Program
BS in Computer Science
BS in Computer Information Systems
Minor in Computer Science
Minor in Information Technology
MS in Computer Science

The undergraduate programs prepare students for careers in diverse areas of application of Computer Science. The MS program provides a strong graduate-level core foundation in Computer Science while also allowing exploration into other areas of interest in the discipline. The department offers students the opportunity to earn the distinction of Honors in Computer Science or Honors in Computer Information Systems. This recognition appears on the permanent transcript and diploma. The Honors award confers a distinction that enhances opportunities for graduate school and employment.

Faculty and Facilities
The breadth of faculty expertise is evident from the many courses offered in operating systems and networks, programming languages, artificial intelligence, computer graphics, computer architecture, database systems, computer theory, and software engineering, and from the variety of professional consulting and research projects in which the faculty are involved.

The College of Engineering, Computer Science, and Construction Management (ECC) is housed in the O’Connell Technology Center. ECC maintains a large site to support its computing and technology needs. Currently, the College manages 19 labs with a combined total of more than 300 machines (not including machines in faculty and department offices), 16 servers and multiple operating systems, supporting approximately 20,000 users.

Computing facilities available to computer science majors include five general-purpose labs containing high-end PCs and thin-clients, with access to Windows XP, Vista, and UNIX and Linux servers. The department has a separate computer networks laboratory where students get hands-on experience in configuring and reconfiguring various types of networks and in the analysis of data obtained from network analyzers. The department houses the Institute for Research on Intelligent Systems (IRIS) and the Intelligent Systems Lab (ISL), providing robotics resources for curriculum, collaborative research, and outreach. The department is also a member of the Microsoft MSDN Academic Alliance, giving all students free access to Microsoft software development tools.

Student Organizations
Student chapters of the Association for Computing Machinery (ACM), Institute of Electrical and Electronics Engineers (IEEE), Society of Women Engineers (SWE), and the Upsilon Pi Epsilon (UPE) international honor society are active on campus. Additionally, the Chico State Linux User’s Group (CSLUG), Network for Women in Technology (NeWT), Chico Java User’s Group (Chico JUG), Chico Flex User Group (Chico FUG), Chico .NET User’s Group, American Institute of Mechatronic Engineers (AIME) and the Computer Graphics Consortium (CGC) provide opportunities for various student activities.

Cooperative Work Experience
The computer industry holds the department in high regard, in part due to its active participation in the Cooperative Work Experience Program.
The Bachelor of Science in Computer Science

Total Course Requirements for the Bachelor's Degree: 128 units

See “Requirements for the Bachelor's Degree” in the University Catalog for complete details on general degree requirements. A minimum of 40 units, including those required for the major, must be upper division.

A suggested Major Academic Plan (MAP) has been prepared to help students meet all graduation requirements within four years. Please request a plan from your major advisor or view it and other current advising information at http://em.csuchico.edu/aap/ProgramSearch.

General Education Requirements: 48 units

See “General Education Requirements” in the University Catalog and the Class Schedule for the most current information on General Education requirements and course offerings. The course requirements marked below with an asterisk (*) may also be applied toward General Education.

HIST 130 may be used to fulfill any one of the Breadth Area C1, C2, or C3 requirements and POLS 155 may be used to fulfill any one of the Breadth Area D1, D2, or D3 requirements.

Upper-division theme modification has been approved for this major. See the General Education chapter in the University Catalog for specifics on how to apply this modification.

Diversity Course Requirements: 6 units

See “Diversity Requirement” in the University Catalog. Most courses taken to satisfy these requirements may also apply to General Education.

U.S. History, Constitution, and American Ideals: 6 units

See “U.S. History, Constitution, and American Ideals” under “Bachelor’s Degree Requirements”. For this major, this requirement is normally fulfilled by completing HIST 130 and POLS 155 or approved equivalents.

For this major, HIST 130 may also be applied to General Education Breadth Area C1, C2, or C3, and POLS 155 may also be applied to General Education Breadth Area D1, D2, or D3.

Literacy Requirement:

See “Mathematics and Writing Requirements” in the University Catalog. Writing proficiency in the major is a graduation requirement and may be demonstrated through satisfactory completion of a course in your major which has been designated as the Writing Proficiency (WP) course for the semester in which you take the course. Students who earn below a C- are required to repeat the course and earn a C- or better to receive WP credit.

See the Class Schedule for the designated WP courses for each semester. You must pass ENGL 130 (or its equivalent) with a C- or better before you may register for a WP course.

Course Requirements for the Major: 92 units

Completion of the following courses, or their approved transfer equivalents, are required of all candidates for this degree.

Enrollment in any mathematics course requires a grade of C- or higher in all prerequisite courses or their transfer equivalents.

Lower-Division Requirements: 33 units

9 courses required:

<table>
<thead>
<tr>
<th>Course</th>
<th>Units</th>
<th>Prerequisites</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSCI 111</td>
<td>4.0</td>
<td>Programming and Algorithms I</td>
</tr>
<tr>
<td>CSCI 211</td>
<td>4.0</td>
<td>Programming and Algorithms II</td>
</tr>
<tr>
<td>CSCI 221</td>
<td>3.0</td>
<td>Assembly Language Programming</td>
</tr>
<tr>
<td>NSCI 102</td>
<td>3.0</td>
<td>Intro to Living Systems</td>
</tr>
<tr>
<td>MATH 120</td>
<td>4.0</td>
<td>Analytic Geometry and Calculus</td>
</tr>
<tr>
<td>MATH 121</td>
<td>4.0</td>
<td>Analytic Geometry and Calculus</td>
</tr>
<tr>
<td>MATH 217</td>
<td>3.0</td>
<td>Discrete Math</td>
</tr>
<tr>
<td>PHYS 204A</td>
<td>4.0</td>
<td>Mechanics</td>
</tr>
<tr>
<td>PHYS 204B</td>
<td>4.0</td>
<td>Electricity and Magnetism</td>
</tr>
</tbody>
</table>

Upper-Division Requirements: 59 units

15 courses required:

<table>
<thead>
<tr>
<th>Course</th>
<th>Units</th>
<th>Prerequisites</th>
</tr>
</thead>
<tbody>
<tr>
<td>CINS 370</td>
<td>3.0</td>
<td>Introduction to Databases</td>
</tr>
<tr>
<td>CINS 448</td>
<td>3.0</td>
<td>Computer Security</td>
</tr>
<tr>
<td>CSCI 301</td>
<td>3.0</td>
<td>Computer's Impact on Society</td>
</tr>
<tr>
<td>CSCI 311</td>
<td>4.0</td>
<td>Algorithms and Data Structures</td>
</tr>
<tr>
<td>EECE 320</td>
<td>3.0</td>
<td>System Architecture and Performance</td>
</tr>
<tr>
<td>CSCI 340</td>
<td>4.0</td>
<td>Operating Systems</td>
</tr>
<tr>
<td>CSCI 346</td>
<td>3.0</td>
<td>Intro to Computer Networks/Mgmt</td>
</tr>
<tr>
<td>CSCI 430</td>
<td>3.0</td>
<td>Software Engineering</td>
</tr>
<tr>
<td>CSCI 431</td>
<td>3.0</td>
<td>Software Engineering Tools</td>
</tr>
<tr>
<td>CSCI 465</td>
<td>3.0</td>
<td>Web Programming Fundamentals</td>
</tr>
<tr>
<td>CSCI 490</td>
<td>3.0</td>
<td>Directed Programming Exp</td>
</tr>
<tr>
<td>CSCI 515</td>
<td>3.0</td>
<td>Compiler Design</td>
</tr>
<tr>
<td>CSCI 550</td>
<td>3.0</td>
<td>Theory of Computing</td>
</tr>
<tr>
<td>CSCI 580</td>
<td>3.0</td>
<td>Artificial Intelligence</td>
</tr>
<tr>
<td>MATH 314</td>
<td>4.0</td>
<td>Prob &amp; Stat for Science &amp; Tech</td>
</tr>
<tr>
<td>CSCI 317</td>
<td>4.0</td>
<td>Linear Programming Apps</td>
</tr>
<tr>
<td>CSCI 351</td>
<td>4.0</td>
<td>Numerical Methods Programming</td>
</tr>
</tbody>
</table>

7 units selected from:

Select upper-division Computer Science (CSCI) or Computer Information Systems (CINS) courses, and/or upper-division Math courses that meet a requirement for the Minor in Mathematics. A maximum of 3 units may be taken for credit/no credit grading.

Additional Computer Science Graduation Requirement:

Graduating seniors must complete an exit exam as a requirement for graduation. Passing the exam is not required for the degree; the scores will be used for program assessment. Consult the department office for examination details.

Electives Requirement:

To complete the total units required for the bachelor’s degree, select additional elective courses from the total University offerings. You should consult with an advisor regarding the selection of courses which will provide breadth to your University experience and possibly apply to a supportive second major or minor.

Grading Requirement:

All courses taken to fulfill major course requirements must be taken for a letter grade except those courses specified by the department as Credit/No Credit grading only.

A grade of C- or better is required in all computer science (CSCI) and Computer Information Systems (CINS) courses used for the major.

Advising Requirement:

Advising is mandatory for all majors in this degree program. Consult your undergraduate advisor for specific information.

Honors in the Major

Honors in the Major is a program of independent work in your major. It requires 6 units of honors course work completed over two semesters.

The Honors in the Major program allows you to work closely with a faculty mentor in your area of interest on an original performance or research project. This year-long collaboration allows you to work in your field at a professional level and culminates in a public presentation of your work. Students sometimes take their projects beyond the University for submission in professional journals, presentation at conferences, or academic competition. Such experience is valuable for graduate school and professional life. Your honors work will be recognized at your graduation, on
Completion of these requirements also satisfies requirements for a minor in Business Administration.

**Lower-Division Requirements: 24 units**

<table>
<thead>
<tr>
<th>Course</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>CINS 220 PCs and Peripherals</td>
<td>3.0 SP</td>
</tr>
<tr>
<td>CINS 242 Information Systems Design</td>
<td>3.0 FA</td>
</tr>
<tr>
<td>Prerequisites: CSCI 111 with a grade of C- or higher.</td>
<td></td>
</tr>
<tr>
<td>CSCI 111 Programming and Algorithms I</td>
<td>4.0 FS</td>
</tr>
<tr>
<td>Prerequisites: At least one year of high school algebra and strong computer skills or CSCI 101.</td>
<td></td>
</tr>
<tr>
<td>CSCI 211 Programming and Algorithms II</td>
<td>4.0 FS</td>
</tr>
<tr>
<td>Prerequisites: CSCI 111 or ECE 135 with a grade of C- or higher.</td>
<td></td>
</tr>
<tr>
<td>MATH 105 Statistics</td>
<td>3.0 FS</td>
</tr>
<tr>
<td>Prerequisites: Completion of ELM requirement.</td>
<td></td>
</tr>
<tr>
<td>MATH 109 Survey of Calculus</td>
<td>4.0 FS</td>
</tr>
<tr>
<td>Prerequisites: Completion of ELM requirement; MATH 118, MATH 119 (or High School equivalents).</td>
<td></td>
</tr>
<tr>
<td>MATH 217 Discrete Math</td>
<td>3.0 FA</td>
</tr>
<tr>
<td>Prerequisites: Completion of ELM, MATH 119 (or equivalent), CSCI 111.</td>
<td></td>
</tr>
</tbody>
</table>

**Upper-Division Requirements: 38 units**

<table>
<thead>
<tr>
<th>Course</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>CINS 370 Introduction to Databases</td>
<td>3.0 SP</td>
</tr>
<tr>
<td>Prerequisites: CSCI 311 with a grade of C- or higher.</td>
<td></td>
</tr>
<tr>
<td>CINS 448 Computer Security</td>
<td>3.0 FA</td>
</tr>
<tr>
<td>Prerequisites: Any upper-division computer networking course.</td>
<td></td>
</tr>
<tr>
<td>CSCI 301 Computer’s Impact on Society</td>
<td>3.0 FS</td>
</tr>
<tr>
<td>Prerequisites: ENGL 130 (or its equivalent) with a grade of C- or higher; Junior standing.</td>
<td></td>
</tr>
<tr>
<td>CSCI 311 Algorithms and Data Structures</td>
<td>4.0 FS</td>
</tr>
<tr>
<td>Prerequisites: CSCI 211 with a grade of C- or higher; MATH 217 recommended.</td>
<td></td>
</tr>
<tr>
<td>CSCI 340 Operating Systems</td>
<td>4.0 SP</td>
</tr>
<tr>
<td>Prerequisites: CSCI 311 with a grade of C- or higher.</td>
<td></td>
</tr>
<tr>
<td>CSCI 346 Intro to Computer Networks/Mgmt</td>
<td>3.0 FA</td>
</tr>
<tr>
<td>Prerequisites: Grade of C- or higher in either CINS 220 or CSCI 221.</td>
<td></td>
</tr>
<tr>
<td>CSCI 465 Web Programming Fundamentals</td>
<td>3.0 FA</td>
</tr>
<tr>
<td>Prerequisites: CINS 370 with a grade of C- or higher.</td>
<td></td>
</tr>
<tr>
<td>CSCI 490 Directed Programming Exp</td>
<td>3.0 FS</td>
</tr>
<tr>
<td>Prerequisites: CSCI 311 with a grade of C- or higher, Senior standing.</td>
<td></td>
</tr>
</tbody>
</table>

**Database/ERP:**

Note that prerequisites for the BSIS/MINS courses are waived for CINS students, but course content is unchanged.

<table>
<thead>
<tr>
<th>Course selected from:</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>BSIS 524 Business Programming with ABAP</td>
<td>3.0 Inq</td>
</tr>
<tr>
<td>Prerequisites: CSCI 111 or MINS 325.</td>
<td></td>
</tr>
<tr>
<td>CINS 570 Advanced Database Mgmt Systems</td>
<td>3.0 FA</td>
</tr>
<tr>
<td>Prerequisites: CINS 370 with a grade of C- or higher or MINS 235.</td>
<td></td>
</tr>
<tr>
<td>CINS 574 Adv Database Admin: Workshop I</td>
<td>3.0 S2</td>
</tr>
<tr>
<td>Prerequisites: CINS 170 with a grade of C- or higher.</td>
<td></td>
</tr>
<tr>
<td>MINS 522 ERP: Systems Adm</td>
<td>3.0 FS</td>
</tr>
<tr>
<td>Prerequisites: Concurrent enrollment in or prior completion of MINS 345 and instructor permission.</td>
<td></td>
</tr>
</tbody>
</table>

**Networking/Security:**

<table>
<thead>
<tr>
<th>Course selected from:</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>CINS 548 Advanced Computer Security</td>
<td>3.0 SP</td>
</tr>
<tr>
<td>Prerequisites: CINS 448 with a grade of C- or higher.</td>
<td></td>
</tr>
<tr>
<td>CSCI 546 Adv Network Management</td>
<td>3.0 SP</td>
</tr>
<tr>
<td>Prerequisites: CSCI 346 with a grade of C- or higher.</td>
<td></td>
</tr>
<tr>
<td>CSCI 547 Advanced Computer Networks</td>
<td>3.0 FA</td>
</tr>
<tr>
<td>Prerequisites: CSCI 346 with grade of C- or higher.</td>
<td></td>
</tr>
</tbody>
</table>

**Systems:**

<table>
<thead>
<tr>
<th>Course selected from:</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSCI 344 C++ Programming</td>
<td>3.0 SP</td>
</tr>
<tr>
<td>Prerequisites: Grade of C- or higher in either CSCI 144 or CSCI 211.</td>
<td></td>
</tr>
<tr>
<td>CSCI 444 Fundamental UNIX System Admin.</td>
<td>3.0 FA</td>
</tr>
<tr>
<td>Prerequisites: CSCI 344 with a grade of C- or higher.</td>
<td></td>
</tr>
<tr>
<td>CSCI 540 Systems Programming</td>
<td>3.0 S2</td>
</tr>
<tr>
<td>Prerequisites: CSCI 340 with a grade of C- or higher.</td>
<td></td>
</tr>
</tbody>
</table>

**3 units selected from: (for majors only)**

Select from upper-division Computer Science (CSCI) or Computer Information Systems (CINS) courses.

**Formal Business Minor Requirements: 24 units**

The following courses, or their approved transfer equivalents, also fulfill requirements for a Minor in Business Administration. Students are responsible for formally declaring the Minor in Business Administration.
The following courses, or their approved transfer equivalents, are required

Course Requirements for the Minor: 21 units

The Minor in Information Technology

Course Requirements for the Minor: 21 units

The following courses, or their approved transfer equivalents, are required of all candidates for this minor.

The following courses, or their approved transfer equivalents, are required

Course Requirements for the Minor: 21 units

The Minor in Information Technology

Course Requirements for the Minor: 21 units

The following courses, or their approved transfer equivalents, are required of all candidates for this minor.

The Master of Science in Computer Science

Course Requirements for the Master's Degree: 30 units

Continuous enrollment is required. A minimum of 9 semester units of transfer and/or CSU Chico Open University course work may be applied toward the degree.

Graduate Time Limit:

All requirements for the degree are to be completed within five years of the end of the semester of enrollment in the oldest course applied toward the degree. See “Graduate Education” in the University Catalog for complete details on general degree requirements.

Due to the rapid changes in the field of computer science, the Department of Computer Science requires all candidates to complete the program within five years, including projects and theses. No course validation will be allowed and no program extensions will be granted.

Prerequisites for Admission to Conditionally Classified Status:

In addition to any requirements listed above:

1. Completion of program prerequisites equivalent to the following senior courses:
   (a) CSCI 430 (Software Engineering) with a grade of B- or better.
   (b) CSCI 511 (Object-Oriented Programming) with a grade of B- or better.

2. Students are expected to complete these courses immediately as a matter of reasonable progress toward the master's degree.

Advancement to Candidacy:

In addition to any requirements listed above:

1. Completion of the Graduate Requirement in Writing Proficiency.
2. Classified graduate standing and completion of, or enrollment in, the graduate core courses.
3. Development of an approved program in consultation with the Graduate Coordinator.
4. Formation of the graduate advisory committee, in the case of the thesis or project plan as described below, in consultation with the Graduate Coordinator.

Requirements for the MS Degree in Computer Science:
Completion of all requirements as established by the department graduate committee, the graduate advisory committee, and the Graduate School, to include:
1. Completion of an approved program consisting of 30 units of course work as follows:
   (a) Completion of the 5 graduate core courses (15 units).
      CSCI 611 Distributed Computing 3.0 SP
      CSCI 620 Computer Architecture 3.0 SP
      CSCI 630 Software Engineering 3.0 FA
      CSCI 640 Operating Systems 3.0 SP
      CSCI 650 Design/Analysis of Algorithms 3.0 FA
      Prerequisites: Classified graduate standing.
   (b) Completion of 3 area courses (9 units), each course from a different area (Artificial Intelligence, Database, Networks/Security, or Visual Computing) listed below.

Artificial Intelligence
CSCI 580 Artificial Intelligence 3.0 FA
Prerequisites: CSCI 311 with a grade of C- or higher.
CSCI 583 Advanced Artificial Intelligence 3.0 SP
Prerequisites: CSCI 211 with a grade of C- or higher.
CSCI 585 Robotics/Machine Intelligence 3.0 FA
Prerequisites: CSCI 211 with a grade of C- or higher; CSCI 221 with a grade of C- or higher.
CSCI 682 Topics: Artificial Intel 3.0 Inq
Prerequisites: Classified graduate standing.

Database
CINS 570 Advanced Database Mgmt Systems 3.0 FA
Prerequisites: CINS 370 with a grade of C- or higher or MINS 235.
CINS 574 Adv Database Admin: Workshop I 3.0 S2
Prerequisites: CINS 370 with a grade of C- or higher.
CINS 574/577 Advanced Database Admin Workshop II 3.0 F2
Prerequisites: CINS 574 or faculty permission.
CSCI 679 Topics in Database Systems 3.0 Inq
Prerequisites: Classified graduate standing.

Networks/Security
CINS 548 Advanced Computer Security 3.0 SP
Prerequisites: CINS 448 with a grade of C- or higher.
CSCI 546 Adv Network Management 3.0 SP
Prerequisites: CSCI 346 with a grade of C- or higher.
CSCI 547 Advanced Computer Networks 3.0 FA
Prerequisites: CSCI 346 with a grade of C- or higher.
CSCI 649 Topics in Networking 3.0 Inq
Prerequisites: Classified graduate standing.

Visual Computing
CSCI 566 Computer Graphics Programming 3.0 FA
Prerequisites: CSCI 311 with a grade of C- or higher.
CSCI 567 Graphical User Interfaces 3.0 F2
Prerequisites: CSCI 311 with a grade of C- or higher.
CSCI 568 Digital Image Processing 3.0 F1
Prerequisites: CSCI 311 with a grade of C- or higher.
CSCI 569 Advanced Computer Graphics 3.0 SP
Prerequisites: CSCI 566 with a grade of C- or higher.
CSCI 669 Topics in Computer Graphics 3.0 Inq
Prerequisites: Classified graduate standing.

(c) Completion of 1 elective course (3 units), selected from any of the four areas in (b) above or the following additional elective options:
   CSCI 533 Object-Oriented Analysis/Dsgn 3.0 S1
   Prerequisites: Object-oriented programming experience.
   CSCI 540 Systems Programming 3.0 S2
   Prerequisites: CSCI 340 with a grade of C- or higher.
   CSCI 598 Adv Topic in Computer Science 3.0 Inq
   CSCI 619 Topics in Program Lang Theory 3.0 Inq
   Prerequisites: Classified graduate standing.
   CSCI 629 Topics in Computer Architecture 3.0 Inq
   Prerequisites: Classified graduate standing.
   CSCI 639 Topics in Software Engineering 3.0 Inq
   Prerequisites: Classified graduate standing.
   CSCI 659 Topics in Computer Theory 3.0 Inq
   Prerequisites: Classified graduate standing.
   CSCI 697 Independent Study 1.0-6.0 FS
   Prerequisites: Classified graduate standing, faculty permission.
   (d) Completion of the appropriate culminating activity course (3 units) in one of the three plans described in section 2 below.
   (e) At least 18 of the units required for the degree in 600-level courses.
   (f) Not more than 9 semester units of transfer and/or CSU, Chico Open University course work (correspondence courses and UC extension course work are not acceptable). Transfer courses must be approved by the Graduate Coordinator.
2. Completion and final approval of one of the following three plans as approved by the Graduate Coordinator. The standard culminating experience for master's students in Computer Science is to demonstrate competency in graduate study by completion of the capstone course using plan (a). With rare exception, students may meet the requirement of a culminating experience by completing a thesis or project as described in the following:
   (a) Capstone Course Plan
      This plan includes 30 units of in-class course work, including a passing score in the capstone course CSCI 693. CSCI 693 is to be taken as part of the last 9 units, or during the last semester of the graduate program. Registration in CSCI 693 must be approved by the Graduate Coordinator. The course may be attempted a maximum of three times. Failure on the third attempt will result in dismissal from the graduate program in Computer Science.
   (b) Project Plan
      The project plan includes 27 units of in-class course work and 3 units of project preparation (CSCI 699P). For students to be qualified to take the project path, they must have demonstrated exceptional abilities by:
      (i) maintaining a GPA of 3.5 or above in their post-baccalaureate coursework,
      (ii) having been nominated by a faculty member to conduct research in that faculty member's area of expertise,
      (iii) having had a project proposal approved by a 2/3 majority vote of the faculty. A formal written description of the project must be submitted to the Graduate School for approval and accession to the library.
   (c) Thesis Plan
      This plan includes 24-27 units of in-class course work and up to 6 units of thesis preparation (CSCI 699T). Students opting to complete 6 units of CSCI 699T may count 3 units of the units as their elective course in 1(c) above. For students to be qualified to take the thesis path, they must have demonstrated exceptional abilities by:
      (i) maintaining a GPA of 3.5 or above in their post-baccalaureate coursework,
      (ii) having been nominated by a faculty member to conduct research in that faculty member's area of expertise,
      (iii) having had a thesis proposal approved by a 2/3 majority vote of the faculty. This plan requires a formal research thesis, which must be submitted to the Graduate School for approval and accession to the library.
3. Approval by the Graduate Coordinator and the Graduate Council on behalf of the faculty of the University.

Graduate Requirement in Writing Proficiency:
Writing proficiency is a graduation requirement. Computer Science students will demonstrate their writing competence in the English language by successfully passing a Graduate Writing Exam (GWE) administered by the department at the beginning of each semester, or successful completion (B- higher) of an approved technical writing course. Students must either pass the GWE or immediately enroll in the writing course in their first semester of graduate study. Consult the Graduate Coordinator for specific information.

Graduate Grading Requirements:
All courses in the major (with the exceptions of Independent Study - 697, Master's Project - 699P, and Master's Thesis - 699T) must be taken for a letter grade, except those courses specified by the department as ABC/No Credit (400/500-level courses), AB/No Credit (600-level courses), or Credit/No Credit grading only. A maximum of 10 units combined of ABC/No Credit, AB/No Credit, and Credit/No Credit grades may be used on the approved program (including 697, 699P, 699T and courses outside the major). While grading standards are determined by individual programs and instructors, it is also the policy of the University that unsatisfactory grades may be given when work fails to reflect achievement of the high standards, including high writing standards, expected of students pursuing graduate study.

Students must maintain a minimum 3.0 grade point average in each of the following three categories: all course work taken at any accredited
Computer Information Systems Course Offerings

Please see the section on “Course Description Symbols and Terms” in the University Catalog for an explanation of course description terminology and symbols, the course numbering system, and course credit units. All courses are lecture and discussion unless otherwise stated. Some prerequisites may be waived with faculty permission. Many syllabi are available on the Chico Web.

CINS 448 Computer Security 3.0 Fall
Prerequisites: Any upper-division computer networking course.
This course provides a broad overview of some of the more technical aspects of Information Systems Security. The content is designed to prepare students for the Certified Information Systems Security Professional/Associate (CISSP/A) examination from the International Information Systems Security Certification Consortium (ISSEP), including a discussion of each of the following topics: security management practices; access control systems; telecommunications and network security; cryptography; security architecture and models; operations security; applications and systems development; business continuity planning; and disaster recovery planning; law, investigation, and ethics; and physical security. (020232)

CINS 548 Advanced Computer Security 3.0 Spring
Prerequisites: CINS 448 with a grade of C- or higher.
This course provides advanced training in the engineering and management of information systems security, particularly those systems that play a role in U.S. national security, and is aimed at professionals who plan to work either as contractors or federal employees in the area of national security or defense. The course also prepares students for the Information Systems Security Engineering Professional (ISSEP) certification test prepared by the International Information Systems Security Certification Consortium (ISSEP) in collaboration with the National Security Agency. Specific areas of concentration are systems security engineering; certification and accreditation (C&A); technical management; and U.S. Government Information Assurance (IA) regulations. (020234)

CINS 570 Advanced Database Management Systems 3.0 Fall
Prerequisites: CINS 370 with a grade of C- or higher or MINS 235.
Course topics include database application programming using a high performance, high concurrency multi-user database management system. This course covers the SQL programming language including Data Definition Language, Data Manipulation Language, and Data Control Language. The course then focuses on a procedural database programming language including control structures, composite datatypes, explicit cursors, exception handling, and writing embedded SQL applications. 2.0 hours activity, 2.0 hours discussion. (002381)

CINS 574 Advanced Database Architecture and Administration I 3.0 EvmSp
Prerequisites: CINS 370 with a grade of C- or higher.
Students install the latest release of a robust, scalable database system such as Oracle, and create and maintain a sample database. Topics covered include advanced database architecture, intro performance monitoring, network configuration, database security, user management, and backup/recovery techniques with powerful admin tools. Prepares for Oracle Certification. (020614)

CINS 674 Database Administration II: Advanced Tuning and Recovery 3.0 EvmFa
Prerequisites: CINS 574 or faculty permission.
Students install database software components and create and administer their own example databases. Features hands-on diagnosis and recovery in diverse, complex scenarios using advanced backup and recovery tools. Proactive performance analysis and tuning of applications, storage structures and database processes. Prepares for Adv. Oracle Certification. (002431)

Computer Science Course Offerings

CSCI 100 Computer Literacy 3.0 Fa/Spr
Introduction to the computer for non-computer science students. History of the computer, hardware, software, and a variety of computer applications are considered. The social impact and future of computers for communication systems are discussed. An integrated software package for word processing, spreadsheets, databases, and presentation is used. 2.0 hours activity, 2.0 hours lecture. Special fee required; see the Class Schedule. (002379)

CSCI 101 Introduction to Computer Science 3.0 Fa/Spr
Students who have had limited experience with computers should take CSCI 101 before CSCI 111. CSCI 101 provides an overview of the fundamentals of computer science. Number systems and data representation are introduced. An overview of hardware, including the control unit, memory, the ALU, and I/O is provided. Software is introduced with an overview of operating systems, programming languages, applications, and software tools. Students are exposed to common operating systems and applications. Student also design and implement several programs. 2.0 hours activity, 2.0 hours discussion. (002280)
CSCI 102 Living With Technology 3.0 Fa/Spr

This course explores the impact of technology on our lives. Aspects of our complex technological society are investigated through study of the various forms technology takes, and readings in contemporary literature regarding the impact these technologies have on individuals. Students are encouraged to reflect on technology in their own lives through journaling, and to discourse with their peers on the benefits and harm to individuals, society, and humanity that modern technology presents. This is an approved General Education course. (020623)

CSCI 111 Programming and Algorithms I 4.0 Fa/Spr

Prerequisites: At least one year of high school algebra and strong computer skills or CSCI 101.

A first-semester object-oriented programming course, providing an overview of computer systems and an introduction to problem solving, object-oriented software design, and programming. Coverage includes the software life cycle, as well as algorithms and their role in software design. Students are expected to design, implement, and test a number of programs. 2.0 hours activity, 3.0 hours lecture. (002281)

CSCI 111X Programming Problem Session 1.0 Fa/Spr

Corequisites: CSCI 111.

This course supplements CSCI 111 with additional programming activities. It provides students with the opportunity for additional assistance in developing programming abilities. 2.0 hours activity. Credit/no credit grading only. (020718)

CSCI 144 Introduction to UNIX/Linux 3.0 Fall

A comprehensive introduction to using the UNIX/Linux operating system and the Windows based Cygwin Linux emulator. The course includes hands-on experience with commands, files, and tools. Topics include basic UNIX/Linux commands, filename expansion, command history, command editing, using the UNIX file system (files, file protection, directories), I/O redirection, network utilities, text utilities (editors, office tools), managing processes, pipes, regular expressions, basic shell programming, and advanced utilities (sed, grep, awk). 2.0 hours activity, 2.0 hours discussion. (002302)

CSCI 211 Programming and Algorithms II 4.0 Fa/Spr

Prerequisites: CSCI 111 or ECEC 135 with a grade of C- or higher.

A second semester object-oriented programming course in computer science that emphasizes problem solving. This course continues the study of software specification, design, implementation, and debugging techniques while introducing abstract data types, fundamental data structures and associated algorithms. Coverage includes dynamic memory, file I/O, linked lists, stacks, queues, trees, recursion, and an introduction to the complexity of algorithms. Students are expected to design, implement, test, and analyze a number of programs. 2.0 hours activity, 3.0 hours lecture. (002282)

CSCI 211X Programming Problem Session 1.0 Fa/Spr

Corequisites: CSCI 211.

This course supplements CSCI 211 with additional programming activities. It provides students with the opportunity for additional assistance in developing programming abilities. 2.0 hours activity. Credit/no credit grading only. (020719)

CSCI 221 Assembly Language Programming 3.0 Fa/Spr

Prerequisites: CSCI 111 or ECEC 135 with a grade of C- or better.

Topics include number systems and their rules for arithmetic; basic central processing unit (CPU) organization concepts such as registers, data paths, the arithmetic and logic unit (ALU) and the interface to random access memory (RAM); instruction formats, addressing modes and their uses with a variety of data structures; and parameter passing techniques including the use of a stack frame. The use of good programming methodologies to develop and document algorithms at the assembly language level is emphasized. 2.0 hours activity, 3.0 hours lecture. (002290)

CSCI 221X Programming Problem Session 1.0 Fa/Spr

Corequisites: CSCI 221.

This course supplements CSCI 221 with additional programming activities. It provides students with the opportunity for additional assistance in developing programming abilities. 2.0 hours activity. Credit/no credit grading only. (020720)

CSCI 301 Computer’s Impact on Society 3.0 Fa/Spr

Prerequisites: ENGL 130 (or its equivalent) with a grade of C- or higher; Junior standing.

Impact of computers and high-tech systems on people, institutions, organizations, and environment. Examines the following: law, medicine, education, government, data banks, privacy, computer security, changing work, automation, robots, expert systems, AI, social responsibility, ethics, war, conflict resolution. Includes weekly reading, midterm, and final writing projects. Weekly lectures, discussions, films, and writing. No programming. This is a writing proficiency, WP, course; a grade of C- or better certifies writing proficiency for majors. This is an approved General Education course. (002309)

CSCI 311 Algorithms and Data Structures 4.0 Fa/Spr

Prerequisites: CSCI 211 with a grade of C- or higher; MATH 217 recommended.

This course focuses on object-oriented methodologies in designing and implementing a variety of data structures and algorithms. Coverage includes recursion, trees, search structures, hashing, heaps, sorting algorithms, and graph algorithms. Data structure and algorithm combinations will be studied and analyzed along with their relative merits using both mathematical and empirical measurements. The course includes a number of large programming assignments focusing on object-oriented software engineering and algorithm development. Students will be required to design, implement, test, and analyze their programs in at least one object-oriented language. 2.0 hours activity, 3.0 hours lecture. (002325)

CSCI 311X Programming Problem Session 1.0 Fa/Spr

Corequisites: CSCI 311.

This course supplements CSCI 311 with additional programming activities. It provides students with the opportunity for additional assistance in developing programming abilities. 2.0 hours activity. Credit/no credit grading only. (020721)

CSCI 313H Mind in the Machine - Honors 3.0 Spring

Prerequisites: Acceptance into the Honors Program, faculty permission.

An Honors seminar that explores the psychological, philosophical, social, biological, and technical aspects of machine “minds.” Explores core issues within a subset of the disciplines that comprise the cognitive sciences, including artificial intelligence, philosophy, and psychology. Readings and discussions focus on theories of artificial intelligence and classic themes in human cognition and philosophy, such as determinism, consciousness, free-will, and the mind-body problem. The course focuses on increasing one’s capability to express beliefs and evaluate arguments concerning various issues. This is an approved General Education course. This course is also offered as PSYC 332H. (002311)

CSCI 315 Programming Languages 3.0 Fall

Prerequisites: CSCI 211 with a grade of C- or higher.

An exploration into the structure and syntax of current programming languages, including binding, scope, data types, transfer-of-control structures, subprograms, abstract data types, object-oriented programming, and logical and functional programming. (002323)

CSCI 317 Linear Programming Applications 4.0 EvnFa

Prerequisites: CSCI 311 with a grade of C- or higher.

Mathematical optimization and managerial decision techniques. Simplex method with applications, transportation problems, assignment problems, integer programming, network algorithms, and inventory models. 2.0 hours activity, 3.0 hours discussion. (002331)

CSCI 320 Computer Architecture 3.0 Fall

Prerequisites: CSCI 221 with a grade of C- or higher.

The course introduces basic digital logic design techniques and integrates the topics of assembly language programming, computer organization, and computer design. Topics include the design of the arithmetic and logic unit (ALU), hardware multiplication and division, multiple clock cycle implementations, pipelined implementations, hazard detection and forwarding, design of a memory hierarchy, system busses and the design of a direct memory access (DMA) controller. (002336)

CSCI 340 Operating Systems 4.0 Spring

Prerequisites: CSCI 311 with a grade of C- or higher.

Operating system fundamentals, including history, process and thread management, concurrency with semaphores and monitors, deadlocks, storage management, file systems, I/O, and distributed systems. 2.0 hours activity, 3.0 hours discussion. (002328)
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**Highlighted text** indicates a change from the original publication.
CSCI 540  Systems Programming  3.0 EvnSp
Prerequisites: CSCI 340 with a grade of C- or higher.
A hands-on project course that examines the development of systems software. It provides an introduction to writing low level programs in the UNIX/Linux environment. Topics include using system calls, processes, threads, concurrency, process/thread synchronization, signals, and inter-process communication. The course includes several large programming projects which provide students solid experience in lower level programming. (002378)

CSCI 546  Advanced Network Management  3.0 Spring
Prerequisites: CSCI 346 with a grade of C- or higher.
This course covers advanced network management concepts and implementations including a network operating system, workstation management, and domain administration. Coverage also includes TCP/IP administration and router/hub management. The course provides hands-on experience on network management in a laboratory environment. (002382)

CSCI 547  Advanced Computer Networks  3.0 Fall
Prerequisites: CSCI 346 with grade of C- or higher.
This course provides hands-on experience on network infrastructure management for hubs, switches, and routers in a laboratory environment. (002383)

CSCI 550  Theory of Computing  3.0 Spring
Prerequisites: CSCI 311 with a grade of C- or higher; Math 217.
An introduction to formal languages, grammars, and automata theory with unsolvable problems. (002171)

CSCI 566  Computer Graphics Programming  3.0 Fall
Prerequisites: CSCI 311 with a grade of C- or higher.
This course covers algorithms and data structures in computer graphics. Topics include output primitives and their attributes, 2-D and 3-D geometric transformations and viewing, 3-D object modeling, parallel and perspective projections, visible surface detection, illumination models, and rendering algorithms. (002363)

CSCI 567  Graphical User Interfaces  3.0 EvnFa
Prerequisites: CSCI 311 with a grade of C- or higher.
Implementation of graphical user interfaces using object-oriented programming. Topics include the model-view-controller design pattern, use of a variety of user interface components, event handling, customization, graphics contexts, and layout. (002365)

CSCI 568  Digital Image Processing  3.0 OddFa
Prerequisites: CSCI 311 with a grade of C- or higher.
Explores the field of digital image processing, providing an overview of its many areas of application and delving into the details of a select set of algorithms. Topics include imaging, digital images, basic image manipulation, grey level and color enhancement, neighborhood operations, the frequency domain, geometric operations, segmentation, morphological image processing, and image compression. (002407)

CSCI 569  Advanced Computer Graphics  3.0 Spring
Prerequisites: CSCI 366 with a grade of C- or higher.
Advanced topics in computer graphics, including hierarchical models and scene graphics, texture and bump mapping, compositing, antialiasing, representation and rendering of curves and surfaces, physically based models and particle systems, fractals, and techniques used in scientific visualization. (002406)

CSCI 580  Artificial Intelligence  3.0 Fall
Prerequisites: CSCI 311 with a grade of C- or higher.
An introduction to the basic principles, techniques, and applications of Artificial Intelligence. Coverage includes knowledge representation, logic, inference, problem solving, search algorithms, game theory, perception, learning, planning, and agent design. Students will program with AI language tools. Additional areas may include expert systems, machine learning, natural language processing, and computer vision. (002360)

CSCI 583  Expert Systems and Applications  3.0 Spring
Prerequisites: CSCI 211 with a grade of C- or higher.
The basic concepts and techniques of expert systems. Emphasis is on the reasoning behind expert system design, practical problem solving (comparison of use of expert system shell implementations), and advanced problem solving techniques such as those employed in machine learning and knowledge acquisition. (002359)

CSCI 585  Robotics and Machine Intelligence  3.0 Fall
Prerequisites: CSCI 211 and CSCI 221, both with a grade of C- or higher.
This course introduces students to the field of robotics by emphasizing the task of endowing machines with intelligence. Topics include various case studies of robot architectures and algorithms that facilitate embodying a robot with behaviors that are traditionally associated with human cognition (e.g., perception, reasoning, intelligent navigation, vision, learning, etc.). Students conduct research and experiments with robotics hardware and software. 2.0 hours activity, 2.0 hours lecture. (002361)

CSCI 598  Advanced Topics in Computer Science  3.0 Inquire
This course is a special topic offered for 1.0-3.0 units. Exploration of selected topics in Computer Science. Consult semester schedules for specific listings. Standard letter grading only. (020184)

CSCI 611  Distributed Computing  3.0 Spring
Prerequisites: CSCI 311 and classified graduate standing.
This course focuses on distributed computing using the object-oriented paradigm, large class libraries, and the interactive programming environment. The course is designed to prepare the student to do commercial enterprise development. Topics may include object serialization, beans, multithreading, networking, remote objects, database connectivity, servlets, and client/server programming with enterprise and application servers. (002395)

CSCI 619  Topics in Programming Language Theory  3.0 Inquire
Prerequisites: Classified graduate standing.
Further study of selected advanced topics in programming language theory as presented in recently published journals; possible emphasis on research interests and/or projects of faculty in the department. Consult the Graduate Coordinator to determine how many units may be counted toward your major. You may take this course more than once for a maximum of 12.0 units. (002392)

CSCI 620  Computer Architecture  3.0 Spring
Prerequisites: EECE 320 and classified graduate standing.
Provides a thorough and fundamental treatment of the art of computer architecture. Topics include concepts of von Neumann architectures, methods of evaluating CPU performance, instruction-set design and examples, compiler issues, instruction pipelining, superscalar processors, methods for reduction of branch penalty, memory hierarchies, I/O systems, floating-point arithmetic, and current issues in parallel processing. (002436)

CSCI 629  Topics in Computer Architecture  3.0 Inquire
Prerequisites: Classified graduate standing.
Further study of selected advanced topics in computer architecture as presented in recently published journals; possible emphasis on research interests and/or projects of faculty in the department. Consult the Graduate Coordinator to determine how many units may be counted toward your major. You may take this course more than once for a maximum of 12.0 units. (002423)

CSCI 630  Software Engineering  3.0 Fall
Prerequisites: Classified graduate standing.
In-depth study and application of the planning, design, implementation, and management of complex software systems. Topics include requirements engineering, formal specifications, object-oriented analysis, design patterns, and peopleware. Teams of students will implement a large software project using a cutting edge software engineering approach. (002394)

CSCI 639  Topics in Software Engineering  3.0 Inquire
Prerequisites: Classified graduate standing.
Further study of selected advanced topics in software engineering as presented in recently published journals; possible emphasis on research interests and/or projects of faculty in the department. Consult the Graduate Coordinator to determine how many units may be counted toward your major. You may take this course more than once for a maximum of 12.0 units. (002396)

CSCI 640  Operating Systems  3.0 Spring
Prerequisites: CSCI 340 and classified graduate standing.
In-depth study of operating systems concepts including results from recent research. Topics may include processes, threads, virtual memory, file systems, distributed computing, scheduling, protection, and communication protocols. Students may be required to implement operating system projects. (002430)
CSCI 649  Topics in Networking  3.0 Inquire
Prerequisites: Classified graduate standing.
Further study of selected advanced topics in networking as presented in recently published journals; possible emphasis on research interests and/or projects of faculty in the department. Consult the Graduate Coordinator to determine how many units may be counted toward your major. You may take this course more than once for a maximum of 12.0 units. (002413)

CSCI 650  Design and Analysis of Algorithms  3.0 Fall
Prerequisites: CSCI 311, MATH 217, and classified graduate standing.
Algorithms from many areas of computer science will be analyzed. Topics include algorithm design techniques (such as divide-and-conquer, greedy algorithms, dynamic programming, and others), mathematical and empirical analysis of algorithms and NP-completeness. (002417)

CSCI 659  Topics in Computer Theory  3.0 Inquire
Prerequisites: Classified graduate standing.
Further study of selected advanced topics in computer theory as presented in recently published journals; possible emphasis on research interests and/or projects of faculty in the department. Consult the Graduate Coordinator to determine how many units may be counted toward your major. You may take this course more than once for a maximum of 12.0 units. (002419)

CSCI 669  Topics in Computer Graphics  3.0 Inquire
Prerequisites: Classified graduate standing.
Further study of selected advanced topics in computer graphics as presented in recently published journals; possible emphasis on research interests and/or projects of faculty in the department. Consult the Graduate Coordinator to determine how many units may be counted toward your major. You may take this course more than once for a maximum of 12.0 units. (002408)

CSCI 679  Topics in Database Systems  3.0 Inquire
Prerequisites: Classified graduate standing.
Further study of selected advanced topics in database systems as presented in recently published journals; possible emphasis on research interests and/or projects of faculty in the department. Consult the Graduate Coordinator to determine how many units may be counted toward your major. You may take this course more than once for a maximum of 12.0 units. (002435)

CSCI 682  Topics in Artificial Intelligence  3.0 Inquire
Prerequisites: Classified graduate standing.
Further study of selected advanced topics in artificial intelligence as presented in recently published journals; possible emphasis on research interests and/or projects of faculty in the department. Consult the Graduate Coordinator to determine how many units may be counted toward your major. You may take this course more than once for a maximum of 12.0 units. (002402)

CSCI 693  Research methods in Computer Science  3.0 Fa/Spr
Prerequisites: Candidate status.
This course interweaves three distinct themes (investigation, experimentation, and technical writing), that culminate in a comprehensive research project, presentation, and oral defense. First, the students are immersed into the research process within Computer Science. This includes an understanding of the role, ethics, and responsibility of researchers in Computer Science. The second focus is on rigorous design of experiments for the purpose of testing research hypothesis, simulations, and models, and interpreting the results of those experiments. Finally, proficiency in communication of scientific ideas and findings will be addressed, from intensive reading, critiques, technical writing and oral presentations. (020616)

CSCI 697  Independent Study  1.0–6.0 Fa/Spr
Prerequisites: Classified graduate standing, faculty permission.
This course is an independent study offered for 1.0-6.0 units. You must register directly with a supervising faculty member. Independent study and investigation of special problems in student's area of concentration. Both registration and study plan must have approval of the instructor and the student's graduate advisory committee chair. You may take this course more than once for a maximum of 6.0 units. Credit/no credit grading only. (002451)

CSCI 699P Master’s Project  3.0 Fa/Spr
Prerequisites: Candidate status.
You must register directly with a supervising faculty member. Independent study and investigation of special problems in student's area of concentration. Both registration and study plan must have approval of the instructor and the student's graduate advisory committee chair. Master’s Project courses earn a Credit grade upon completion. You may take this course more than once for a maximum of 6.0 units. (002453)

CSCI 699T Master’s Thesis  1.0–6.0 Fa/Spr
Prerequisites: Candidate status.
This course is offered for 1.0-6.0 units. You must register directly with a supervising faculty member. Independent study and investigation of special problems in student's area of concentration. Both registration and study plan must have approval of the instructor and the student's graduate advisory committee chair. Master’s Thesis courses earn a Credit grade upon completion. You may take this course more than once for a maximum of 6.0 units. (002453)