Computer Science
A.S.-T DEGREE: 60 units

DESCRIPTION
The Associate in Science in Computer Science for Transfer Degree (AS-T in Computer Science) has been established to assist students in seamlessly transferring from Gavilan College to a California State University (CSU), with the objective of pursuing a baccalaureate degree in computer science. The Associate in Science in Computer Science for Transfer Degree therefore necessarily requires the completion of a general education sequence of courses, as well as specific preparation for upper-division computer science coursework.

PROGRAM LEARNING OUTCOMES
Upon completion of the Associate in Science in Computer Science for Transfer Degree, students will be prepared for more advanced upper-division coursework in computer science, and will be able to:

- Code, debug, document, test, and run programs.
- Write programs in at least three different programming languages, and compare and contrast the philosophies and comparative advantages of each of these languages.
- Demonstrate professional conduct by meeting project deadlines, and participating in self-managed teams.
- Create algorithms to solve programming problems, and implement those algorithms.

PROGRAM REQUIREMENTS: (28 UNITS)

REQUIRED CORE:

- CSIS5 or CSIS45 or CSIS24 or CSIS46 or CSIS27 or CSIS28 or CSIS26 or MATH1A or MATH1B or PHYS4A or PHYS4B
- C++ Scientific Programming 3
- C++ Programming I 3
- Java Programming I 3
- C++ Programming II 3
- Java Programming II 3
- Computer Architecture and Organization 3
- Discrete Structures 3
- Single-Variable Calculus and Analytic Geometry 4
- Single-Variable Calculus and Analytic Geometry 4
- Physics for Scientists and Engineers - Mechanics 4
- Physics for Scientists and Engineers - Electricity and Magnetism 4

ASSOCIATE DEGREE FOR TRANSFER REQUIREMENTS:

- Completion of 60 semester units that are eligible for transfer to the California State University, including both of the following:
  1. The Intersegmental General Education Transfer Curriculum (IGETC) or the California State University General Education-Breadth Requirements.
  2. A minimum of 18 semester units in a major or area of emphasis, as determined by the community college district.
- Obtainment of a minimum grade point average of 2.0.

Title 5 section 55063(a) also require that students must earn a "C" or better in all courses required for the major or area of emphasis, or a “P” if the course was taken on a ‘pass-no-pass’ basis.

TOTAL UNITS FOR THE MAJOR: 28

DOUBLE COUNTED UNITS: CSU 7; IGETC: 7

GENERAL EDUCATION REQUIREMENTS: CSU: 39; IGETC: 37

A student may complete the Gavilan College A.A./A.S. general education, the CSU-GE Breadth or the IGETC pattern, plus sufficient electives to meet a 60 unit total. See a counselor for details.

NOTE: A course may be used to satisfy both general education and major courses. See "Double Counting Rule".

ELECTIVES AS NEEDED TO GET TO 60 UNITS: CSU: 0; IGETC: 2

TOTAL UNITS FOR THE DEGREE: 60

Computer Science
& Information Systems Emphasis
A.A. DEGREE: 60 units

DESCRIPTION
Students will have the opportunity to explore several areas of computer science, including programming, web page design, system administration and desktop publishing.

PROGRAM LEARNING OUTCOMES
Students will develop an appreciation of both the technical and artistic sides of the profession. Students will be able to communicate ideas in a team environment.

REQUIREMENTS: (18 UNITS)

Choose any combination of courses for a minimum of 18 units:

- CD12 Computer Education for Teachers 3
- CSIS5 C++ Scientific Programming 3
Create programs in three different languages that use loop statements such as for and while statements.

**REQUIREMENTS:**

**FOR TRANSFER MAJORS:**

- CSIS6 or DM6: Webpage Authoring 3
- DM7: Webpage Authoring 3
- CSIS18L: UNIX / C++ Programming Lab 1
- CSIS18: UNIX / C++ Programming 3
- CSIS24: Java Programming I 3
- CSIS26: Discrete Structures 3
- CSIS43: C Programming 4
- CSIS44: C#.NET Programming 4
- CSIS45: C++ Programming I 3
- CSIS46: C++ Programming II 3
- CSIS47: Visual C++ Programming 3
- CSIS49: UNIX / Linux Shell Programming 4
- CSIS51: Visual Basic Programming 3
- CSIS54: Perl Programming 3
- CSIS54L: Perl Programming Lab 1
- CSIS84: Java Script Programming 2

**FOR NON-TRANSFER MAJORS:**

- CSIS6 or DM6: Webpage Authoring 3
- DM7: Webpage Authoring 3
- CSIS18L: UNIX / C++ Programming Lab 1
- CSIS18: UNIX / C++ Programming 3
- CSIS24: Java Programming I 3
- CSIS26: Discrete Structures 3
- CSIS43: C Programming 4
- CSIS44: C#.NET Programming 4
- CSIS45: C++ Programming I 3
- CSIS46: C++ Programming II 3
- CSIS47: Visual C++ Programming 3
- CSIS49: UNIX / Linux Shell Programming 4
- CSIS51: Visual Basic Programming 3
- CSIS54: Perl Programming 3
- CSIS54L: Perl Programming Lab 1
- CSIS84: Java Script Programming 2

**DIGITAL MEDIA:**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
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<tbody>
<tr>
<td>CSIS46</td>
<td>C++ Programming II</td>
</tr>
<tr>
<td>CSIS48</td>
<td>UNIX/Linux Operating System</td>
</tr>
<tr>
<td>CSIS5</td>
<td>C++ Scientific Programming</td>
</tr>
<tr>
<td>CSIS45</td>
<td>C++ Programming I</td>
</tr>
</tbody>
</table>

**CHOOSE ONE:**

- CSIS5 | C++ Scientific Programming 3

**CHOOSE 10 UNITS FROM LIST BELOW:**

- CSIS6 or DM6: Webpage Authoring 3
- DM7: Webpage Authoring 3
- CSIS12: Assembly Language Programming 3
- CSIS12L: Assembly Language Programming Lab 1
- CSIS24: Java Programming I 3
- CSIS26: Discrete Structures 3
- DM73: Advanced PhotoShop 3
- CSIS74: Advanced PhotoShop 3
- DM76: Digital Illustration 3
- CSIS76: Digital Illustration 3
- DM77: Introduction to Digital Media and its Tools 3
- CSIS77: Introduction to Digital Media and its Tools 3
- DM80: Digital Photography 3
- CSIS80: Digital Photography 3
- DM85: Web Development and Design 3
- CSIS85: Web Development and Design 3
- DM113: Introduction to Digital Video 3
- DM114: Digital Media Production 2

**GENERAL EDUCATION REQUIREMENTS:** (35-39)

A student may complete the Gavilan College A.A./A.S. general education, the CSU-GE Breadth or the IGETC pattern, plus sufficient electives to meet a 60 unit total. See a counselor for details.

**NOTE:** A course may be used to satisfy both general education and major courses. See “Double Counting Rule”.

**AREA OF EMPHASIS TOTAL:** 18
FOR ASSOCIATE DEGREE, COMPLETE GENERAL EDUCATION REQUIREMENTS (35-39)
A student may complete the Gavilan College A.A./A.S. general education, the CSU-GE Breadth or the IGETC pattern, plus sufficient electives to meet a 60 unit total. See a counselor for details.

NOTE: A course may be used to satisfy both general education and major courses. See "Double Counting Rule".

Computer Hardware
CERTIFICATE OF PROFICIENCY: 8 units

DESCRIPTION
Students receiving this certificate will have job entry skills in computer hardware repair. Students will be eligible to take the industry A+ hardware exam for certification.

REQUIREMENTS (8 UNITS)
CSIS181  PC Hardware .............................................. 4
CSIS182  Operating Systems ................................. 4

RECOMMENDED ELECTIVES:
CSIS2L or  Computers in Business Lab ............... 1
CSIS2   Computers in Business ............................. 4
CSIS122  Computer Keyboarding .......................... 0.5-2

Computer Networking
A.S. DEGREE: minimum of 60 units
CERTIFICATE OF ACHIEVEMENT: 24 units

DESCRIPTION
Computer Networking is designed to provide entry-level skills and knowledge for students to enter the networking profession. Students will be eligible to take the industry A+ hardware exam. The program also provides a solid foundation in network technology for students who plan to pursue further education in the networking field at a four year college. Career Opportunities: network technician, network maintenance, network help desk, assistant network administrator, PC/network installation.

PROGRAM LEARNING OUTCOMES
Upon successful completion of this program, students will be able to:
- Work individually and in teams.
- Install and test hardware and software necessary for network connectivity.
- Set up a connection with a remote host, employing appropriate commands.

REQUIREMENTS: (24 UNITS)
CSIS48  UNIX/Linux Operating System ................ 4
CSIS178  Applied Networking .............................. 4
CSIS179  Introduction to Information Security ........ 4
CSIS181  PC Hardware ....................................... 4
CSIS182  Operating Systems ............................... 4
CSIS183  Introduction to Microsoft Servers ........... 4

FOR ASSOCIATE DEGREE, COMPLETE GENERAL EDUCATION REQUIREMENTS (35-39 UNITS)
A student may complete the Gavilan College A.A./A.S. general education, the CSU-GE Breadth or the IGETC pattern, plus sufficient electives to meet a 60 unit total. See a counselor for details.

NOTE: A course may be used to satisfy both general education and major courses. See "Double Counting Rule".

Computerized Accounting
CERTIFICATE OF PROFICIENCY: 17 units

DESCRIPTION
Students receiving the certificate will have entry-level computerized bookkeeping skills for a modern office.

REQUIREMENTS: (17 UNITS)
ACCT121 or Spreadsheet - MS Excel .................... 1-2
CSIS121  Spreadsheet - MS Excel ........................ 1-2
CSIS2L   Computers in Business Lab .................... 1
ACCT20  Financial Accounting ............................ 4
ACCT21  Managerial Accounting ........................... 4
CSIS120 or  Computerized Accounting - QuickBooks 3
ACCT120  Computerized Accounting - QuickBooks 3

CHOOSE ONE:
ACCT103 or  General Office Accounting ................ 3
ACCT105 or  Payroll Accounting .......................... 3
ACCT111  Introduction to Income Tax ................. 3
Programming for the Internet

A.S. DEGREE: 60 units
CERTIFICATE OF ACHIEVEMENT: 19-20 units

DESCRIPTION

Programming for the Internet prepares students for entry-level positions developing and maintaining internet and intranet web pages. The courses prepare students to create, modify, and program web pages, such as those used in electronic commerce. Students will gain knowledge in both technical and artistic sides of this profession. Career Opportunities: web page developer, web programmer, technical support, webmaster.

PROGRAM LEARNING OUTCOMES

Upon successful completion of this program, students will be able to:

- Create, modify, and program web pages with images and forms.
- Create programs in three different languages that use loop statements such as for and while statements.

REQUIREMENTS: (19 - 20 UNITS)

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Units</th>
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<tbody>
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<td>CSIS6 or DM6</td>
<td>Webpage Authoring</td>
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</tr>
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<td>CSIS51</td>
<td>Visual Basic Programming</td>
<td>4</td>
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<td>CSIS54</td>
<td>Perl Programming</td>
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<td>CSIS54L</td>
<td>Perl Programming Lab</td>
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<td>CSIS84</td>
<td>JavaScript Programming</td>
<td>2</td>
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<td>CSIS5</td>
<td>C++ Scientific Programming</td>
<td>3</td>
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<td>CSIS45</td>
<td>C++ Programming I</td>
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CHOOSE ONE: (3 UNITS)

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<tr>
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<tbody>
<tr>
<td>CSIS7 or DM7</td>
<td>Web Page Authoring II</td>
<td>2</td>
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<tr>
<td>CSIS75 or DM75</td>
<td>Photoshop I - Adobe Photoshop</td>
<td>3</td>
</tr>
<tr>
<td>DM85 or CSIS85</td>
<td>Web Development and Design</td>
<td>3</td>
</tr>
<tr>
<td>DM110 or CSIS110</td>
<td>Interactive Animation: Flash</td>
<td>3</td>
</tr>
<tr>
<td>CSIS78</td>
<td>Web Sites with SOL and PHP</td>
<td>4</td>
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RECOMMENDED ELECTIVE:

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<tr>
<th>Course</th>
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<td>MATH233</td>
<td>Intermediate Algebra</td>
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</table>

FOR ASSOCIATE DEGREE, COMPLETE GENERAL EDUCATION REQUIREMENTS (35-39 UNITS)

A student may complete the Gavilan College A.A./A.S. general education, the CSU-GE Breadth or the IGETC pattern, plus sufficient electives to meet a 60 unit total. See a counselor for details.

NOTE: A course may be used to satisfy both general education and major courses. See “Double Counting Rule.”
Scientific Programming
A.S. DEGREE: 60 units
CERTIFICATE OF ACHIEVEMENT: 25 - 28 units

DESCRIPTION
Scientific Programming prepares students for entry-level scientific programming in a wide variety of occupations. Many of the courses will be needed for students transferring to a university to study Computer Science. Students planning to transfer need to research lower division major requirements at the transfer destination of their choice. Career Opportunities: scientific programming, computer programming, statistical programming, research.

PROGRAM LEARNING OUTCOMES
Upon successful completion of this program, students will be able to:
- Create programs in three different languages that use control flow statements such as if and switch statements.
- Create scientific programs in three different languages that use loop statements such as for and while statements.

REQUIREMENTS: (25 - 28 UNITS)
CSIS46   C++ Programming II ........................................... 3
MATH1A   Single-Variable Calculus and Analytic Geometry ...... 4

CHOOSE ONE:
CSIS5     C++ Scientific Programming .............................. 3
CSIS45    C++ Programming I ........................................... 3

CHOOSE TWO:
CSIS24    Java Programming I ........................................... 3
CSIS47    Visual C++ Programming ................................... 3
CSIS51    Visual Basic Programming .................................. 4
CSIS54    Perl Programming ............................................ 3
CSIS54L   Perl Programming Lab ...................................... 1

CHOOSE TWO:
MATH1B    Single-Variable Calculus and Analytic Geometry .... 4
MATH5     Introduction to Statistics .................................. 3
MATH7     Finite Mathematics ......................................... 3
CSIS26    Discrete Structures .......................................... 3

FOR ASSOCIATE DEGREE, COMPLETE GENERAL EDUCATION REQUIREMENTS
A student may complete the Gavilan College A.A./A.S. general education, the CSU-GE Breadth or the IGETC pattern, plus sufficient electives to meet a 60 unit total. See a counselor for details.

UNIX Operating System
A.S. DEGREE: 60 units
CERTIFICATE OF ACHIEVEMENT: 23 - 24 units

DESCRIPTION
If you are using the web, you are using UNIX, since most large web servers are UNIX systems. The UNIX Operating System Option prepares students for entry-level positions working with UNIX/Linux operating systems. Many of the courses will be needed for students transferring to a 4-year college to study computer science. Students planning to transfer should research lower division major requirements at the transfer destination of their choice. Career Opportunities: UNIX/Linux system administration, webmaster, C/C++ programming.

PROGRAM LEARNING OUTCOMES
Upon successful completion of this program, students will be able to:
- Use UNIX editors to create and modify files.
- Modify, move, and rename files and directories. They will be able to use UNIX email and FTP commands.

REQUIREMENTS: (23-24 UNITS)
CSIS48    UNIX/Linux Operating System ............................ 4
CSIS49    UNIX/Linux Shell Programming .......................... 4

CHOOSE ONE:
CSIS18    UNIX/C++ Programming .................................... 3
CSIS18L   UNIX/C++ Programming Lab ............................... 1
CSIS45    C++ Programming I ......................................... 3
CSISS     C++ Scientific Programming .............................. 3

CHOOSE TWO:
CSIS24    Java Programming I ........................................... 3
CSIS46    C++ Programming II ......................................... 3
CSIS54    Perl Programming ............................................ 3
CSIS54L   Perl Programming Lab ...................................... 1

FOR ASSOCIATE DEGREE, COMPLETE GENERAL EDUCATION REQUIREMENTS
A student may complete the Gavilan College A.A./A.S. general education, the CSU-GE Breadth or the IGETC pattern, plus sufficient electives to meet a 60 unit total. See a counselor for details.

NOTE: A course may be used to satisfy both general education and major courses. See "Double Counting Rule".