UNIVERSITY of VIRGINIA
ENGINEERING

Computer Engineering Undergraduate Handbook

Bachelor of Science in Computer Engineering

Computer Engineering Program
School of Engineering and Applied Science
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**Administered by
the Computer Science Department
and
the Charles L. Brown Department of
Electrical & Computer Engineering**

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Introduction

Computer Engineering is an exciting field that spans topics in both electrical engineering and computer science. Students learn and practice the design and analysis of computer systems, including both hardware and software aspects and their integration. Careers in Computer Engineering (CpE) are as wide and varied as computer systems themselves, which range from embedded computer systems found in consumer products or medical devise, to control systems for automobiles, aircraft, and trains, to more wide-ranging applications in telecommunications, financial transactions, and information systems.

A recent Bureau of Labor Statistics Occupational Outlook Handbook states that "very favorable opportunities" (more numerous job openings compared to job seekers) can be expected for college graduates with at least a bachelor's degree in computer engineering. It also projects an employment increase of over 38% by 2016 for occupations available to graduates with a bachelor's degree in computer engineering.
(www.bls.gov/oco.)

Computer Engineering gives you a great working knowledge and balance in both CS & ECE. With the freedom to choose electives in either department, you are in full control of your educational experience and how you wish to enhance your knowledge.

Kevin Chang, 08

Program Objectives

Graduates of the CpE program at the University of Virginia have the knowledge, skills, and attitudes that allow them to make tangible contributions, meet new technical challenges, contribute effectively as team members, and be innovators in computer hardware, software, design, analysis, and applications. They communicate effectively and interact responsibly with colleagues, clients, employers and society.

Faculty from the Computer Science and Electrical & Computer Engineering departments jointly administer the CpE undergraduate degree program at the University of Virginia.

The Computer Engineering Program does not currently offer a minor.

It's the future. Everything is digitized and computer engineering allows you to keep up with changing technology. It's a complex field with many great opportunities for advancement.

Rob Yip, '08

Disciplines

Our curriculum has been carefully designed to ensure that the students obtain an excellent background in both Computer Science and Electrical Engineering, providing breadth across these disciplines as well as depth in at least one. All Computer Engineering students work through an extended sequence of introductory, intermediate and advanced courses:

CS 101	Introduction to Computer Science
CS 201	Software Development Methods
CS 202	Discrete Math I
ECE 203	Introductory Circuit Analysis
ECE 204	Electronics I
CS 216	Program and Data Representation
ECE/CS 230	Digital Logic Design
ECE 323	Signals & Systems I
CS/ECE 333	Computer Architecture
CS 340	Advanced Software Development
CS 414	Operating Systems
ECE 435	Computer Organization & Design
ECE 436	Advanced Digital Design
CS/ECE 457	Computer Networks

In addition to providing breadth across the two areas, this core of the Computer Engineering program provides depth in the following areas:

Circuits

ECE 203   Introductory Circuit Analysis
ECE 204   Electronics I

Software Engineering

CS 201   Software Development Methods
CS 340   Advanced Software Development

Digital Logic

ECE/CS 230 Digital Logic Design
CS 202   Discrete Math I

Computer Systems

CS 216   Program and Data Representation
CS/ECE 333 Computer Architecture
CS 414   Operating Systems
ECE 435   Computer Organization & Design
ECE 436   Advanced Digital Design
CS/ECE 457 Computer Networks

Grade Requirement

In completing their program of study, computer engineering majors must achieve a "C" average or better in their Computer Science and Electrical Engineering courses.

I decided to major in CPE because it gave me an opportunity to combine two majors into one. I came to UVA interested in computer science, but decided that I wanted to know more about the hardware and doing CPE was the perfect choice for me. In the long run having this major can make the student more marketable because he or she can take on careers in many paths.

Alla Aksel, '04

Degree Curriculum

FIRST SEMESTER		CREDIT HRS.
APMA 111	Single Variable Calculus	4
CHEM 151	Chemistry for Engineers	3
CHEM 151L	Chemistry for Engineers Lab	1
ENGR 162	Introduction to Engineering	4
STS 101	Lang. Comm. And Tech. Soc.	3

15 credits

SECOND SEMESTER		CREDIT HRS.
APMA 212	Multivariate Calculus	4
PHYS 142E	General Physics I	4
CS 101	Intro. to Computer Science	3
SCI	Science Elective [2]	3
HSS	HSS Elective [1]	3

17 credits

THIRD SEMESTER		CREDIT HRS.
APMA 213	Ordinary Differential Equations	4
CS 201	Software Development Meth.	3
CS 202	Discrete Math I	3
ECE 203	Introductory Circuit Analysis	3
HSS	HSS Elective [1]	3

16 credits

FOURTH SEMESTER		CREDIT HRS.
CS 216	Program & Data Representation	3
ECE/CS 230	Digital Logic Design	3
ECE 204	Electronics I	4
CS/ECE	Elective [3] [5]	3
STS	STS Elective	3

16 credits

FIFTH SEMESTER		CREDIT HRS.
CS/ECE 333	Computer Architecture	3
ECE 323	Signals & Systems	3
APMA 310	Probability	3
PHYS 241E	Physics II	3
PHYS 241L	Physics II Lab	1
UE	Unrestricted Elective [4]	3

16 credits

SIXTH SEMESTER		CREDIT HRS.
CS 340	Advanced Software Development	3
CS/ECE	Elective [3] [5]	3
CS 414	Operating Systems	3
HSS	HSS Elective [1]	3
UE	Unrestricted Elective [4]	3

15 credits

SEVENTH SEMESTER		CREDIT HRS.
ECE 435	Computer Org. & Design	4.5
CS/ECE 457	Computer Networks	3
CS/ECE	Elective [3] [5]	3
UE	Unrestricted Elective [4]	3
STS 401	Western Technology & Culture	3

16.5 credits

EIGHTH SEMESTER		CREDIT HRS.
ECE 436	Advanced Digital Design	4.5
CS/ECE	Elective [3] [5]	3
UE	Unrestricted Elective [4]	3
STS 402	The Engineer in Society	3
UE	Unrestricted Elective [4]	3

16.5 credits

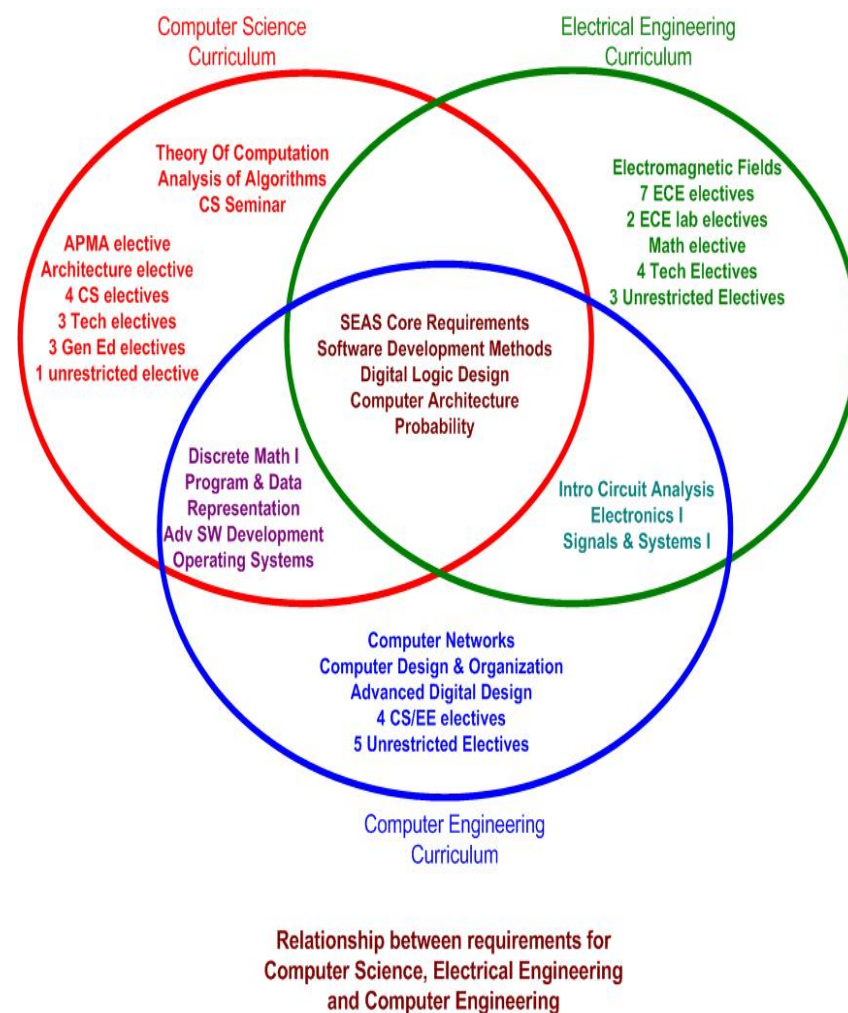[1] Chosen from the approved list available in A122 Thornton Hall.

[2] Chosen from: among BIOL 201, 202; CHEM 152; ECE 200; MSE 209; and PHYS 252.

[3] Students interested in selected advanced CS electives should take CS 302. Students interested in selected advanced ECE electives should delay this elective until the sixth semester and take an engineering elective instead.

[4] Unrestricted electives may be chosen from any graded course in the University except mathematics courses below MATH 131 including STAT 110 and 112, and courses that substantially duplicate any others offered for the degree, including PHYS 201, 202; CS 110, 120; or any introductory programming course. Students in doubt as to what is acceptable to satisfy a degree requirement should get the approval of their advisor and the dean's office, located in Thornton Hall, Room A122. APMA 109 counts as a three-credit unrestricted elective.

[5] Chosen from CS/ECE course at the 300 level or higher. Two CS/ECE electives must be 400 level or above.

Comparison Chart

Computer Science Curriculum

Electrical Engineering Curriculum

Theory Of Computation
Analysis of Algorithms
CS Seminar

Electromagnetic Fields
7 ECE electives
2 ECE lab electives
Math elective
4 Tech Electives
3 Unrestricted Electives

APMA elective
Architecture elective
4 CS electives
3 Tech electives
3 Gen Ed electives
1 unrestricted elective

SEAS Core Requirements
Software Development Methods
Digital Logic Design
Computer Architecture
Probability

Discrete Math I
Program & Data
Representation
Adv SW Development
Operating Systems

Intro Circuit Analysis
Electronics I
Signals & Systems I

Computer Networks
Computer Design & Organization
Advanced Digital Design
4 CS/EE electives
5 Unrestricted Electives

Computer Engineering Curriculum

Relationship between requirements for
Computer Science, Electrical Engineering
and Computer Engineering

Course Requirement Flowchart

UVa BS-CpE Bachelor's Degree: Course Prerequisites *(Updated November 2007)*

Arrows indicate required ECE pre-requisites. Additional non-ECE pre-requisites may also apply! (not pictured)
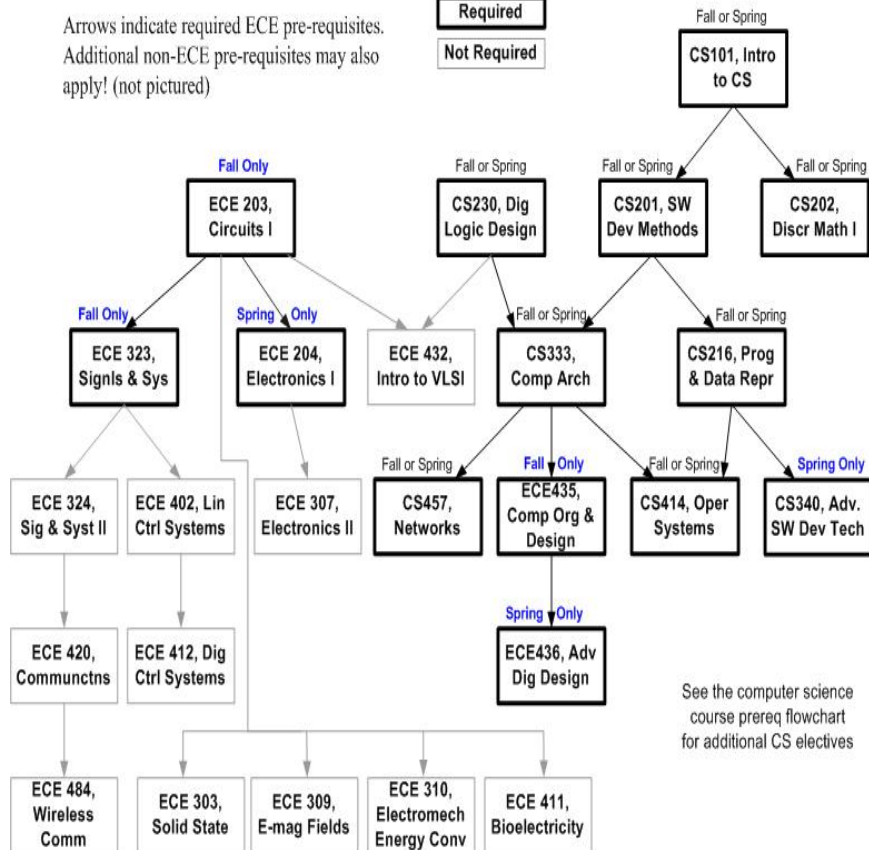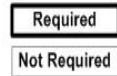
Miscellaneous Information

Please refer to the Undergraduate Record for detailed information about SEAS Academic Rules and Regulations including HSS electives. Guidelines such as Course Load, Academic Probation and Academic Suspension can also be found in the Record.

VISTAA is the Virginia Student Academic Audit reporting System for students to assist the students and their advisors in monitoring and tracking the student's program of study. A VISTAA report lists both the courses he/she has completed and in which the student is enrolled. The website for VISTAA is:

www.virginia.edu/registrar/vistaa.html

The website includes detailed instructions for students and faculty advisors as well as a FAQ page.