits.

General Education

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (<https://bulletins.psu.edu/undergraduate/general-education/baccalaureate-degree-general-education-program/>) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required and Inter-Domain courses do not meet this requirement.)

- **Quantification (GQ):** 6 credits
- **Writing and Speaking (GWS):** 9 credits

Breadth in the Knowledge Domains (Inter-Domain courses do not meet this requirement.)

- **Arts (GA):** 3 credits
- **Health and Wellness (GHW):** 3 credits
- **Humanities (GH):** 3 credits
- **Social and Behavioral Sciences (GS):** 3 credits
- **Natural Sciences (GN):** 3 credits

Integrative Studies

- **Inter-Domain Courses (Inter-Domain):** 6 credits

Exploration

- **GN**, may be completed with Inter-Domain courses: 3 credits
- **GA, GH, GN, GS, Inter-Domain courses.** This may include 3 credits of World Language course work beyond the 12th credit level or the requirements for the student's degree program, whichever is higher: 6 credits

University Degree Requirements

First Year Engagement

All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement

6 credits are required and may satisfy other requirements

- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum

3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits

A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work

Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition

The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (<https://senate.psu.edu/students/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/>)). For more information, check the Suggested Academic Plan for your intended program.