

Computer Engineering B.S. Degree Requirements

The Bachelor of Science (B.S.) in Computer Engineering is made up of 125 credits. The major offers two tracks: (1) Electronic Systems (ES) and (2) Communications (COM). These tracks share twenty-six common courses as detailed below. In addition, students must take two specialized courses for their track, and all Computer Engineering students must complete three technical electives. These requirements apply to students entering as freshmen in Fall 2014.

Students who started their undergrad careers prior to Fall 2014 should see: [CMPE Four-Year Plan \(pre 2014\)](#).

I. Required Common Core Courses (88 credits):

Computer Science	CMSC 201/201H*: Introduction to Computer Science CMSC 202/202H: Computer Science II for Majors CMSC 203: Discrete Structures CMSC 341/341H: Data Structures CMSC 411: Computer Architecture CMSC 421: Principles of Operating Systems
Computer Engineering	CMPE 212*: Principles of Digital Design CMPE 306: Introductory Circuit Theory CMPE 310: Systems Design and Programming CMPE 311: C Programming and Embedded Systems CMPE 314: Principles of Electronic Circuits CMPE 349: Introduction to Professional Practice CMPE 450: Capstone I CMPE 451: Capstone II
Engineering	ENES 101*: Introduction to Engineering
Science	PHYS 121: Introductory Physics I PHYS 122*: Introductory Physics II One of CHEM 101, BIOL 141, BIOL 142, PHYS 220, PHYS 224, or PHYS 225.
Mathematics	MATH 151: Calculus and Analytical Geometry I MATH 152*: Calculus and Analytical Geometry II MATH 221: Introduction to Linear Algebra MATH 225: Introduction to Differential Equations MATH 251: Multivariable Calculus
English	ENGL 100: Composition
* These courses must be completed with an unweighted average of "B" or better. CMPE 212 requires a grade of "B" or better.	

II. Computer Engineering Gateway

Each student who wishes to earn a B. S. in Computer Engineering must meet the following two Gateway requirements:

- 1) A grade of "B" or better in CMPE 212
- 2) An unweighted average of "B" or better in the following 5 courses:
 - a) CMSC 201
 - b) CMPE 212
 - c) MATH 152
 - d) ENES 101
 - e) PHYS 122

Students must pass the gateway before taking any 300- or 400- level Computer Engineering or Computer Science Course, with the exception of CMSC 341 and CMPE 306. Registration for CMSC 341 or CMPE 306 does not require completion of the Computer Engineering Gateway.

III. Computer Engineering Tracks

Electronic Systems (ES) Track Requirements (7 credits):

In addition to the required common core courses, students in the Electronic Systems Track must complete:

- **CMPE 315:** Principles of VLSI Design
- **CMPE 415:** Programmable Logic Devices

Communications (COM) Track Requirements (7 credits):

In addition to the required common core courses, students in the Communication Engineering Track must complete:

- **CMPE 323:** Signal and Systems Theory
- **CMPE 330:** Electromagnetic Waves and Transmission

IV. Technical Electives (9 credits):

Students in both the ES and COM tracks must complete three technical electives. Two of those three courses must be upper-level Computer Engineering courses (List A), and the final course, if approved by an advisor, may be an upper-level Computer Science course (List B) or a CMPE course (List A). With the approval of the student's faculty advisor, graduate courses in Computer Engineering or Electrical Engineering may be substituted for undergraduate technical electives. Track Electives (see above) may be counted as electives for students in the other track. For example, ES students may take CMPE 323 as an elective.

Computer Engineering Electives (A)	Computer Science Electives (B)
CMPE 315: Principles of VLSI Design	CMSC 345: Software Design and Development
CMPE 321: Communications Laboratory	CMSC 422: Operating Systems Design
CMPE 323: Signals and Systems	CMSC 425: Performance Analysis of Computer Systems
CMPE 330: Electromagnetic Wave and Signal Transmission	CMSC 426: Principles of Computer Security
CMPE 415: FPGA Architectures and Applications	CMSC 431: Compiler Design Principles
CMPE 419: Arithmetic Algorithms	CMSC 435: Computer Graphics
CMPE 422: Digital Signal Processing	CMSC 441: Design and Analysis of Algorithms
CMPE 423: Principles of Communication Engineering	CMSC 442: Information and Coding Theory
CMPE 447: Analog Integrated Circuit Design	CMSC 443: Cryptology
CMPE 491: Special Topics in Computer Engineering	CMSC 455: Numerical Computations
CMSC 426: Principles of Computer Security	CMSC 483: Parallel and Distributed Processing
CMSC 478: Machine Learning	CMSC 486: Mobile Radio Communications
CMSC 479: Introduction to Robotics	ENME 403: Automatic Controls
CMSC 481: Computer Networks	

For additional details and sample course sequences, see [CMPE Four-Year Plan \(pre 2014\)](#) or the [CMPE Four-Year Plan \(2014 and later\)](#).

V. University General Education Program (GEP) Requirements (22 credits):

Remaining credits are comprised of GEP courses. For more information about GEP courses, see UMBC’s Undergraduate Catalog at www.umbc.edu/catalog

