Computing Sciences

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.

Minors in Computing Sciences and Computer Engineering are also available.
SPU’s computing sciences faculty have a combined teaching experience of over 50 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; Information Systems Coordinator  eweltz@spu.edu  206-281-3639
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, Computer Science Advisor  mht@spu.edu  206-281-2945
M.S., Ph.D. Computer Science, University of Illinois  
Systems software, operating systems, compilers, web and net-centric computing, algorithms

Aaron Dingler  dinglera@spu.edu  206-281-2943
M.S., Ph.D. Computer Science and Engineering, University of Notre Dame  
Computing architecture, AI and robotics, emerging technologies

Kevin Bolding, ECS Director; Computer Engineering Coordinator  bolding@spu.edu  206-281-2961
M.S., Ph.D. Computer Science, University of Washington

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 2nd Baccalaureate degree. Similarly, a student completing a degree in Information Systems MAY pursue either of the Computer Science degrees as a 2nd 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  
(33-35 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 2014-2015 Catalog

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</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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<td>CSC 2430</td>
<td>Data Structures I</td>
<td>5</td>
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<td>CSC 2431</td>
<td>Data Structures II</td>
<td>5</td>
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<td>5</td>
</tr>
<tr>
<td>CSC 3150W</td>
<td>Systems Design</td>
<td>5</td>
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<td>CSC 3220</td>
<td>Applications Programming</td>
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<td>CSC 3221</td>
<td>Netcentric Computing</td>
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<td>CSC 3310</td>
<td>Concepts in Programming Languages</td>
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<td>CSC 3350</td>
<td>Operating Systems Programming</td>
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<td>CSC 3430</td>
<td>Algorithm Design &amp; Analysis</td>
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<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>
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<td>CSC 4898</td>
<td>Senior Capstone in Computer Science</td>
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### BS/IS Additional CSC Requirements

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<tr>
<th>Course Code</th>
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<tr>
<td>CSC 4151/4152</td>
<td>Software Engineering</td>
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<td>CSC 4410</td>
<td>Database Management</td>
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### BS/CSC Additional CSC Requirements

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<th>Course Code</th>
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<tr>
<td>CSC Project</td>
<td>Research Course</td>
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<td>(CSC 4151/4152 Software Engineering, or 4970)</td>
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<th>B.A. CSC</th>
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<td>BS/CSC CSC Electives: 11 credits (CSC 4000 – 4850, or 4970)</td>
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### BA/CSC Additional CSC Requirements

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<tr>
<td>CSC Project</td>
<td>Research Course</td>
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<tr>
<td>(CSC 4151/4152 Software Engineering, or 4970)</td>
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<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>B.S. CSC</th>
<th>B.A. CSC</th>
<th>B.S. IS</th>
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<td>BA/CSC CSC Electives: 2 courses (CSC 4000 – 4850, or 4970)</td>
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## Total Computer Science Credits Required

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<th>Credits Required</th>
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<th>B.A. CSC</th>
<th>B.S. IS</th>
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<tbody>
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<td>Total Credits</td>
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## Total Supporting-Discipline Credits Required

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<th>B.A. CSC</th>
<th>B.S. IS</th>
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</thead>
<tbody>
<tr>
<td>Total Credits</td>
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## Total Upper-division Credits Required

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<th>Credits Required</th>
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<th>B.A. CSC</th>
<th>B.S. IS</th>
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<tbody>
<tr>
<td>Total Credits</td>
<td>48</td>
<td>41-45</td>
<td>52</td>
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</tbody>
</table>

*This course fulfills a General Education requirement
**COMPUTER SCIENCE PROGRAM - MAJOR REQUIREMENTS CHECKLIST**

**Effective Fall 2014**

**Major Admission GPA.** Admission to a major in computer science or information systems requires: A minimum SPU cumulative GPA of 2.0, and a GPA of 2.5 or above in 10 credits of CSC-labeled courses taken at SPU that apply to the chosen major.  

**Note:** Courses marked with * may fulfill a general education requirement.

## 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 Architecture (5)
- CSC 3898 Sr. Capstone in Computer Science (5)
- CSC 4154/4152 Software Eng. I & II (6)
- CSC 4498 Sr. Capstone in Computer Science (5)
- CSC 4898 Sr. Capstone in Computer Science (5)
- CSC 4970 Directed Research in CS (5)
- MAT 1221 Survey of Calculus (5)
- MAT 1720 Math. for Computer Science (5)
- CSC 4151/4152 Software Eng. I & II (6)
- 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) *
- BUS 4644 Operations Management (5)
- BUS 4625 Organizations' Presence on Net (5)
- MAT 2700 Statistics for Bus. & Econ. (5)
- CSC 4410 Database Management (5)
- CSC 4498 Sr. Capstone in Computer Science (5)
- CSC 4970 Directed Research in CS (5)
- MAT 2700 Statistics for Bus. & Econ. (5)
- MAT 1221 Survey of Calculus (5)
- MAT 1720 Math. for Computer Science (5)
- BUS 4644 Operations Management (5)
- BUS 4625 Organizations' Presence on Net (5)
- CSC 4410 Database Management (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 3898 Sr. Capstone in Computer Science (5)
- CSC 4151/4152 Software Eng. I & II (6)
- MAT 1221 Survey of Calculus (5)
- MAT 1720 Math. for Computer Science (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)
- CSC 4410 Database Management (5)
- CSC 4498 Sr. Capstone in Computer Science (5)
- CSC 4970 Directed Research in CS (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) *
- BUS 4644 Operations Management (5)
- BUS 4625 Organizations' Presence on Net (5)
- MAT 2700 Statistics for Bus. & Econ. (5)
- CSC 4410 Database Management (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 3898 Sr. Capstone in Computer Science (5)
- CSC 4151/4152 Software Eng. I & II (6)
- MAT 1221 Survey of Calculus (5)
- MAT 2700 Statistics for Bus. & Econ. (5)
- 1 course from the following list:
  - MAT 1360 Intro. To Statistics (5) *
- BUS 3614 Organizational Behavior (5)
- BUS 3620 Management Information Systems (5)
- BUS 4625 Organizations' Presence on Net (5)
- COM 4295 Organizational Communication (5)
COMPUTER SCIENCE Program
COMPUTING SCIENCES MINOR REQUIREMENTS CHECKSHEET

Name: ___________________________ Student ID: ___________________________

Minor in Computing Sciences

Admission to the Minor: ___________________________

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

______________________________   Advisor
______________________________   (Signed)
BA in Computer Science - Flow Chart and Suggested Schedule
See Current Time Schedule for Exact Quarters and Times

Freshman
- CSC 1230 PS & Prog. 5cr
- CSC 2430 Data Str 5cr
- CSC 2431 Data Str II 5cr
- CSC 3220 App Prog 3cr
- CSC 3221 Network 3cr
- CSC 3550 Sys Design 5cr
- MAT 1110 Pre-Calc 5cr
- MAT 1221 Surv Calc 5cr

Sophomore
- CSC 3230 Prog Lang 3cr
- CSC 3750 Com Arch 5cr
- CSC 3899 Social Imp 3cr
- BUS 3620 Org 5cr

Junior
- CSC 3310 Prog Lang 3cr
- CSC 3330 Com Arch 5cr
- CSC 3350 Oper Sys 3cr
- BUS 3625 OR CSC 4750 5cr

Senior
- CSC 4151 SW Egr I 3cr
- CSC 4152 SW Egr II 3cr
- BUS 4625 OR CSC 4750 5cr
- COM 4265 Org Com 5cr

8 Elective Credits: CSC 4000 – 4850, 4970

UCOR 2000 (5cr) + UCOR 3000 (5cr) + UFND 2000 (5cr) + UFND 3100 (5cr)
WK-Creative Arts (5cr) + WK-Human Systems (5cr) + WK-Humanities (5cr) + WK-Fundamental Science + WE (5cr)
Foreign Language (if needed) (0-15cr)

BS in Information Systems - Flow Chart & Suggested Schedule
See Current Time Schedule for Exact Quarters and Times

Freshman
- CSC 1230 PS & Prog. 5cr
- CSC 2430 Data Str 5cr
- CSC 2431 Data Str II 5cr
- CSC 3220 App Prog 3cr
- CSC 3221 Network 3cr
- CSC 3550 Sys Design 5cr
- MAT 1110 Pre-Calc 5cr
- MAT 1221 Surv Calc 5cr

Sophomore
- CSC 3230 Prog Lang 3cr
- CSC 3750 Com Arch 5cr
- CSC 3899 Social Imp 3cr
- BUS 3620 Org 5cr

Junior
- CSC 3310 Prog Lang 3cr
- CSC 3330 Com Arch 5cr
- CSC 3350 Oper Sys 3cr
- BUS 3625 OR CSC 4750 5cr

Senior
- CSC 4151 SW Egr I 3cr
- CSC 4152 SW Egr II 3cr
- BUS 4625 OR CSC 4750 5cr
- COM 4265 Org Com 5cr

BUS 3614 (Org Behavior) OR BUS 4644 (Op. Mgmt) 5cr
Available ANY Quarter

UCOR 2000 (5cr) + UCOR 3000 (5cr) + UFND 2000 (5cr) + UFND 3100 (5cr)
WK-Creative Arts (5cr) + WK-Human Systems (5cr) + WK-Humanities (5cr) + WK-Fundamental Science (5cr) + WE (5cr)
Foreign Language (if needed) (0-15cr)