COMPUTER SCIENCE MAJOR (BA)

The BA program in Computer Science supports the mission of the University by providing a flexible curriculum focusing on the advanced practices of computer science grounded in a strong liberal arts core curriculum. Students have the flexibility to choose a wide range of elective courses, which can also allow them to pursue a variety of minors or even double majors. Students may obtain a concentration in Computer Engineering or Software Engineering.

The Program Educational Objectives (PEOs) are broad statements that describe what alumni do within a few years following graduation. The BA in Computer Science program is committed to our alumni who, within a few years of their graduation, are expected to:

1. Be employed in a field that makes use of computer science background.
2. Continue the process of life-long learning through formal and informal education.
3. Communicate effectively.
4. Practice professional ethics with social responsibility.

The program emphasizes the complete development of computing-based solutions. Students learn how to gather requirements, design, develop, test, deploy, and maintain software using rigorous computing practices. They are taught how to leverage technology to create flexible and scalable applications and to address the challenges that arise during the development process. Also, the program exposes students to a range of other disciplines, such as the physical sciences, social sciences, languages and literature, and the arts, that emphasizes a whole person learning pedagogy.

Fairfield's computer science curriculum encompasses a truly unique combination of experiences:

- Experiential Hands-On Learning: A unique curriculum provides opportunities for computer science students to obtain the equivalent of 20 months of real-world experience through a sophomore year service-learning initiative, a junior year entrepreneurial experience, and an industry-based senior capstone project.
- Cross-Disciplinary Engineering Exposure: As part of the School of Engineering and Computing, computer science students have access to other engineering disciplines and engineering-heavy industries, which expands career opportunities exponentially.
- Student Mentoring: By volunteering as high school mentors, students learn valuable management skills, they become comfortable explaining highly technical concepts simply and clearly, and they experience the satisfaction of sharing their knowledge to help others.
- Liberal Arts Core: A strong foundation in the liberal arts encourages engineers to think critically, design imaginatively, communicate clearly and collaborate productively.
- Academic/Research Activities and Internship: Companies from a variety of domains, such as The Weather Company (visualization), Federal Aviation Administration (software engineering and data mining), Saugatuck Energy (artificial intelligence) have an on-campus presence and provide computer science students opportunities to interact with industry leaders.

Major Requirements

Bachelor of Arts in Computer Science

122 credits

For a major in computer science, students complete the following:

Code	Title	Credits
Foundation Courses		
CPSC 1101	Introduction to Computing (Preferred course)	3
or ENGR 1031	Fundamentals of Engineering	
CPSC 1131	Fundamentals of Programming	3
CPSC 2231	Programming Workshop	3
CPSC 2231L	Programming Workshop Lab	1
CPSC 2232	Data Structures	3
CPSC 2232L	Data Structures Lab	1
Computing and Software Depth		
CPSC 2250L	Computer Science Sophomore Clinic	1
CPSC 2304	Web Development	3
CPSC 3351L	Computer Science Junior Clinic I	1
CPSC 3352L	Computer Science Junior Clinic II	1
CPSC 3354	Theory of Programming Languages	3
SWEG 3301	Software Engineering Methods	3
SWEG 3302	Software Design Methods	3
Select four major elective courses [1]		12
Total Credits		**41**

[1] Major electives are chosen from the department, but may be chosen from among other courses with approval of advisor and department chair.

Note: Students with a primary major in a degree other than Computer Science, may use the foregoing 41 credits as the basis for a Computer Science double major

Optional Concentrations

Concentrations in Software Engineering and Computer Engineering are available to students majoring in Computer Science. These concentrations build on required courses in the program and require students to complete additional credits.

Computer Engineering Concentration

Code	Title	Credits
CPEG 2245 & 2245L	Digital Design I and Digital Design I Lab	4
CPEG 3346	Computer Systems Architecture	3
Select two courses from the following:		6-7
CPEG 3246	Digital Electronics Design II	
CPEG 3331	Biomedical Signal Processing	
CPEG 4320	Computer Networks	
or CPSC 4314	Network Security	
CPEG 4332	Biomedical Imaging	

ELEG 3348 & 3348L	Embedded Microcontrollers and Embedded Microcontrollers Lab	
Total Credits		**13-14**

Software Engineering Concentration

Code	Title	Credits
SWEG 3301 & CPSC 3351L	Software Engineering Methods and Computer Science Junior Clinic I	4
SWEG 3302 & CPSC 3352L	Software Design Methods and Computer Science Junior Clinic II	4
SWEG 4320	Software Testing and Maintenance	3
SWEG 4321 or SWEG 4312	Software Project Management or Agile Software Engineering	3
Total Credits		**14**

Magis Core Requirements

Magis Core Relationship to the Computer Science Major

The Computer Science BA degree requires the completion of the *Magis* Core requirements shown below, 41 major elective course credits, and 36 general elective course credits.

Tier I: Orientation

Code	Title	Credits
English		
ENGL 1001	Introduction to Rhetoric and Composition	3
History		
Select one HIST 1000-level course		3
or CLST 1115 or CLST 1116		
Mathematics		
MATH 1121	Applied Calculus I	3
Modern or Classical Language		
Select one language course based on placement [1]		3
Philosophy		
PHIL 1101	Introduction to Philosophy	3
Religious Studies		
Select one RLST 1000-level course		3
Modern/Classical Language or Mathematics		
MATH 1122	Applied Calculus II	3
Total Credits		**21**

[1] If starting a new language, a placement exam is not necessary.

Tier II: Exploration

Code	Title	Credits
Behavioral and Social Sciences		
Select two courses from the following fields:		6
Communication		
Economics		
Politics		
Psychology (except PSYC 1610)		
Sociology and Anthropology (except ANTH 1200 and ANTH 1210)		
History, Philosophy, Religious Studies		
Select two 2000- or 3000-level courses from two different disciplines		6
Literature		
Select one course from the following fields:		3
Classics		
English		
Modern Languages and Literatures		
Natural Sciences		
Select two courses from the following fields:		6
ANTH 1200	Biological Anthropology	
ANTH 1210	Biomedical Anthropology	
Biology		
Chemistry and Biochemistry		
Physics		
PSYC 1610	Behavioral Neuroscience	
Visual and Performing Arts		
Select one 1000-level course from the following fields in Visual and Performing Arts:		3
Art History and Visual Culture		
Film, Television, and Media Arts		
Music		
Studio Art		
Theatre		
Total Credits		**24**

Plan of Study

A typical, full-time, four-year plan of study appears below. Some variation may be possible. Students should always discuss their individual plan of study with their advisor prior to registering for courses.

Course	Title	Credits
First Year		
Fall		
CPSC 1101 or ENGR 1031	Introduction to Computing (placement based-preferred course) or Fundamentals of Engineering	3
ENGL 1001	Introduction to Rhetoric and Composition	3
MATH 1121	Applied Calculus I	3
PHIL 1101	Introduction to Philosophy	3
Modern/Classical Language Orientation Tier [5]		3
	Credits	**15**
Spring		
CPSC 1131	Fundamentals of Programming	3
MATH 1122	Applied Calculus II	3
Literature Exploration Tier [7]		3
Religious Studies Orientation Tier [1]		3
General Elective [8]		3
	Credits	**15**

Second Year

Fall

CPSC 2250L	Computer Science Sophomore Clinic	1
CPSC 2231	Programming Workshop	3
CPSC 2231L	Programming Workshop Lab	1
CPSC 2304	Web Development	3
Behavioral and Social Sciences Exploration Tier [3]		3
History Orientation Tier [1]		3
Natural Science Exploration Tier [9]		3
	Credits	**17**

Spring

CPSC 2232	Data Structures	3
CPSC 2232L	Data Structures Lab	1
Behavioral and Social Sciences Exploration Tier [3]		3
History or Philosophy or Religious Studies Exploration Tier [2]		3
History or Philosophy or Religious Studies Exploration Tier [2]		3
General Elective [8]		3
	Credits	**16**

Third Year

Fall

CPSC 3351L	Computer Science Junior Clinic I	1
SWEG 3301	Software Engineering Methods	3
Natural Sciences Exploration Tier [9]		3
General Elective [8]		3
General Elective [8]		3
General Elective [8]		3
	Credits	**16**

Spring

SWEG 3302	Software Design Methods	3
CPSC 3352L	Computer Science Junior Clinic II	1
Major Elective [4]		3
Visual and Performing Arts Exploration Tier [6]		3
General Elective [8]		3
General Elective [8]		3
	Credits	**16**

Fourth Year

Fall

Major Elective [4]		3
General Elective [8]		3
General Elective [8]		3
General Elective [8]		3
	Credits	**12**

Spring

CPSC 3354	Theory of Programming Languages	3
Major Elective [4]		3
Major Elective [4]		3
General Elective [8]		3
General Elective [8]		3
	Credits	**15**
	Total Credits	**122**

[1] Choose an appropriate History or Religious Studies course at the 1000 level.

[3] Core Social Science course may be filled by appropriate courses in Communication, Economics, Psychology, Politics, or Sociology and Anthropology.

[4] Major electives are chosen from the department, but may be chosen with approval of advisor and department chair from among other courses.

[5] Choose any language offered by the Department of Modern Languages and Literatures, based on placement exam.

[6] Visual and Performing Art History courses may be chosen from Art History, Music, Film, Television, and Media Arts, Studio Art, or Theatre.

[7] Approved English, Modern Languages and Literatures, or Classics courses.

[8] General Electives may be chosen from any courses offered at the university, and are frequently chosen to help fulfill requirements toward a chosen minor.

[9] Natural science elective is typically met by any course in Biology, Chemistry, or Physics, as well as some courses in Anthropology.