

# Computer Engineering Major Degree Plan

The program leading to a Bachelor of Science in computer engineering is nominally a four-year program. The required program consists of a basic foundation of mathematics, science, computer science, engineering fundamentals, and laboratory and design experiences. Elective courses providing for one or more areas of technical focus, communication skills, and University Studies complete the program and prepare students for productive and rewarding careers in the computer engineering profession.

Required courses are shown in the accompanying paragraphs; however, because of differences in high school or transfer student preparation, it is strongly recommended that students meet with the college academic advisor to plan a detailed semester-by-semester schedule for completing the preprofessional requirements. Particular attention must be paid to course prerequisites, requiring some students to take longer than four semesters to complete the preprofessional program. Students transferring into the department should consult with the college academic advisor for transfer credit evaluation and proper placement in the curriculum.

AP and CLEP credit may be used to meet some of the required technical and University Studies courses. Details concerning courses acceptable as electives are available from the Electrical and Computer Engineering Department.

## Pre-professional Program

### Suggested Semester Schedule

#### Freshman Year (30-31 credits)

##### Fall Semester (15-16 credits)

MATH 1210 (QL)* Calculus I	4
CS 1400* Introduction to Computer Science—CS 1	3
CS 1405 <sup>1</sup> Introduction to Computer Science—CS 1 Lab	(1)
ECE 1000* Introduction to Electrical and Computer Engineering	2
University Studies Breadth courses	6

##### Spring Semester (15 credits)

MATH 1220 (QL)* Calculus II	4
CS 1410 (QI)* Introduction to Computer Science—CS 2	3
PHYS 2210 (QI)* General Physics—Science and Engineering I	4
ECE 2700* Digital Circuits	4

#### Sophomore Year (31-32 credits)

##### Fall Semester (16 credits)

ENGL 2010 (CL2)* Intermediate Writing: Research Writing in a Persuasive Mode	3
CS 2420 (QI)* Algorithms and Data Structures—CS 3	3
MATH 2270 (QI)* Linear Algebra	3
PHYS 2220 (BPS/QI)* General Physics— Science and Engineering II	4
University Studies Breadth course	3

##### Spring Semester (15-16 credits)

MATH 2280 (QI)* Ordinary Differential Equations	3
MATH 3310 Discrete Mathematics	3
CS 3100 Operating Systems and Concurrency	3
ECE 2250* Electrical Circuits	4
Technical Elective course	2-3

<sup>1</sup>Students desiring a Computer Science minor must take CS 1405 as a freshman. The rest of the minor is built into the curriculum. This lab is *not required* for the Computer Engineering major.

\*These classes are required for admission to the Professional Engineering Program (PEP). Courses are listed under the semesters in which they best fit.

## Professional Program

### Suggested Semester Schedule

Because of the variation in schedules, it is recommended that students meet with an advisor to work out a schedule for their junior and senior years. The following courses are required for students selecting the Professional Program in Computer Engineering.

### Suggested Semester Schedule

#### Junior Year (33 credits)<sup>2</sup>

##### Fall Semester (16 credits)

ECE 3620 Circuits and Signals	3
ECE 3710 Microcontroller Hardware and Software	4
ECE 5530 Digital System Design	3
ECE 5720 Computer Systems Programming and Architecture	3
University Studies Breadth course	3

##### Spring Semester (17 credits)

ECE 3410 Microelectronics I	4
ECE 3640 Signals and Systems	3
ECE 3810** Engineering Professionalism	1
ENGL 3080 (CI)** Introduction to Technical Communication	3
MATH 5710 Introduction to Probability	3
University Studies Breadth course	3

#### Senior Year (30-33 credits)

##### Fall Semester (16-17 credits)

ECE 4740 Computer and Data Communications	3
High-Level Technical Elective course	4
Computer Science elective course	4
Computer Engineering elective course	3
University Studies Depth Humanities and Creative Arts (DHA) course	2-3

##### Spring Semester (14-16 credits)

ECE 4850 (CI)*** Engineering Communications	2
High-Level Technical Elective course	3-4
Math/Science elective course	3
University Studies Depth Social Sciences (DSS) course	3
ECE Capstone course***	3-4

<sup>2</sup>Some of the junior classes can be delayed until the senior year, but this may limit a student's choice of electives during his or her senior year.

\*\*ENGL 3080 must be taken before or concurrently with ECE 3810.

\*\*\*ECE 4850 and a capstone course must be taken during the same semester.

### Capstone Courses (select 3-4 credits)

ECE 4840 (CI) Engineering Design (F,Sp)	3
ECE 5220 Electrotechnical Engineering	3
ECE 5240 Space System Design (Sp)	3
ECE 5340 Mobile Robots (F)	4
ECE 5770 Microcomputer Interfacing (Sp)	4
ECE 5930 ST: Digital Radio (ECE 5660 or 5810 should be taken concurrently) (Sp)	3

### High-Level Technical Elective Courses

#### (select 14-17 credits)

Students must complete a total of *at least* 14 credits within high-level technical electives. Courses listed in this departmental section as Computer Engineering Electives or Computer Science Electives may be used to fulfill this requirement. Also, courses having an ECE or CS prefix, which are numbered at the 5000 level, may be used as high-level technical electives.

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## Technical Elective Courses (select 20 or more credits)

### Computer Engineering Electives (select 3-13 credits)

<b>ECE 5320</b> Mechatronics (Sp).....	4
<b>ECE 5640</b> Real-Time Processors (Sp).....	4
<b>ECE 5740</b> Concurrent Programming (F).....	3
<b>ECE 5750</b> Computer Architecture (Sp).....	3
<b>ECE 5770</b> Microcomputer Interfacing (Sp).....	4
<b>ECE 5780</b> Real-Time Systems (F).....	4

### Computer Science Electives (select 4-14 credits)

<b>CS 5100</b> Graphical User Interfaces and Windows Programming (Sp).....	4
<b>CS 5200</b> Distributed and Network Programming (F).....	4
<b>CS 5400</b> Computer Graphics I (Sp).....	4

### Math and Science Electives (select 3-6 credits)

<b>MATH 2210 (QI)</b> Multivariable Calculus (F,Sp,Su).....	3
<b>MATH 4200 (CI)</b> Foundations of Analysis (F,Sp).....	3
<b>MATH 4310 (CI)</b> Introduction to Algebraic Structures (F,Sp).....	3
<b>MATH 5210</b> Introduction to Analysis I (F).....	3
<b>MATH 5220</b> Introduction to Analysis II (Sp).....	3
<b>MATH 5270</b> Complex Variables (Sp).....	3
<b>MATH 5310</b> Introduction to Modern Algebra (Sp).....	3
<b>MATH 5340</b> Theory of Linear Algebra (F).....	3
<b>MATH 5410</b> Methods of Applied Mathematics (F).....	3
<b>MATH 5420</b> Partial Differential Equations (Sp).....	3
<b>MATH 5460</b> Introduction to the Theory and Application of Nonlinear Dynamical Systems (Sp).....	3
<b>MATH 5510</b> Introduction to Topology (Alt F).....	3
<b>MATH 5610</b> Computational Linear Algebra and Solution of Systems of Equations (F).....	3
<b>MATH 5620</b> Numerical Solution of Differential Equations (Sp).....	3
<b>MATH 5720</b> Introduction to Mathematical Statistics (Sp).....	3
<b>MATH 5760</b> Stochastic Processes (F).....	3
AP Biology.....	4
<b>BIOL 1610</b> Biology I (F).....	4
<b>BIOL 2420</b> Human Physiology (F,Sp,Su).....	4
<b>BIOL 3300</b> General Microbiology (F,Sp).....	4
AP Chemistry.....	8

<b>CHEM 1210</b> Principles of Chemistry I (F,Sp).....	4
<b>CHEM 1215</b> Chemical Principles Laboratory I (F,Sp).....	1
<b>CHEM 1220 (BPS)</b> Principles of Chemistry II (F,Sp,Su).....	4
<b>CHEM 2310</b> Organic Chemistry I (F).....	4
<b>CHEM 3700</b> Introductory Biochemistry (Sp).....	3
<b>CHEM 3710</b> Introductory Biochemistry Laboratory (Sp).....	1
<b>PHYS 2710</b> Introductory Modern Physics.....	3
<b>PHYS 3550<sup>3</sup></b> Intermediate Classical Mechanics.....	3
<b>PHYS 3600</b> Electromagnetism I.....	3
<b>PHYS 3700<sup>4</sup></b> Thermal Physics.....	3
<b>PHYS 3710</b> Intermediate Modern Physics.....	3
<b>PHYS 3750</b> Foundations of Wave Phenomena.....	3
<b>PHYS 4600</b> Electromagnetism II.....	3
<b>PHYS 4650<sup>5</sup></b> Optics I.....	3
<b>PHYS 4680<sup>5</sup></b> Optics II.....	3
<b>PHYS 4700</b> Quantum Mechanics I.....	3
<b>PHYS 4710</b> Quantum Mechanics II.....	3
<b>WILD 2200 (BLS)</b> Ecology of Our Changing World (F,Sp).....	3

### Technical Electives (select 0-3 credits)

<b>CS 2450 (CI)</b> Introduction to Software Engineering I (F,Sp).....	3
<b>CS 2810</b> Computer Systems Organization and Architecture I (F,Sp).....	3
<b>CS 3450</b> Introduction to Software Engineering II (F,Sp).....	3
<b>CS 4700</b> Programming Languages (F,Sp).....	3
<b>CEE 4200</b> Engineering Economics (F).....	2
<b>ECE 4250</b> Internship/Co-op (F,Sp,Su).....	3
<b>ENGR 2010</b> Engineering Mechanics Statics (F,Sp).....	2
<b>ENGR 2030</b> Engineering Mechanics Dynamics (F,Sp,Su).....	3
<b>ENGR 2140</b> Strength of Materials (F,Sp,Su).....	2
<b>MAE 2160</b> Material Science (F,Sp).....	3
<b>MAE 2300</b> Thermodynamics I (Sp,Su).....	3

Any upper-division (3000, 4000, or 5000 level) ECE class not required by the major may also be used as a Technical Elective course. However, specific courses must be approved in writing before the student registers for the course.

<sup>3</sup>Students cannot receive credit for both Engineering Mechanics and Physics Mechanics.

<sup>4</sup>Students cannot receive credit for both Engineering Thermodynamics and Physics Thermodynamics.

<sup>5</sup>Students cannot receive credit for both ECE Optics and PHYS Optics.