



# Computer Engineering

Rev. Date:  
9/2015

## Freshman Year

### Fall Semester

Math 1371 Calculus I  
*(placement into course or pre-req)* 4

Phys 1301W Intro Physics I  
*(&Math 1371)* 4

Lib Ed or Writ 1301/1401 3/4

Liberal Education course 3/4

CSE 1001: 1st Yr Experience 1

### Spring Semester

Math 1372 Calculus II  
*(1371)* 4

Phys 1302W Intro Physics II  
*(1301, &Math 1372)* 4

EE 1301 Intro to Comp Sys  
*(&Math 1371) or*  
CSci 1113 Intro to C/C++  
*(Math 1371)* 4

EE 1001 Intro to EE and CompE  
*optional* 1

Lib Ed or Writ 1301/1401 3/4

## Sophomore Year

### Fall Semester

CSci 1913 Intro Alg, Data, Prog  
*(1113)* 4

EE 2001 Intro to Circ & Elec  
*(&Math 2373, &Phys 1302)* 3

EE 2002 Intro Circ/Elec Lab  
*(2001 or &2001)* 1

EE 2301 Intro Dig Sys Desig  
*(Math 1372)* 4

Math 2373 Lin Alg/Diff Eq.  
*(1372)* 4

### Spring Semester

CSci 2011 Disc. Structures  
*(Math 1371)* 4

EE 2011 LinSys, Circ, & Ele  
*(2001)* 3

EE 2361 Intro to Microcontrollers  
*(1301, 2301, or CSci 1113, or*  
*CSci 1133)* 4

Math 2374 Multivariable Calc  
*(1372)* 4

Liberal Education course 3/4

## Junior Year

### Fall Semester

EE 3015 Signals & Systems 3  
*(EE 2011)*

EE 3101 Circ & Electr Lab I  
*(3115 or &3115)* 2

EE 3115 Analog Electronics 3  
*(3015 or &3015)*

EE 4363 Computer Arch 4  
*(2361; no cr if CSci 4203, 5361 or 5201 taken)*

Liberal Education course 3/4

### Spring Semester

CSci 4041 Algs & Data Str. 4  
*(1913, CSci 2011)*

EE 3025 Statistical Methods 3  
*(3015)*

EE 3102 Circ & Electr Lab II 2  
*(3101)*

Technical Elective 3/4

Liberal Education course 3/4

## Senior Year

### Fall Semester

CSci 4061 Intro Oper System 4  
*(2021 or EE 2361)*

Technical Elective 3/4

Technical Elective 3/4

Technical Elective 3/4

### Spring Semester

EE 4951W Senior Design Proj 4  
*(3015, 3102, 3115)*

Technical Elective 3/4

Technical Elective 3/4

Technical Elective 3/4

## About This Plan

- This plan is not a contract. Curriculum can change.
- Shaded courses are only offered in the indicated semester.
- Course pre-requisites and co-requisites (designated by &) are listed below the course number and title.
- Students can take either the CSE-only or University-wide versions of the math course (Math 1371/1271, 1372/1272, 2373/2243, 2374/2263).
- Double boxed courses are required for application to this major.
- Liberal Education and Writing requirements with an (\*) will be fulfilled by taking courses required for this major at UM-TC.
- Students admitted prior to Fall 2013 may use CSci 1901/1902 in lieu of CSci 1113/1913.

## Applying to your Major

Students who have completed the required courses for admission to this major and have a 3.2 UM-TC technical GPA at the end of the fall semester will be guaranteed admission. All other students who have completed the required courses will be considered for admission on a space-available basis. Admission following the spring semester is only based on space availability. The major application database is available at [z.umn.edu/csemajorapp](http://z.umn.edu/csemajorapp).

## Department Contact Information

- Website: [www.ece.umn.edu/undergraduate/](http://www.ece.umn.edu/undergraduate/)
- Additional Information: [z.umn.edu/ecematrix](http://z.umn.edu/ecematrix)
- Main Office: 3-166 Keller; Main Phone: 612-624-7777
- Director of Undergraduate Studies: Professor Rhonda Franklin
- Department Advisors: Frances Wood and Roopa Sukumaran Berzins
- Department Advising Email: [fkwood@umn.edu](mailto:fkwood@umn.edu)

## University Degree Requirements

All students must complete the following Writing & Liberal Education requirements, as noted on their APAS report. See link for full Core & Theme names: [z.umn.edu/liberaleducation](http://z.umn.edu/liberaleducation)

Writing Requirements:	Liberal Education	
<b>University Writing:</b> Writ 1301/1401 or equivalent	<b>CORES:</b>	<b>THEMES</b>
<b>Writing Intensive (WI):</b> Two: 1xxx or 2xxx level ** One: 3/4/5xxx level (in major)* One: 3/4/5xxx level (any dept.)	Bio Phy* His SocS Ltr AH Mth*	<b>4 of 5:</b> Civ DSJ Env GP TS

**Total Credits Needed for Degree: 126**

# What can I do with a major in computer engineering?

Computer engineers are knowledgeable in the hardware and software aspects of computer science as well as circuit theory and electronic circuits. Careers in computer engineering may include writing software and firmware for embedded microcontrollers, or designing VLSI chips, analog sensors, mixed signal circuit boards, and operating systems. Computer engineers are also suited for robotics research, which relies heavily on using digital systems to control and monitor electrical systems like motors, communications, and sensors.

Several specialty areas within computer engineering include:

- Coding, cryptography, and information protection
- Communications and wireless networks
- Compilers and operating systems
- Computational science and engineering
- Computer networks, mobile computing, and distributed systems
- Computer systems: architecture, parallel processing, and dependability
- Computer vision and robotics
- Embedded systems
- Integrated circuits, VLSI design, testing, and CAD
- Signal, image, and speech processing

## Employers *(sample listing)*

Alliant TechSystems  
Nest Labs  
General Electric  
Cisco Systems  
Target Corporation  
Cray Inc.

Intel Corporation  
Honeywell  
IBM Corporation  
Logic PD  
Microsoft Corporation  
Seagate Technology

Medtronic  
Symantec Corporation  
Fast Enterprises  
Sun Microsystems  
Unisys  
UnitedHealth Group

## Industries *(sample listing)*

Communication technology  
Electronic components  
Government safety agencies  
Hardware design  
Human genetics engineering

Information technology  
Medical technologies  
Open systems control  
Semiconductors  
Software developers  
Software systems

Telecommunications  
Computer aided engineering  
Manufacturing  
Automation  
High speed supercomputers  
Hardware manufacturer

## Positions *(sample listing)*

**Hardware Engineer:** Researches, designs, develops, and tests computer hardware and supervises its manufacture and installation. Hardware refers to computer chips, circuit boards, computer systems, and related equipment such as keyboards, modems, and printers. Computer hardware engineers work with computers and computer-related equipment exclusively.

**Software Engineer:** Applies the principles and techniques of computer science, engineering, and mathematical analysis to the design, development, testing, and evaluation of the software and systems that enable computers to perform their many applications. Software engineers are concerned with developing algorithms and analyzing and solving programming problems.

**Network Systems and Data Communications Analysts/Specialist:** Plans, designs, builds, maintains, and tests networks and other data communications systems.

**Database Administrator:** Organizes, tracks, and stores information for businesses and organizations. Database administrators also design and coordinate database security systems.

\*Some positions may require an advanced degree.

**Career Center**  
[cse.umn.edu/career](http://cse.umn.edu/career)  
**Salary Information**  
[z.umn.edu/csosalary](http://z.umn.edu/csosalary)  
**More Information on Undergraduate Majors**  
[cse.umn.edu/majors](http://cse.umn.edu/majors)