Programs in the Computing Sciences provide knowledge and problem-solving skills in the theoretical and applied aspects of computing-related disciplines. Our students learn to utilize computing technologies in a socially responsible manner and apply their expertise wherever they serve in the world. Our graduates are equipped for a variety of careers in engineering, business and scientific computing. The Computing Sciences at SPU include three computing-related degree tracks, a minor, and, in cooperation with Electrical Engineering, a major in Computer Engineering. All of these programs are housed in the Department of Engineering and Computer Science.

*Which is the right major for you? The answer lies in what YOU want to do with computers!*

**Computing Sciences Majors:**

**Computer Science** is the discipline which studies the representation, storage, and transformation of information utilizing computers. The computer scientist develops software and hardware to analyze data and solve problems; our graduates often begin their careers in software design, implementation and testing. Computer scientists also devise new ways of using computers and work to develop effective ways to solve difficult problems using computing technology. SPU’s Bachelor of Science in Computer Science is the traditional degree in computer science. It provides preparation for graduate studies or professional careers in computer science, emphasizing scientific and engineering foundations. Our Bachelor of Arts in Computer Science emphasizes problem solving, organizing and synthesizing ideas, and applications of computing theory. This is a particularly good major for students wishing to double-major or minor in another field, and graduates are well-suited for projects that apply computing to other disciplines.

**Information Systems** specialists focus on integrating technology solutions and organizational processes to meet the information needs of both for-profit and nonprofit organizations. IS professionals play a key role in determining the requirements for an organization’s information systems and are active in their specification, design, implementation and support. SPU’s Bachelor of Science in Information Systems is designed to provide students with an understanding of both the technical and organizational factors surrounding information systems.

**Computer Engineering** is concerned with the design and construction of computers and computer-based systems. Computer engineering students not only study software development, but also the design of digital hardware systems including communications systems, computers and devices that contain computers. The Bachelor of Science in Computer Engineering combines strong bases in computer science, digital electronics and engineering.
FACULTY

SPU’s Computing Sciences faculty have a combined teaching experience of over 55 years. All teach the foundational freshman-level computing courses; each also brings their own special interests and expertise to upper-division courses in computer science and engineering.

Elaine Weltz, Computer Science Chair  
CSDP (Certified Software Development Professional)  
M.S.E. Software Engineering, Seattle University; M.Mus., University of Southern California  
Software engineering, system design, database management, social impacts of computing

Michael Tindall  
M.S., Ph.D. Computer Science, University of Illinois  
Systems software, operating systems, compilers, web and net-centric computing, algorithms

Computer Engineering Coordinator  
206-281-2945

For More Information:  
Visit the Computer Science web site for the most up-to-date information about our current degree programs and requirements (http://www.spu.edu/depts/csc/).

The SPU web site (http://www.spu.edu) always has a vast wealth of information on the University as a whole as well as on all University programs. Current catalog requirements and course scheduling information are available at http://www.spu.edu/acad/UGCatalog/time_schedule/cats.asp.

Contact the Office of Undergraduate Admissions for information on campus visits, admissions procedures and deadlines, or to connect with an admissions counselor (http://www.spu.edu/depts/ugadm/).
The Engineering and Computer Science Department offers several Computer Science program degree tracks:

- a Bachelor of Science in Computer Science degree
- a Bachelor of Arts in Computer Science degree
- a Bachelor of Science in Information Systems degree
- a minor in Computer Science

**Preliminary Prerequisites.** High School Pre-Calculus or Math Analysis is required.

**MAJOR and MINOR Admission:** A student must apply to the department for admission to any of the major or minor programs of study. For the CS and IS degrees, this is recommended after completing the first 3 CSC-labeled courses that apply to the program. An admission form is available from [http://www.spu.edu/depts/csc](http://www.spu.edu/depts/csc).

**MAJOR Admission and GPA Requirement:**
Admission to any major in Computer Science or Information Systems requires:
- a minimum SPU cumulative GPA of 2.0 (C).
- A GPA of 2.5 or above in 10 credits of CSC-labeled courses taken at SPU that apply to the chosen major.

**MINOR Admission and GPA Requirement:**
Admission to a minor in Computer Science requires:
- a minimum SPU cumulative GPA of 2.0 (C).
- A GPA of 2.0 or above in 10 credits of CSC-labeled courses taken at SPU that apply to the minor.

**Double-majoring:** A student cannot double-major in multiple Computer Science or Information Systems degrees. Also, a student cannot complete both a major in Computer Science or Information Systems degree and a minor in Computer Science.

**Multiple Degrees:** A student cannot complete both a BA and a BS degree in Computer Science. However, a student who completes either Computer Science degree MAY pursue an Information Systems degree as a 2\(^{nd}\) Baccalaureate degree. Similarly, a student completing a degree in Information Systems MAY pursue either of the Computer Science degrees as a 2\(^{nd}\) Baccalaureate degree. All SPU rules governing additional Baccalaureate degrees apply.

**The Department of Engineering and Computer Science also offers:**

**B.S. in Computer Engineering:** Design and construction of computers and computer-based systems. Hardware, software, communications and the interaction among them. For more information, contact the Department of Engineering and Computer Science.
Requirements for the Bachelor of Science in Computer Science
(106 Credits; 48 upper-division)
The BS/CS requires an 11-course core that provides a broad background in the topics of computer science. A project or research course plus three additional senior-level electives allow the student to explore these and other areas in greater depth, and apply their core knowledge to more advanced problems. This computing curriculum is supported by five courses in mathematics, two in electrical engineering, and one year of calculus-based physics.

Requirements for the Bachelor of Arts in Computer Science
(71 Credits; 41 upper-division)
The BA/CS emphasizes problem solving, organizing and synthesizing ideas, and applications of computing theory. Students complete 15 courses total in computer science, encompassing the major topics of the discipline. Mathematics courses in calculus, computer math, and statistics complete the major requirements.

Requirements for the Bachelor of Science in Information Systems
(82 Credits; 52 upper-division)
The BS/IS emphasizes the integration of information systems and organizational processes through studies in three areas:
- Computing Sciences – 12 courses focusing on problem solving, software and system development.
- Mathematics – calculus, computer math, and statistics provide a quantitative background.
- Organization – three courses in organizational/management topics help students make the connection between technology and the information needs of people.

Requirements for the Computing Sciences Minor
(35 Credits; 15 upper-division)
A CS Minor requires a minimum of a 15-credit differential from any major or minor being earned by the student.

Core Courses – Both required:
- CSC 1230 Problem Solving and Programming ................................................................. 5
- CSC 2430 Data Structures I ............................................................................................. 5

Intermediate Programming – Select one of:
- CSC 2431 Data Structures II ........................................................................................... 5
- CSC 3220 Applications Programming ............................................................................... 3

15 Approved UD Credits (minimum of 10 must be CSC 3000 – 4850)
15 approved upper-division credits .................................................................................. 15

Mathematics
- Select one of: MAT 1221, MAT 1234, MAT 1360, MAT 2700, PSY 2360, SOC 2360 ........... 5

Total ........................................................................................................................................... 33 - 35
# Computer Science Degrees

## Department of Engineering and Computer Science

### Required Courses for 2013-2014 Catalog

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>B.S. CSC</th>
<th>B.A. CSC</th>
<th>B.S. IS</th>
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<tr>
<td>CSC 1230</td>
<td>Problem Solving &amp; Programming</td>
<td>5</td>
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<tr>
<td>CSC 2430</td>
<td>Data Structures I</td>
<td>5</td>
<td>5</td>
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<td>CSC 2431</td>
<td>Data Structures II</td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>CSC 3150W</td>
<td>Systems Design</td>
<td>5</td>
<td>5</td>
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<tr>
<td>CSC 3220</td>
<td>Applications Programming</td>
<td>3</td>
<td>3</td>
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<tr>
<td>CSC 3221</td>
<td>Netcentric Computing</td>
<td>3</td>
<td>3</td>
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<tr>
<td>CSC 3310</td>
<td>Concepts in Programming Languages</td>
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<td>3</td>
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<tr>
<td>CSC 3350</td>
<td>Operating Systems Programming</td>
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<tr>
<td>CSC 3430</td>
<td>Algorithm Design &amp; Analysis</td>
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<tr>
<td>CSC 3750</td>
<td>Computer Architecture</td>
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<td>CSC 3760</td>
<td>Computer Organization</td>
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<td>CSC 3899</td>
<td>Social Impacts of Computing</td>
<td></td>
<td>3</td>
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<tr>
<td>CSC 4898</td>
<td>Senior Capstone in Computer Science</td>
<td>2</td>
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### BS/IS Additional CSC Requirements
- CSC 4151/4152 Software Engineering 6
- CSC 4410 Database Management 5

### BS/CSC Additional CSC Requirements
- CSC Project or Research Course (CSC 4151/4152 Software Engineering, or 4970) 5
- BS/CSC CSC Electives: 11 credits (CSC 4000 – 4850, or 4970) 11

### BA/CSC Additional CSC Requirements
- CSC Project or Research Course (CSC 4151/4152 Software Engineering, or 4970) 5
- BA/CSC CSC Electives: 2 courses (CSC 4000 – 4850, or 4970) 6-10

## Total Computer Science Credits Required

<table>
<thead>
<tr>
<th></th>
<th>B.S. CSC</th>
<th>B.A. CSC</th>
<th>B.S. IS</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAT 1221</td>
<td>Survey of Calculus *</td>
<td>5</td>
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<tr>
<td>MAT 1720</td>
<td>Math for Computer Science</td>
<td>5</td>
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<tr>
<td>MAT 1360</td>
<td>Introduction to Statistics * or</td>
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<tr>
<td>MAT 2700</td>
<td>Statistics for Business and Economics *</td>
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<tr>
<td>MAT 1234*, 1235, 1236</td>
<td>Calculus I, II, III</td>
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<tr>
<td>MAT 2720</td>
<td>Discrete Mathematics</td>
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<tr>
<td>MAT 3360</td>
<td>Probability and Statistics or MAT 2401 Linear Algebra or MAT 2200 Engr. Probability &amp; Stats AND MAT 3237 Differential Equations</td>
<td>5</td>
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<tr>
<td>Physical Science: Select 3 courses, 2 must be from the same discipline. PHY 1121, 1122, 1123 Physics * (recommended sequence). CHM 1211, 1212, 1330 Chemistry *. BIO 2101, 2102, 2103 Biology *</td>
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<tr>
<td>EE 1210</td>
<td>Logic System Design</td>
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<td>EE 3280</td>
<td>Microcontroller System Design</td>
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<tr>
<td>BUS 3614</td>
<td>Organizational Behavior for Managers or</td>
<td>5</td>
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<tr>
<td>BUS 4644</td>
<td>Operations Management</td>
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<tr>
<td>BUS 3620</td>
<td>Management Information Systems</td>
<td>5</td>
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<tr>
<td>BUS 4625</td>
<td>Organization’s Presence on Net</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>COM 4265</td>
<td>Organizational Communication</td>
<td>5</td>
<td></td>
</tr>
</tbody>
</table>

## Total Supporting-Discipline Credits Required

|               | 48       | 15       | 35      |

## Total Credits Required

|               | 106      | 71-75    | 82      |

## Total Upper-division Credits Required

|               | 48       | 41-45    | 52      |

* This course fulfills a General Education requirement
Seattle Pacific University
Computer Science Curriculum PREREQUISITE Diagram

Effective FALL 2013

MAT 1235
MAT 2720 (3) Discrete Mathematics
MAT 2720 or MAT 1720
MAT 1221/1234
MAT 1720 (5) Mathematics for Computer Science (BA)
MAT (Statistics) 1360/2376/2700/3360 and MAT 1720/2720

CSC 3430 (3) Algorithm Design and Analysis
CSC 3310 (3) Concepts in Prog. Lang.
CSC 3750 (5) (BA) Computer Architecture and Organization
CSC 3760 (5) (BS) Computer Organization and Assm Language
CSC 3150W (5) Systems Design
CSC 4150 (5) Software Engineering
CSC 4899W (3) Social Issues in Computing
CSC 4898 (2) Senior Capstone in Computer Science

High School pre-Calculus or math analysis
CSC 1230 (5) Problem Solving and Programming
CSC 2430 (5) Data Structures I
CSC 2431 (5) Data Structures II
CSC 2430 and EE 1210

CSC 3220 (3) Applications Programming
Recommended
Jr. or Sr.

CSC 4210 (3) Theory of Algorithms and Computation
CSC 3350 (3) Operating Systems Programming
CSC 4750 (5) Computer Networks
CSC 4410 (5) Database Management
CSC 4151/4152(6) Software Engineering [Team-Project]
CSC 4510 (3) Windows Programming

CSC 3221 (3) Netcentric Computing

Various Prerequisites and Credits
CSC 4800 (3 or 5) CSC 4810W (3 or 5) "W" Writing
Advanced Issues in Computer Science

Sr. class
Jr. or Sr. standing
Sr. CSC Major
### BS/CS - BACHELOR OF SCIENCE in COMPUTER SCIENCE REQUIREMENTS

(Major Total = 106 credits)

- CSC 1230 Problem Solving & Programming (5)
- CSC 2430 Data Structures I (5)
- CSC 2431 Data Structures II (5)
- CSC 3150W Systems Design (5)
- CSC 3220 Applications Programming (3)
- CSC 3221 Netcentric Computing (3)
- CSC 3310 Concepts in Programming Lang. (3)
- CSC 3350 Operating Systems Programming (3)
- CSC 3430 Algorithm Design and Analysis (3)
- CSC 3760 Computer Organization (5)
- CSC 4898 Sr. Capstone in Computer Science (2)

Minimum 5 credits from the following list:

- CSC 4151/4152 Software Eng. I & II (6)
- CSC 4970 Directed Research in CS (5)

11 credits: CSC 4000 – 4850, 4970

- MAT 1234 Calculus 1 *
- MAT 1235 Calculus 2
- MAT 1236 Calculus 3
- MAT 2720 Discrete Mathematics (3)
- 1 alternative from the following list:
  - MAT 3360 Probability and Statistics (5)
  - MAT 2200(3) and MAT 2401 Linear Alg(3)
  - MAT 2200(3) and MAT 3237 Diff. Eq. (3)
- 15 credits: Physical Science

Select 3 courses, 2 must be from same discipline

- Physics for Sci/Engr PHY 1121*,1122*,1123*
- Chemistry CHM 1211*,1212,1330*
- Biology BIO 2101*,2102*,2103*
- EE 1210 Introduction to Logic System Design (5)
- EE 3280 Microcontroller System Design (5)

### BA/CS - BACHELOR OF ARTS in COMPUTER SCIENCE REQUIREMENTS

(Major Total = 71 credits)

- CSC 1230 Problem Solving & Programming (5)
- CSC 2430 Data Structures I (5)
- CSC 2431 Data Structures II (5)
- CSC 3150W Systems Design (5)
- CSC 3220 Applications Programming (3)
- CSC 3221 Netcentric Computing (3)
- CSC 3310 Concepts in Programming Lang. (3)
- CSC 3350 Operating Systems Programming (3)
- CSC 3430 Algorithm Design and Analysis (3)
- CSC 3750 Computer Architecture (5)
- CSC 3899 Social Impacts of Computing (3)
- CSC 4898 Sr. Capstone in Computer Science (2)

Minimum 5 credits from the following list:

- CSC 4151/4152 Software Eng. I & II (6)
- CSC 4970 Directed Research in CS (5)

2 Courses: CSC 4000 – 4850, 4970

- MAT 1221 Survey of Calculus (5) *
- MAT 1720 Math. for Computer Science (5)

1 course from the following list:

- MAT 1360 Intro. To Statistics (5) *
- MAT 2700 Statistics for Bus. & Econ. (5) *

### BS/IS – BACHELOR OF SCIENCE in INFORMATION SYSTEMS REQUIREMENTS

(Major Total = 82 credits)

- CSC 1230 Problem Solving & Programming (5)
- CSC 2430 Data Structures I (5)
- CSC 2431 Data Structures II (5)
- CSC 3150W Systems Design (5)
- CSC 3220 Applications Programming (3)
- CSC 3221 Netcentric Computing (3)
- CSC 3750 Computer Architecture (5)
- CSC 3899 Social Impacts of Computing (3)
- CSC 4898 Sr. Capstone in Computer Science (2)

Minimum 5 credits from the following list:

- CSC 4151/4152 Software Eng. I & II (6)
- CSC 4410 Database Management (5)

- MAT 1221 Survey of Calculus (5) *
- MAT 1720 Math. for Computer Science (5)

1 course from the following list:

- MAT 1360 Intro. To Statistics (5) *
- MAT 2700 Statistics for Bus. & Econ. (5) *

1 course from the following list:

- BUS 3614 Organizational Behavior (5)
- BUS 4644 Operations Management (5)
- BUS 3620 Management Information Systems (5)
- BUS 4625 Organizations’s Presence on Net (5)
- COM 4265 Organizational Communication (5)
A CS Minor requires a minimum of a 15-credit differential from any major or minor being earned by the student.

Core Courses – Both required:

- CSC 1230  Problem Solving and Programming .......................................................... 5
- CSC 2430  Data Structures I ..................................................................................... 5

Intermediate Programming – Select one of:

- CSC 2431  Data Structures II ..................................................................................... 5
- CSC 3220  Applications Programming ....................................................................... 3

15 Approved UD Credits (minimum of 10 must be CSC 3000 – 4850)

15 approved upper-division credits ......................................................................................... 15

Mathematics

Select one of: MAT 1221, MAT 1234, MAT 1360, MAT 2700, PSY 2360, SOC 2360 ........... 5

Total ............................................................................................................................................ 33 - 35

_____________________________  Advisor
_____________________________  (Signed)