Program

BS in Computer Science
Options in:
  General
  Math/Science
  Systems
  Computer Graphics Programming
BS in Computer Information Systems
BS in Applied Computer Graphics
Options in:
  Production
  Technical
Minor in Applied Computer Graphics
Minor in Computer Science
MS in Computer Science

The Computer Science, BS in Computer Information Systems, and MS in Computer Science, with their various options, allow students to prepare for careers in diverse areas of applications of Computer Science.

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.

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 Users Group (CSLUG) and Network for Women in Technology (NeWT) and Computer Graphics Consortium (CGC) also provide opportunities for various student activities.

Cooperative Work Experience

The computer industry holds the department in high regard in part because of its active participation in the Cooperative Work Experience Program. Students are placed with firms such as IBM, ChevronTexaco, SUN, and Hewlett-Packard, and various government laboratories. Selected students stop out for a term and a summer (six to eight months) and work in the field and receive normal employee salary and academic credit for their valuable experience.

Career Outlook

The computer enables society to keep abreast of increasing need for more and better information, opening up a wide range of computer-related jobs. Given the current expansion of science and technology, employment of trained computer scientists is expected to remain very high.

Accreditation

The B.S. in Computer Science degree is accredited by the Commission on Accreditation of Computing Education Programs (CAC). The program is also a member of the Microsoft Academic Alliance.

Highlighted text indicates a change from the original publication.
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 on the CSU, Chico Web.

General Education Requirements: 48 units

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

Computer Science and Computer Information Systems

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.

For all Computer Science Options except Math Science: Of the three courses you must select to complete the 9-unit Upper-Division Thematic requirement, one must be science-oriented. That course must be approved in advance by your advisor in order to meet requirements of the Computing Accreditation Commission of ABET, 111 Market Place, Suite 1050, Baltimore, MD 21202-4012, telephone: (410) 347-7700.

For Math Science Option: Upper-division theme modification has been approved for this option. See the General Education chapter in the University Catalog for specifics on how to apply this modification.

Cultural Diversity Course Requirements: 6 units

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

American Institutions Requirement: 6 units

See the “American Institutions Requirement” under “Bachelor’s Degree Requirements.” For this major, this requirement is normally fulfilled by completing HIST 130 and POLS 155.

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: 75–89 units

The following courses, or their approved transfer equivalents, are required of all candidates for this degree. Additional required courses, depending upon the selected option or advising pattern, are outlined following the degree core program requirements.

Upper-Division Core: 28 units

10 courses required:

- CSCI 301 Computer's Impact on Society 3.0 FS *
  Prerequisites: Junior standing.
- CSCI 305 Proj Requirements/Design/Test 3.0 FS
  Prerequisites: ENGL 130; CSCI 112 or ECE 221. This course is also offered as ECE 335.
- CSCI 311 Algorithms and Data Structures 3.0 FS
  Prerequisites: Grade of C– or better in CSCI 112.
- CSCI 315 Programming Languages 3.0 FS
  Prerequisites: CSCI 112.
- CSCI 320 Computer Architecture 3.0 FS
  Prerequisites: CSCI 221.
- CSCI 330 Software Engineering 3.0 FS WP
  Prerequisites: CSCI 311; ENGL 130 (or its equivalent) with a grade of C– or higher.
- CSCI 340 Operating Systems Programming 3.0 FS
  Prerequisites: CSCI 311; CSCI 320.
- CSCI 490 Directed Programming Exp 1.0–3.0 FS
  Prerequisites: CSCI 311, faculty permission.

Note: One unit of CSCI 490 is required

CSCI 550 Theory of Computing 3.0 FS

Prerequisites: MATH 317.

MATH 317 Discrete Math Structures 3.0 FA

Prerequisites: MATH 120.

Major Option Course Requirements: 22–36 units

The following courses, or their approved transfer equivalents, are required dependent upon the option chosen. Students must select one of the following options for completion of the major course requirements.

The Option in General Computer Science: 22 units

1 course selected from:

One upper-division General Education Natural Sciences Thematic course approved in advance by your CSCI advisor. See General Education requirements.

2 courses required:

- CSCI 515 Compiler Design 3.0 FS
  Prerequisites: CSCI 112.

- MATH 314 Prob & Stat for Science & Tech 4.0 SP
  Prerequisites: MATH 121.

1 course selected from:

- CSCI 470 Database Management 3.0 FS
  Prerequisites: CSCI 112.

- CSCI 547 Computer Networks 3.0 FS
  Prerequisites: CSCI 140.

- CSCI 566 Computer Graphics Programming 3.0 FA
  Prerequisites: CSCI 311.

- CSCI 567 Graphical User Interface Impl 3.0 SP
  Prerequisites: CSCI 311.

- CSCI 580 Artificial Intelligence 3.0 FA
  Prerequisites: Grade of C– or better in CSCI 311.

CSCI 583 Expert Systems & Applications 3.0 SP

Prerequisites: CSCI 112.

9 units selected from:

Any upper-division Computer Science (CSCI) courses (minimum of two courses 6 units at the 400 or 500 level) except CSCI 399, CSCI 490, CSCI 499, and CSCI 599.

MATH 320 Elem Differential Equations 4.0 FS

Prerequisites: MATH 121.

MATH 335 Elementary Linear Algebra 3.0 FS

MATH 350 Intro to Probability/Stat 3.0 FA

Prerequisites: MATH 121.

PHYS 204C Heat/Wave Motion/Sound/Light 4.0 FS

Prerequisites: MATH 121; PHYS 204A with a grade of C– or higher.

The Option in Math/Science: 36 units

6 courses required:

- CHEM 111 General Chemistry 4.0 FS *
  Prerequisites: Second-year high school algebra; one year high school chemistry. (One year of high school physics and one year of high school mathematics past Algebra II are recommended.)

- MATH 220 Analytic Geometry and Calculus 4.0 FS
  Prerequisites: MATH 121.

- MATH 260 Elem Differential Equations 4.0 FS
  Prerequisites: MATH 121.

- MATH 335 Elementary Linear Algebra 3.0 FS
  Prerequisites: MATH 121.

- MATH 350 Intro to Probability/Stat 3.0 FA
  Prerequisites: MATH 121.

- PHYS 204C Heat/Wave Motion/Sound/Light 4.0 FS
  Prerequisites: MATH 121; PHYS 204A with a grade of C– or higher.

1 course selected from:

- CSCI 351 Numerical Methods Programming 3.0 Inq
  Prerequisites: CSCI 112 or ECE 135; MATH 220.

- MATH 460 Numerical Analysis 3.0 S2
  Prerequisites: MATH 220; MATH 335, completion of the computer literacy requirement.

1 course selected from:

- CSCI 470 Database Management 3.0 FS
  Prerequisites: CSCI 112.
**The Option in Systems: 22 units**

1 course selected from:

One upper-division General Education Natural Sciences Thematic course approved in advance by your CSCI advisor. See General Education requirements.

6 courses required:

- CSCI 448 Survey of Computer Security 3.0 FA
- CSCI 515 Compiler Design 3.0 FS
- CSCI 540 Multi-User Operating Systems 3.0 FA
- CSCI 542 Systems Design 3.0 FA
- CSCI 547 Computer Networks 3.0 FS
- MATH 314 Prob & Stat for Science & Tech 4.0 SP

**The Option in Computer Graphics Programming: 27–28 units**

1 course selected from:

One upper-division General Education Natural Sciences Thematic course approved in advance by your CSCI advisor. See General Education requirements.

5 courses required:

- APCG 110 Computer-Assisted Art I 3.0 FS
- APCG 330 3-D Computer Modeling 3.0 FS
- CSCI 465 Web Programming Fundamentals 3.0 SP
- CSCI 467 Graphical User Interface Des 3.0 FA
- CSCI 567 Graphical User Interface Impl 3.0 SP

2 courses selected from:

- APCG 360 Web Page Design 3.0 FA
- APCG 445 Advanced Animation Production 3.0 FA
- CSCI 465 Web Programming Fundamentals 3.0 SP
- CSCI 467 Graphical User Interface Des 3.0 FA
- CSCI 567 Graphical User Interface Impl 3.0 SP

1 course selected from:

- ARTS 122 Color Theory 3.0 FS
- ARTS 240 Intro to Fine Art Photography 3.0 FS
- CDES 131 Visual Communication Concepts 2.0 FS
- CDES 206 Intro Photo Com & Dig Imaging 3.0 FS

**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.

**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.

**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 courses required 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 involves 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 to professional journals, presentation at conferences, or competition in shows. Such experience is valuable for graduate school and later professional life. Your honors work will be recognized at your graduation, on your permanent transcripts, and on your diploma. It is often accompanied by letters of commendation from your mentor in the department or the department chair.

Some common features of Honors in the Major program are

1. You must take 6 units of Honors in the Major course work. At least 3 of these units are independent study (399H, 499H) as specified by your department. You must complete each class with a minimum grade of B.
2. You must have completed 9 units of upper-division course work or 21 overall units in your major before you can be admitted to Honors in the Major. Check the requirements for your major carefully, as there may be specific courses that must be included in these units.
3. Your cumulative GPA should be at least 3.5 or within the top 5% of majors in your department.
4. Your GPA in your major should be at least 3.5 or within the top 5% of majors in your department.
5. Most students apply for or are invited to participate in Honors in the Major during the second semester of their junior year. Then they complete the 6 units of course work over the two semesters of their senior year.
6. Your honors work culminates with a public presentation of your honors project.

While Honors in the Major is part of the Honors Program, each department administers its own program. Please contact your major department or major advisor to apply.

**Honors in Computer Science**

In addition to the common requirements for the Honors in the Major program given above, the Honors in Computer Science program includes the following:

1. You must be recommended by a faculty member.
2. Students who are admitted to the department's Honors in the Major program must complete 3 units of CSCI 465H, CSCI 470H, CSCI 515H, CSCI 520H, CSCI 540H, CSCI 547H, CSCI 550H, CSCI 566H, CSCI 567H, CSCI 580H, or CSCI 583H, with a minimum grade of B. Unless other arrangements are made, the professor instructing the course you take becomes your faculty mentor. It is during this time that you must define a research problem or performance area and develop an Honors Research Project/Thesis proposal in preparation for work in CSCI 499H. You must also maintain a minimum GPA of 3.0 in your senior year. (Note: For the BS in Computer Information Systems, the Honors choices are CSCI 565H, CSCI 470H, CSCI 511H, CSCI 540H, CSCI 546H, CSCI 547H, or CSCI 570H. For the BS in Applied Computer Graphics, the Honors choices are APCG 445H, CSCI 465H, CSCI 566H, or CSCI 567H.)
3. Each Honors in the Major class requires completion of the course plus an additional Honors Project and culminates with a public presentation of your Honors project.

**The Bachelor of Science in Computer Information Systems**

**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 on the CSU, Chico Web.
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.

For additional University requirements, please see General Education, Cultural Diversity, and Literacy Requirements under the Bachelor of Science in Computer Science.

American Institutions Requirement: 6 units
See the “American Institutions Requirement” under “Bachelor’s Degree Requirements.” For this major, this requirement is normally fulfilled by completing HIST 130 and POLS 155.

Course Requirements for the Major: 79 units
The following courses, or their approved transfer equivalents, are required of all candidates for this degree.
Completion of these requirements also satisfies requirements for a minor in Business Administration.

Lower-Division Requirements: 18 units
5 courses required:
- CSCI 111 Programming and Algorithms I 3.0 FS
- Prerequisites: At least one year of high school algebra and strong computer skills or CSCI 101.
- CSCI 112 Programming & Algorithms II 3.0 FS
- Prerequisites: Grade of C– or better in CSCI 111 (or ECE 135 for engineering majors).
- CSCI 221 Assembly Language Programming 3.0 FS
- Prerequisites: CSCI 111.
- MATH 105 Statistics 3.0 FS *
- Prerequisites: Completion of ELM requirement.
- MATH 109 Survey of Calculus 3.0 FS *
- Prerequisites: Completion of ELM requirement. This course is not intended for majors in mathematics, physics, chemistry, or engineering.

1 course selected from:
- CSCI 110 Intro to Applications Prog 3.0 FS
- CSCI 144 Introduction to UNIX Operating 3.0 FS

Upper-Division Requirements: 37 units
7 courses required:
- CSCI 305 Proj Requirements/Design/Test 3.0 FS
- Prerequisites: ENGL 130; CSCI 112 or ECE 221.
- This course is also offered as ECE 335.
- CSCI 311 Algorithms and Data Structures 3.0 FS
- Prerequisites: Grade of C– or better in CSCI 112.
- CSCI 320 Computer Architecture 3.0 FS
- Prerequisites: CSCI 221.
- CSCI 330 Software Engineering 3.0 FS WP
- Prerequisites: CSCI 311, ENGL 130 (or its equivalent) with a grade of C– or higher.
- CSCI 340 Operating Systems Programming 3.0 FS
- Prerequisites: CSCI 311, CSCI 320.
- CSCI 470 Database Management 3.0 FS
- Prerequisites: CSCI 112.
- CSCI 490 Directed Programming Exp 1.0–3.0 FS
- Prerequisites: CSCI 311, faculty permission.

Note: One unit of CSCI 490 is required.

6 courses selected from:
Choose courses from the Database/ERP, Networking, Systems, Web, or Computer Science listings below.
A minimum of one course must be from the Networking selections.
A minimum of one course must be from the Web selections.
Note that prerequisites for the MINS courses are waived for CIS students, but course content is unchanged.

Database/ERP:
- BSIS 420 ERP: Systems Config and Use 3.0 FS
- Prerequisites: MINS 350, permission of instructor.
- BSIS 524 Business Programming with ABAP 3.0 Inq
- Prerequisites: CSCI 111, permission of instructor; either BSIS 420 or MINS 522.
- CSCI 570 Advanced Database Mgmt Systems 3.0 FA
- Prerequisites: CSCI 470 or MINS 235.
- MINS 335 Database Application Dev 3.0 FS
- Prerequisites: BSIS 301, MINS 215.
- MINS 522 ERP: Systems Adm 3.0 FS
- Prerequisites: Concurrent enrollment in or prior completion of MINS 345 and instructor permission.
- MINS 535 Database Administration 3.0 FS
- Prerequisites: MINS 335 and instructor permission.

Networking:
- CSCI 346 Intro to Computer Netwks/Mgmt 3.0 FS
- Prerequisites: CSCI 111.
- CSCI 546 Adv Network Management 3.0 SP
- CSCI 547 Computer Networks 3.0 FS
- Prerequisites: CSCI 140.
- MINS 345 Distributed Systems Management 3.0 FS
- Prerequisites: BSIS 301, MINS 245.
- MINS 545 Adv Distributed Systems Mgmt 3.0 FS
- Prerequisites: MINS 345 and permission of instructor.

Systems:
- CSCI 344 UNIX Power Utilities Shell Prg 3.0 FA
- CSCI 444 Fundamental UNIX System Admin. 3.0 SP
- CSCI 540 Multi-User Operating Systems 3.0 FA
- Prerequisites: CSCI 344 or permission of instructor.
- CSCI 542 Systems Design 3.0 FA
- Prerequisites: CSCI 130.

Web:
- APCG 360 Web Page Design 3.0 FA
- Prerequisites: CSCI 111.
- CDES 322 Advanced WWW Design & Publish 3.0 FS
- Prerequisites: CDES 222.
- CDES 323 Human Interface Design 3.0 FA
- Prerequisites: CDES 222.
- CSCI 346 Intro to Computer Netwks/Mgmt 3.0 FS
- Prerequisites: CSCI 340.
- CSCI 311 Object-Oriented Programming 3.0 FA
- Prerequisites: CSCI 311.
- MINS 546 E-Com & Client Server Computg 3.0 Inq
- Prerequisites: MINS 350; prior completion or concurrent enrollment in MINS 345.

Computer Science:
Any 400 or 500-level Computer Science course approved by advisor.

Required Business Minor: 24 units
The following courses, or their approved transfer equivalents, also fulfill requirements for a Minor in Business Administration.

8 courses required:
- ACCT 201 Intro to Financial Accounting 3.0 FS
- ACCT 202 Intro to Managerial Accounting 3.0 FS
- Prerequisites: ACCT 201 (or ABUS 261 for ABUS majors only).
- BLAW 302 Managing the Legal Environment 3.0 FS
- Prerequisites: At least junior standing.
- ECON 103 Principles of Micro Analysis 3.0 FS *
- FINA 307 Survey of Finance 3.0 FS
- Prerequisites: ACCT 201, ECON 103.
- MGMT 301 Managerial Accounting/Fin 3.0 FS
- Prerequisites: MINS 301.
- MKTG 305 Survey of Marketing 3.0 FS

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.

Additional Computer Information Systems 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.

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 courses required 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
See Honors in the Major under the BS in Computer Science.
The Bachelor of Science in Computer Engineering

The Department of Electrical and Computer Engineering offers the BS in Computer Engineering. See the Engineering chapter.

The Bachelor of Science in Applied Computer Graphics

Total Course Requirements for the Bachelor’s Degree: 120 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 on the CSU, Chico Web.

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.

Cultural Diversity Course Requirements: 6 units

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

American Institutions Requirement, 6 units

See the “American Institutions Requirement” under “Bachelor's Degree Requirements.” This requirement is normally fulfilled by completing HIST 130 and POLS 155. Courses used to satisfy this requirement do not apply to General Education.

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: 67–72 units

The following courses, or their approved transfer equivalents, are required to complete the major course requirements. The following courses, or their approved transfer equivalents, are required of all candidates for this degree. Additional required courses, depending upon the selected option or advising pattern, are outlined following the degree core program requirements.

Major Core Program: 30 units

10 courses required:

APCG 110 Computer-Assisted Art I 3.0 FS *
APCG 112 Digital Photography 3.0 FS
APCG 117 Concept Design & Storyboarding 3.0 FS
APCG 240 2-D Digital Animation 3.0 FA
Prerequisites: APCG 110
APCG 330 3-D Computer Modeling 3.0 FS
Prerequisites: APCG 110 or previous computer graphics experience.
APCG 331 3-D Character Modeling 3.0 FA
Prerequisites: APCG 330
APCG 340 Computer Animation 3.0 FS
Prerequisites: APCG 110 and APCG 330 or permission of instructor.
APCG 345 Adv Animation Pre-Production 3.0 FS
Prerequisites: ENGL 130 (or its equivalent) with a grade of C– or higher, APCG 117.
APCG 445 Advanced Animation Production 3.0 FA
Prerequisites: APCG 330, APCG 340.
APCG 545 Adv Animation Post-Production 3.0 FS
Prerequisites: APCG 445

Supplemental Program Requirements: 15 units

Select one of the following supplemental programs, Art Studio or Communication Design.

Art Studio Program: 15 units

2 courses required:

ARTS 125 Basic Drawing 3.0 FS
ARTS 126 Basic Drawing 3.0 FS
Prerequisites: ARTS 125 or faculty permission.

Computer Science

1 course selected from:

ARTS 101 Art History Survey 3.0 FS *
ARTS 102 Art History Survey 3.0 FS *

1 course selected from:

ARTS 122 Color Theory 3.0 FS
ARTS 123 Design 3.0 FS

1 course selected from:

One Art Studio course approved in advance by your APCG advisor.

Communication Design Program: 15 units

2 courses required:

CDES 101 Writing for Electronic Media 3.0 FS
Prerequisites: ENGL 130.
CDES 141 Media Aesthetics 3.0 FS

3 courses selected from:

CDES 201 Computer Graphics 3.0 FS
CDES 216 Intro: Digital Audio in Media 3.0 FS
CDES 222 Intro to WWW Design & Pub 3.0 FS
CDES 261 Found of Electronic Media 3.0 FS
CDES 314 Intro Multimedia Dsgn & Dev 3.0 FA
Prerequisites: Basic computer literacy, faculty permission.
CDES 322 Advanced WWW Design & Publish 3.0 FS
Prerequisites: CDES 222.
CDES 323 Computer Graphics 3.0 FS
Prerequisites: CDES 230 for CDES majors. Other majors require instructor permission. Basic computer literacy, faculty permission.
CDES 351 Field Video Production 3.0 FS
Prerequisites: CDES 103, CDES 206, CDES 216; CDES 141, CDES 261 (both with a grade of C– or higher).
CDES 414 Adv Multimedia Dsgn & Develop 3.0 SP
Prerequisites: CDES 314.
CDES 466 Studio Video Production 3.0 FS
Prerequisites: CDES 366.
CDES 468 Video Production Workshop 3.0 FA
Prerequisites: CDES 366.

Major Option Course Requirements: 22–27 units

The following courses, or their approved transfer equivalents, are required dependent upon the option chosen. Students must select one of the following options for completion of the major course requirements.

The Option in Production: 22 units

APCG 389 Industry Internship 1.0–3.0 FS
Prerequisites: Faculty permission.
Note: APCG 389 must be taken for 3 units.
APCG 491 Portfolio 1.0 FS
Prerequisites: APCG 340.
APCG 499 Special Problems 1.0–3.0 FS
Prerequisites: Faculty permission.
Note: APCG 499 must be taken for 3 units.
CDES 301 Communication Criticism 3.0 FS WP
Prerequisites: ENGL 130 (or its equivalent) with a grade of C– or higher.

1 course selected from:

CSCI 101 Intro to Computer Science 3.0 FS
CSCI 111 Programming and Algorithms 1 3.0 FS
Prerequisites: At least one year of high school algebra and strong computer skills or CSCI 101.

Applied Computer Graphics Electives: 9 units

3 courses selected from:

Note: Select a minimum of one upper-division course.

APCG 170 Video Game Design 3.0 FA
APCG 360 Web Page Design 3.0 FA
Prerequisites: CSCI 111.
APCG 370 Video Game Development 3.0 SP
Prerequisites: APCG 170.
APCG 420 Digital Lighting and Texturing 3.0 FA
APCG 422 Digital Compositing & Special Eff 3.0 SP
Prerequisites: APCG 240.
APCG 441 3-D Character Animation 3.0 FA
Prerequisites: APCG 340.
APCG 470 Video Game Production 3.0 FA
Prerequisites: APCG 370.
KINE 318 3-D Desktop Video Applications 3.0 FS
KINE 524 Biomechanical Analysis 3.0 FS
Prerequisites: KINE 322 and basic computer literacy.
THEA 112 Acting for Non-Majors 3.0 FS *
THEA 371 Lighting Design 3.0 FA
Prerequisites: THEA 121, THEA 170, THEA 250.
Corequisites: Concurrent enrollment in THEA 205 for lighting crew is required.
The Option in Technical: 27 units

6 courses required:

- CSCI 111 Programming and Algorithms I 3.0 FS
  Prerequisites: At least one year of high school algebra and strong computer skills or CSCI 101.
- CSCI 112 Programming & Algorithms II 3.0 FS
  Prerequisites: Grade of C– or better in CSCI 111 (or EECE 135 for engineering majors).
- CSCI 311 Algorithms and Data Structures 3.0 FS
  Prerequisites: Grade of C– or better in CSCI 112.
- CSCI 330 Software Engineering 3.0 FS WP
  Prerequisites: CSCI 311, ENGL 130 (or its equivalent) with a grade of C– or higher.
- CSCI 566 Computer Graphics Programming 3.0 FA
  Prerequisites: CSCI 311.
- MATH 109 Survey of Calculus 3.0 FS *
  Prerequisites: Completion of ELM requirement. This course is not intended for majors in mathematics, physics, chemistry, or engineering.

Applied Computer Graphics Electives: 9 units

3 courses selected from:

- Note: Select a minimum of two upper-division courses.
- APCG 170 Video Game Design 3.0 FA
- APCG 360 Web Page Design 3.0 FA
- APCG 370 Video Game Development 3.0 SP
- Prerequisites: APCG 170.
- APCG 420 Digital Lighting and Texturing 3.0 FA
  Prerequisites: Grade of C– or better in CSCI 112.
- APCG 422 3D Compositing & Special Effects 3.0 SP
  Prerequisites: APCG 240.
- APCG 441 3-D Character Animation 3.0 FA
  Prerequisites: APCG 340.
- APCG 470 Video Game Production 3.0 FA
  Prerequisites: APCG 370.
- CSCI 465 Web Programming Fundamentals 3.0 SP
  Prerequisites: CSCI 311.
- CSCI 467 Graphical User Interface Design 3.0 FA
  Prerequisites: CSCI 311.
- CSCI 567 Graphical User Interface Implementation 3.0 SP
  Prerequisites: CSCI 311.
- CSCI 580 Artificial Intelligence 3.0 FA
  Prerequisites: Grade of C– or better in CSCI 311.
- KINE 318 3-D Desktop Video Applications 3.0 FS
  Prerequisites: CSCI 222 and basic computer literacy.
- KINE 525 Biomechanical Analysis 3.0 FS
  Prerequisites: KINE 322.
- THEA 112 Acting for Non-Majors 3.0 FS *
- THEA 371 Lighting Design 3.0 FA
  Prerequisites: THEA 121, THEA 170, THEA 250. Corequisites: Concurrent enrollment in THEA 205 for lighting crew is required.

Elective 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 higher is required in all Applied Computer Graphics courses required 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

See Honors in the Major under the BS in Computer Science.

Minor in Applied Computer Graphics

Course Requirements for the Minor: 21 units

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

3 courses required:

- APCG 110 Computer-Assisted Art I 3.0 FS *
- APCG 112 Digital Photography 3.0 FS
- APCG 117 Concept Design & Storyboarding 3.0 FS

3 units selected from:

Any Applied Computer Graphics (APCG) courses.

9 units selected from:

Any upper-division (300/400/500-level) Applied Computer Graphics (APCG) courses. These courses must be selected in consultation with the Applied Computer Graphics advisor.

The Minor in Computer Science

Course Requirements for the Minor: 21 units

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

Lower-Division: 9 units

3 courses required:

- CSCI 111 Programming and Algorithms I 3.0 FS
  Prerequisites: At least one year of high school algebra and strong computer skills or CSCI 101.
- CSCI 112 Programming & Algorithms II 3.0 FS
  Prerequisites: Grade of C– or better in CSCI 111 (or EECE 135 for engineering majors).
- CSCI 221 Assembly Language Programming 3.0 FS
  Prerequisites: CSCI 111.

Upper-Division: 12 units

2 courses required:

- CSCI 311 Algorithms and Data Structures 3.0 FS
  Prerequisites: Grade of C– or better in CSCI 112.
- CSCI 320 Computer Architecture 3.0 FS
  Prerequisites: CSCI 221.

6 units selected from:

Any upper-division Computer Science (CSCI) courses except CSCI 389, CSCI 399, and CSCI 490.

The Master of Science in Computer Science

Course Requirements for the Master’s Degree: 30 units

Continuous enrollment is required. A maximum of 9 semester units of computer science or 6 semester units of computer science related transfer credit may be applied toward the degree.

Graduate Time Limit:

All requirements for the degree are to be completed within seven 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.

Prerequisites for Admission to Conditionally Classified Status:

1. Satisfactory grade point average as specified in “Admission to Master’s Degree Programs” in the University Catalog.
2. Approval by the department and the Office of Graduate Studies.
3. An acceptable baccalaureate from an accredited institution, or an equivalent approved by the Office of Graduate Studies.
4. Completion of background preparation equivalent to:
   (a) CSCI 311 (Algorithms and Data Structures)
   (b) CSCI 320 (Computer Architecture)
   (c) MATH 120, MATH 121, MATH 314, MATH 317, or equivalents.

Prerequisites for Admission to Classified Status:

In addition to any requirements listed above:

1. Completion of background preparation equivalent to the following undergraduate courses:
   (a) CSCI 330 (Software Engineering)
   (b) CSCI 340 (Operating System Programming)
2. All required undergraduate Computer Science courses must be taken for a letter grade, and a grade of C or better must be earned in each course. 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. Classified graduate standing and completion of, or enrollment in, the graduate core courses.
2. Development of an approved program in consultation with the Graduate Coordinator.
3. If the thesis or project option is chosen, formation of the graduate advisory committee in consultation with the Graduate Coordinator.
Requirements for the MS Degree in Computer Science:

Completion of all requirements as established by the departmental graduate committee, the graduate advisory committee, and the Office of Graduate Studies, to include:

1. Completion of an approved program consisting of 30 units of 400/500/600-level courses as follows:
   (a) At least 24 units in the discipline of Computer Science.
   (b) Completion of the graduate core courses:
       - CSCI 620 Computer Architecture 3.0 SP
       - Prerequisites: CSCI 320 and classified graduate standing.
       - CSCI 630 Software Engineering 3.0 FA
       - Prerequisites: CSCI 330 and classified graduate standing.
       - CSCI 640 Operating Systems 3.0 SP
       - Prerequisites: CSCI 340 and classified graduate standing.
   (c) At least 18 of the units required for the degree in 600-level courses.
   (d) Not more than 9 semester units of transfer and/or extension credit (correspondence courses and U.C. extension course work are not acceptable).

2. Completion and final approval of one of the following three plans as approved by the Graduate Coordinator:
   (a) Examination Plan
      This plan includes 30 units of in-class course work, and a passing score on the written comprehensive examination covering the core. The examination may be taken a maximum of two times. Failure on the second 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). The project must reflect a personal in-depth study of a topic in an applied area of computer science. A formal written description of the project must be submitted to the Office of Graduate Studies for approval and access to the library.
   (c) Thesis Plan
      This plan includes 24 units of in-class course work and 6 units of thesis research and preparation (CSCI 699T). Research may be theoretical or applied, but must reflect a personal in-depth study into an approved topic. This plan requires a formal research thesis which must be submitted to the Office of Graduate Studies for approval and access to the library.

3. Approval by the Graduate Coordinator and the Graduate Coordinators Committee on behalf of the faculty of the University.

Graduate Literacy Requirement:

Writing proficiency is a graduation requirement. Computer Science students will demonstrate their writing competence through successfully completing a departmentally administered examination given at the beginning of each semester or successful completion (B—higher) of an approved technical writing course. The writing examination may be taken a maximum of two times. Consult the Graduate Coordinator for specific information.

Graduate Grading Requirements:

All courses in the major (with the exceptions of Independent Study—597/697, Comprehensive Examination—696, 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 597/697, 696, 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 institution subsequent to admission to the master's program; all course work taken at CSU, Chico subsequent to admission to the program; and all courses on the approved master's degree program.

In addition, students may not count more than two courses in which they receive a grade of C toward the approved program.

The Faculty

Judith A. Challinger, 1999, Assist Professor, PhD, UC Santa Cruz.
Abdel-Moaty M. Fayek, 1985, Assoc Professor, MS, CSU Chico.
Leonard W. Fisk Jr, 1976, Professor, PhD, UC Irvine.
Ralph C. Hilzer, 1985, Chair, Professor, MS, US Naval Postgrad School.
Seung Rae Im, 1982, Professor, PhD, So Methodist U.
Benjoe A. Juliano, 1998, Assoc Professor, PhD, Florida State U.
Anne M. Keuneke, 1989, Professor, PhD, Ohio State U.
Clement H. Luk, 1979, Professor, MS, SUNY Buffalo.
Renée S. Renner, 1998, Assoc Professor, PhD, Florida State U.
Melody J. Stapleton, 1981, Professor, PhD, UC Riverside.
Clarke H. Steinback, 1998, Assoc Professor, PhD, UC Santa Cruz.
Richard A. Vertoll, 1988, Lecturer A, MS, CSU Chico.

Emeritus Faculty

Robert L. Britton, 1969, Professor Emeritus, PhD, U Utah.
Grace C. Herlelin, 1968, Professor Emerita, MA, CSU Chico.
Ralph C. Huntsinger, 1971, Professor Emeritus, PE, PhD, Montana State U.
H.R. Luxembourg, 1970, Professor Emeritus, PhD, UCLA.
Orlando S. Madrigal, 1970, Professor Emeritus, PhD, Texas A&M U.
James Murphy, 1980, Professor Emeritus, PhD, U Wisconsin.
James R. Pinkert, 1977, Professor Emeritus, PhD, U Wisconsin.
Wesley Gary Sitton, 1967, Professor Emeritus, PhD, U Alberta.
Kent Woolridge, 1962, Professor, PhD, U Illinois.

Applied Computer Graphics 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 and employ letter grading unless otherwise stated. Some prerequisites may be waived with faculty permission. Many syllabi are available on the Chico Web.

APCG 110 Computer-Assisted Art I 3.0 Fa/Spr
APCG 110 provides an introduction to computer graphics and art. Students use the computer as a tool for creating static and animated images.

APCG 112 Digital Photography 3.0 Fa/Spr
An introduction to digital photography that explores the composition and aesthetics of photography. Emphasis is on concepts and techniques of image manipulation software. The course addresses printing and displaying photographic portfolios, 2.0 hours lecture, 2.0 hours activity. Special fee required; see the Class Schedule.

APCG 117 Concept Design and Storyboarding 3.0 Fa/Spr
An in-depth look into pre-production process as it directly pertains to story and character creation, character development and design, pre-visualization techniques, and principles of concept design. 2.0 hours lecture, 2.0 hours activity. Special fee required; see the Class Schedule.

APCG 170 Video Game Design 3.0 Fall
An introduction course to video game design, studying the art, technology, and science involved in the creation and development of video games. The course covers video game history, game theory, design of computer-based games, delivery systems, development cycle, case studies, ethical and social issues, and emerging technologies and trends. This course emphasizes the understanding and the interdisciplinary nature of video game design. This is not a computer programming course. 2.0 hours lecture, 2.0 hours activity.

APCG 240 2-D Digital Animation 3.0 Fall
Prerequisites: APCG 110.
The course explores the basic principles and techniques of motion such as timing, staging, squash and stretch, and rotoscoping. Students produce animated works that demonstrate these principles and techniques and that effectively communicate with the audience. 1.0 hours lecture, 4.0 hours activity.

APCG 330 3-D Computer Modeling 3.0 Fa/Spr
Prerequisites: APCG 110 or previous computer graphics experience.
This course uses 3-D modeling and animation software in developing 3-D computer models and creating presentations of those models in story-telling still scenes. The tools, techniques, and topics studied include basic and advanced 3-D modeling tools, 3-D scene layout, lighting, texturing, and rendering. 1.0 hours discussion, 4.0 hours activity.

Computer Science
APCG 331 3-D Character Modeling 3.0 Fall
Prerequisites: APCG 330.
A study of the necessary principles and techniques of creating digital 3-D characters. Students learn the necessary skills for modeling characters, creating effective anatomy, and rigging characters for animation purposes. 1.0 hours lecture, 4.0 hours activity.

APCG 340 Computer Animation 3.0 Fa/Spr
Prerequisites: Consent of instructor. This course explores the concepts of digital compositing and special effects production. Students study the process of integrating images from multiple sources into a single, seamless whole image, and learn techniques and concepts for special effects production. Tools and methods for digital compositing that work for both single and large sequences of images and special effects pertaining to animation are explored. 1.0 hours lecture, 4.0 hours activity.

APCG 345 Advanced Animation Pre-Production and Story Development 3.0 Fa/Spr
Prerequisites: ENG 130 (or its equivalent) with a grade of C- or higher, APCG 117, Concentration on story development as it directly relates to Computer Animation. Students write a treatment, script, and storyboard for an animation project. Emphasis is placed on understanding the story structure, writing interesting dialogue and developing an in-depth storyboard. The course gives students a practical approach to creating the pre-production component of an animated "short."

APCG 360 Web Page Design 3.0 Fall
Prerequisites: CSCI 111.
This course focuses on the study of design and implementation issues for Web page creation and maintenance from the perspective of programming and writing code. Topics include page purpose, content, audience, navigation, speed, style, and maintenance issues, mark-up language tags, style sheets, dynamic mark-up language, scripting. Students are required to work collaboratively to produce functional sites and make verbal presentations. 2.0 hours lecture, 2.0 hours activity.

APCG 370 Video Game Development 3.0 Spring
Prerequisites: APCG 170.
The course covers the principles of game design, gaming strategies, game production, and marketing. Students learn to function as a productive member of an interdisciplinary game design team to plan, document, and develop a video game concept. 2.0 hours lecture, 2.0 hours activity.

APCG 389 Industry Internship 1.0–3.0 Fa/Spr
Prerequisites: Faculty permission.
This internship is offered for 1.0–3.0 units. Students must register directly with a supervising faculty member. You may take this course more than once for a maximum of 6.0 units. Credit/no credit grading only.

APCG 390 Advanced Animation Production 3.0 Fall
Prerequisites: APCG 330, APCG 340.
The computer animation production process is taught in this class. Working from a script, storyboard, and/or animatic, students complete an "animated short" with accompanying sound, music, and visual effects. Emphasis is on working as a member of a computer animation team, similar to a real-world production facility. 1.0 hours discussion, 4.0 hours activity. Formerly CSCI 545.

APCG 470 Video Game Production 3.0 Fall
Prerequisites: APCG 370.
Using the principles of game design, students work in collaborative teams to design, implement, test, and produce a computer game. Marketing strategies are also explored. 1.0 hours lecture, 4.0 hours activity.

APCG 491 Portfolio 1.0 Fa/Spr
Prerequisites: APCG 340.
This course is an exploration of design and implementation of portfolios germane to the computer graphics field.

APCG 498 Special Topics 1.0–3.0 Fa/Spr
Prerequisites: Faculty permission.
This course is for special topics offered for 1.0–3.0 units. Typically the topics are offered on a one-time-only basis and may vary from term to term and be different for different sections. See the Class Schedule for the specific topic being offered.

APCG 499 Special Problems 1.0–3.0 Fa/Spr
Prerequisites: Faculty permission.
This course is an independent study offered for 1.0–3.0 units. You must register directly with a supervising faculty member. You may take this course more than once for a maximum of 6.0 units. Credit/no credit grading only.

APCG 545 Advanced Animation Post-Production 3.0 Fa/Spr
Prerequisites: APCG 445.
This course focuses on the completion of animation projects in the post-production environment, including editing, music, sound effects, and other post-production elements to successfully complete professional-level short animations. Emphasis is on working as a member of a computer animation team, similar to a real-world production facility. 1.0 hours lecture, 4.0 hours activity.

Computer Science 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 and employ letter grading unless otherwise stated. Some prerequisites may be waived with faculty permission. Many syllabi are available on the Chico Web.

CSCI 100 Computer Literacy 3.0 Fa/Spr
Introduction to the computer for non-computer science students. History of the computer, review of hardware, software, and a range 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 lecture, 2.0 hours activity. Special fee required; see the Class Schedule.

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, I/O is provided. Software is introduced with an overview of operating systems, programming languages, applications, and software tools. Students are exposed to common programming languages and are introduced to some programming concepts. 1.0 hour discussion, 2.0 hours activity.

CSCI 110 Introduction to Applications Programming 3.0 Fa/Spr
This course introduces students to programming using an integrated graphical development environment. Event-driven, visual, and object-oriented programming concepts are presented. Course emphasis is on the total program development process/problem analysis, design, coding, testing, debugging, and maintenance. Projects include common business problems that require data entry, display of calculated results, report requests, conditional testing, arithmetic operations, array processing, data validation, searching, sorting, reading and writing to files, and database applications. 2.0 hours discussion, 2.0 hours activity.
CSCI 111  Programming and Algorithms I  3.0 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. Students are expected to design, implement, and test a number of programs. 2.0 hours discussion, 2.0 hours activity. CAN CSCI 22.

CSCI 112  Programming and Algorithms II  3.0 Fa/Spr
Prerequisites: Grade of C– or better in CSCI 111 (or EECE 135 for engineering majors).
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 will be expected to design, implement, test, and analyze a number of programs. 2.0 hours discussion, 2.0 hours activity. CAN CSCI 24.

CSCI 117  Programming Problem Session  1.0 Fa/Spr
Prerequisites: Concurrent enrollment in CSCI 111.
Designed to supplement CSCI 111 with additional applications and extended explanations of concepts encountered in programming. Provides the student with the opportunity for additional assistance in basic programming skills. 2.0 hours activity. Credit/no credit grading only.

CSCI 118  Programming Problem Session  1.0 Fa/Spr
Prerequisites: Concurrent enrollment in CSCI 112.
Designed to supplement CSCI 112 with additional applications and extended explanations of concepts encountered in programming. Provides the student with the opportunity for additional assistance in basic programming skills. 2.0 hours activity. Credit/no credit grading only.

CSCI 144  Introduction to the UNIX Operating System  3.0 Fa/Spr
This course is designed as a comprehensive introduction to the UNIX operating system. It leads the student through logging in, introductory and advanced levels of file management, the directory structure, how UNIX handles files and processes, job control, process monitoring, shell scripts, basic shell utilities, and power utilities. 2.0 hours discussion, 2.0 hours activity.

CSCI 221  Assembly Language Programming  3.0 Fa/Spr
Prerequisites: CSCI 111.
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 discussion, 2.0 hours activity. CAN CSCI 11.

CSCI 301  Computer’s Impact on Society  3.0 Fa/Spr
Prerequisites: 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 an approved General Education course.

CSCI 305  Project Requirements, Design, and Testing  3.0 Fa/Spr
Prerequisites: ENGL 130, CSCI 112 or EECE 22.
Students are introduced to methodologies used to specify system descriptions. Hardware and software documentation standards are described. Methodologies for modeling systems and development of presentation materials are discussed, and students are required to make both written and oral presentations. 2.0 hours discussion, 2.0 hours activity. This course is also offered as EECE 335.

CSCI 311  Algorithms and Data Structures  3.0 Fa/Spr
Prerequisites: Grade of C– or better in CSCI 112.
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 discussion, 2.0 hours activity.

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, and technical aspects of the mind. Core topics will be selected from within a subset of the disciplines that comprise the cognitive sciences, including artificial intelligence, philosophy, and psychology. Readings and discussions will 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.

CSCI 315  Programming Languages  3.0 Fa/Spr
Prerequisites: CSCI 112.
An investigation into the structure and syntax of current programming languages, including binding, looping, data structures, file systems, error handling, and character manipulation. 2.0 hours discussion, 2.0 hours activity.

CSCI 317  Linear Programming Applications  3.0 Inquire
Prerequisites: CSCI 112.
Mathematical optimization and managerial decision techniques. Simplex method with applications, transportation problems, assignment problems, integer programming, network algorithms, and inventory models. 2.0 hours discussion, 2.0 hours activity.

CSCI 320  Computer Architecture  3.0 Fa/Spr
Prerequisites: CSCI 221.
The course introduces basic digital logic design techniques and integrates computer organization, computer design, and computer design. Topics include the design of the arithmetic and logic unit (ALU), hardware and software implementation, memory and processor architecture. 2.0 hours discussion, 2.0 hours activity.

CSCI 323  Systems Architecture  3.0 Inquire
Prerequisites: ENGL 130 (or its equivalent) with a grade of C– or higher; CSCI 311, CSCI 320. Concurrent enrollment in CSCI 340 is recommended.
Definition of problems relating to interfacing processors and peripherals in computer systems. Channel and bus structures, bandwidth computations, performance evaluation, feasibility studies, and methods of systems analysis.

CSCI 330  Software Engineering  3.0 Fa/Spr
Prerequisites: CSCI 311, ENGL 130 (or its equivalent) with a grade of C– or higher.
Special problems in the development of large software systems. Software life cycle, requirements analysis, structural design, implementation, cost, standards, verification, and validation. A group project is required. This is a writing proficiency, WP, course; a grade of C– or better certifies writing proficiency for majors.

CSCI 340  Operating Systems Programming  3.0 Fa/Spr
Prerequisites: CSCI 311, CSCI 320.
Operating system fundamentals, including history, process and thread management, concurrency with semaphores and monitors, deadlock, storage management, file systems, I/O, and distributed systems. 2.0 hours discussion, 2.0 hours activity.

CSCI 344  UNIX Power Utilities and Shell Programming  3.0 Fall
This is an intermediate level UNIX class. During the first part of the course, UNIX users will learn to use (or brush up on their facility with) powerful utilities such as sed, grep, awk, find, cut, paste, and join as preparation for creating shell scripts. Shell programming in the latter part of the course will focus primarily on the Bourne shell; however, some of the special features of C-shell and Korn shell scripts will be covered. 2.0 hours discussion, 2.0 hours activity.
CSCI 346 Introduction to Computer Networks and Network Management 3.0 Fa/Spr
Prerequisites: CSCI 311.
This course is an introduction to basic knowledge of networking technologies and network management concepts, including major network operating systems, communication protocols, and the supporting network hardware and software. The course emphasizes the hands-on experience of network management in a laboratory environment. 2.0 hours discussion, 2.0 hours activity.

CSCI 351 Numerical Methods Programming 3.0 Inquire
Prerequisites: CSCI 112 or EECE 133; MATH 220.
Scientific programming methods, solution of simultaneous linear and non-linear equations, iterative techniques, matrix methods, error analysis, development of specific and general algorithms. 2.0 hours discussion, 2.0 hours activity.

CSCI 380 Machines, Brains, and Minds 3.0 Fa/Spr
Prerequisites: Junior standing, faculty permission.
An examination of the emergence of artificial mind in machines, with special attention to related issues in the philosophy of mind and cognitive science. This is an approved General Education course. This course is also offered as PHIL 364.

CSCI 381 Language, Intelligence, and Computation 3.0 Spring
This course presents a practically based treatment of artificial intelligence, and a general introduction of technical issues associated with the development of intelligent systems. The course addresses issues of knowledge representation and natural language processing in particular, from a computational perspective. Students write programs to perform simple analyses of natural language and logical reasoning. Students also explore the limits of computation, using practical and theoretical approaches. 2.0 hours lecture, 2.0 hours activity. This is an approved General Education course.

CSCI 389 Industry Internship 1.0–3.0 Fa/Spr
Prerequisites: CSCI 311, faculty permission.
This internships is offered for 1.0–3.0 units. Students must register directly with a supervising faculty member. You may take this course more than once for a maximum of 15.0 units. Credit/no credit grading only.

CSCI 399 Special Problems 1.0–3.0 Fa/Spr
Prerequisites: Faculty permission.
This course is a special topic offered for 1.0–3.0 units. You must register directly with a supervising faculty member. Special problems in computer science. Limited to a maximum of 4 units during degree program. You may take this course more than once for a maximum of 6.0 units. Credit/no credit grading only.

CSCI 444 Fundamental UNIX System Administration 3.0 Spring
Prerequisites: CSCI 344 or permission of instructor.
This course guides students through the fundamental responsibilities of UNIX system administration. Topics include file system monitoring, file and directory administration, user account management, shutdown and rebooting sequences, system backups, system log responsibilities, and basic system security. Projects focus on the creation of shell scripts to automate system administration tasks. 2.0 hours discussion, 2.0 hours activity.

CSCI 448 Survey of Computer Security 3.0 Fall
Prerequisites: Any upper-division computer networks course or permission of instructor.
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 (CISP/ASA) examination from the International Information Systems Security Certification Consortium (ISF2), 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.

CSCI 465 Web Programming Fundamentals 3.0 Spring
Prerequisites: CSCI 311.
This course is a comprehensive introduction to the major technologies used in the construction of interactive, client-server Web sites. Emphasis is placed on the protocols and standards used for exchanging data between the client and server programs. Both client and server side implementation methods are discussed using programming and scripting languages for the creation of dynamic Web pages. The use of direct client-to-server network communication, performance implications for implementation technologies, and techniques for increasing Web site security are discussed.

CSCI 467 Graphical User Interface Design 3.0 Fall
Prerequisites: CSCI 311.
Design of graphical user interfaces. Topics include issues, theories, principles, and guidelines in human-computer interaction; user interface design considerations and strategies; and techniques for evaluating user interfaces.

CSCI 470 Database Management 3.0 Fa/Spr
Prerequisites: CSCI 112.
This course provides an introduction to the theory and methodology for database design and implementation. Topics may include a survey/lecture component as well as a project component. The survey component covers entity-relationship modeling, relational algebra and calculus theories, database design and data manipulation languages such as SQL, file structures, transactions, concurrency control, recovery, tuning and optimization, and object-oriented databases. The project entails requirements definition, design, and implementation of a database application.

CSCI 490 Directed Programming Experience 1.0–3.0 Fa/Spr
Prerequisites: CSCI 311, faculty permission.
This directed programming experience offered for 1.0–3.0 units. You must register directly with a supervising faculty member. Directed experience in programming systems and applications, weekly conferences, limited to a maximum of 4 units during degree program. Projects may consist of from one to 10 students working on software development teams. You may take this course more than once for a maximum of 3.0 units. Credit/no credit grading only.

CSCI 498 Advanced Topics in Computer Science 1.0–3.0 Fa/Spr
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.

CSCI 499H Honors Research Project/Thesis 3.0 Fa/Spr
Prerequisites: Open only to juniors and seniors in the major. Open by invitation to computer science majors with a GPA of 3.5 or higher in the major. This Honors in the Major course focuses on the development of a creative research project in computer science, its presentation, discussion of relevant research materials, and the reporting of findings. 9.0 hours supervision.

CSCI 511 Object-Oriented Programming 3.0 Fall
Prerequisites: CSCI 311.
This course focuses on object-oriented programming using large class libraries and interactive programming environments. The course centers on good object-oriented design and implementation by addressing these issues with examples throughout the semester. Students will experience the development environment and extensively use the library of at least one object-oriented programming language. Topics include the proper use of inheritance and model/view/controller distinctions, various issues concerning multi-threaded systems, I/O, exception handling, and distributed computing.

CSCI 515 Compiler Design 3.0 Fa/Spr
Prerequisites: CSCI 311.
The elements of lexical, syntactical, and semantic analysis including finite and push-down automata, top-down and bottom-up parsing, error detection and recovery, semantic actions and code generation.

CSCI 520 Digital Logic Design Theory 3.0 Spring
Prerequisites: CSCI 320.
This course is an introduction to the theory of digital systems. Understanding the problem and developing a systematic solution for the systems' data path architecture and its sequential control circuits are emphasized. Students will design and simulate useful digital systems using a Computer-aided design tool.

CSCI 533 Object-Oriented Analysis & Design 3.0 Spring
Prerequisites: Object-oriented programming experience.
This class is complementary to classes in Object-Oriented Programming (OOP). The focus will be on object-orientation in the earlier phases of the software life cycle: object-oriented analysis (OOA), which creates models of the world based on objects and object-oriented design (OOD), which relates specifically to the design of software. The close relationship between OOA, OOD, and OOP will be examined. Use of the Unified Modeling Language (UML) and Design Patterns will be applied.

CSCI 540 Multi-User Operating Systems 3.0 Fall
Prerequisites: CSCI 140 or permission of instructor.
An analysis of multi-user operating systems, to include an in-depth study of current techniques used by a specific multi-user OS.

CSCI 542 Systems Design 3.0 Fall
Prerequisites: CSCI 130.
Methods related to the functional design of complex computer systems. Emphasis is on the project-team design approach. Operational criteria, system feasibility, requirements, and cost tradeoffs. Integration of personnel, equipment, hardware, and software.
CSCI 546 Advanced Network Management 3.0 Spring
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.

CSCI 547 Computer Networks 3.0 Fa/Spr
Prerequisites: CSCI 340. Covers the concepts, vocabulary, design issues, and techniques currently used in the area of computer networks. Topics include history and evolution, transmission media, interconnection topology, control methods, protocols, message passing, network interactions, performance analysis, diagnosis and maintenance, taxonomy, bridges, and gateways. Case studies of existing state-of-the-art networks are included.

CSCI 548 Advanced Computer Security 3.0 Spring
Prerequisites: CSCI 446. An introduction to 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. Coverage includes incident handling, security architecture, computer forensics, detection and response, intrusion detection, taxonomy, bridges, and gateways. Case studies of existing state-of-the-art networks are included.

CSCI 550 Theory of Computing 3.0 Fa/Spr
Prerequisites: MATH 317. An introduction to formal languages, grammars, and automata theory with unsolvable problems.

CSCI 556 Computer Graphics Programming 3.0 Fall
Prerequisites: CSCI 311. This course covers algorithms and data structures in computer graphics. Topics include output primitives and their attributes, 2-D and 3-D geometric transformation and viewing, 3-D object modeling, parallel and perspective projections, visible surface detection, illumination models, and rendering algorithms.

CSCI 567 Graphical User Interface Implementation 3.0 Spring
Prerequisites: CSCI 311. This course covers algorithms and data structures in computer graphics. Topics include output primitives and their attributes, 2-D and 3-D geometric transformation and viewing, 3-D object modeling, parallel and perspective projections, visible surface detection, illumination models, and rendering algorithms.

CSCI 570 Advanced Database Management Systems 3.0 Fall
Prerequisites: CSCI 470 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 discussion, 2.0 hours activity.

CSCI 580 Artificial Intelligence 3.0 Fall
Prerequisites: Grade of C- or better in CSCI 311. 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., perceiving, reasoning, intelligent navigation, vision, learning, etc.). Students conduct research and experiments with robotics hardware and software. 2.0 hours lecture, 2.0 hours activity.

CSCI 598 Advanced Topics in Computer Science 1.0–3.0 Fa/Spr
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.

CSCI 611 Distributed Computing 3.0 Spring
Prerequisites: CSCI 511 and classified graduate standing. This course focuses on distributed computing using the object-oriented paradigm, 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.

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.

CSCI 620 Computer Architecture 3.0 Spring
Prerequisites: CSCI 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 on-chip memory hierarchy, I/O systems, floating-point arithmetic, and current issues in parallel processing.

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.

CSCI 630 Software Engineering 3.0 Fall
Prerequisites: CSCI 330 and classified graduate standing. In-depth study and application of the principles, techniques, and implementation of complex computer software systems. Topics include requirements engineering, formal specifications, object-oriented analysis, design patterns, and object oriented. Teams of students will implement a large software project using a cutting edge software engineering approach.

CSCI 635 Software Metrics and Control 3.0 Inquire
Prerequisites: Classified graduate standing. Software development: planning, cost estimation, and control. Software metrics, configuration management, and quality controls. Reviews and walkthroughs.

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.

CSCI 640 Operating Systems 3.0 Spring
Prerequisites: CSCI 340 and classified graduate standing. In-depth study of operating systems concepts including start-up 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.

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.

CSCI 650 Design and Analysis of Algorithms 3.0 Fall
Prerequisites: CSCI 411, MATH 302, and classified graduate standing. Algorithms from many areas of computer science will be analyzed. Topics may include complexity analysis of algorithms and NP-completeness.

CSCI 657 Topics in Computer Architecture 3.0 Fall
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., perceiving, reasoning, intelligent navigation, vision, learning, etc.). Students conduct research and experiments with robotics hardware and software. 2.0 hours lecture, 2.0 hours activity.
CSCI 655 Compiler Theory 3.0 Fall
Prerequisites: CSCI 515 and classified graduate standing.
Compile and run-time organization for major language structures such as records, arrays, and control structures. Optimization techniques include peephole, common subexpression elimination, constant folding, reduction-in-strength, code motion, loop unrolling, register tracking, generating code from trees, and generating code from DADS.

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.

CSCI 666 Computer Graphics 3.0 Spring
Prerequisites: CSCI 566 and classified graduate standing.
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.

CSCI 668 Digital Image Processing 3.0 EvnSp
Prerequisites: Classified graduate standing.
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.

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.

CSCI 674 Distributed Database Management Systems 3.0 Inquire
Prerequisites: Classified graduate standing.
This course covers the theory, algorithms, and methods that underlie distributed database management systems. Emphasis is placed on design issues, query decomposition and optimization, transaction management, concurrency and reliability, and current trends in distributed DBMS's.

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.

CSCI 680 Programming in Artificial Intelligence 3.0 EvnSp
Prerequisites: CSCI 580 and classified graduate standing.
This course includes writing new programs and extending previously implemented AI systems. Topics include the constructs of an AI programming language and studies in conjunction with expert system shell development, constraint propagation systems, inference engines, and others.

CSCI 681 Theory of Artificial Intelligence 3.0 OddSp
Prerequisites: CSCI 580 and classified graduate standing.
An in-depth study of current techniques, applications, and issues in artificial intelligence. Suitable topics include advanced knowledge representation; natural language understanding; machine learning; theory of functional programming; cognitive science; neural networks; philosophy and artificial intelligence.

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.

CSCI 697 Independent Study 1.0–6.0 Fa/Spr
Prerequisites: Classified graduate standing.
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 student's graduate advisory committee chair. You may take this course more than once for a maximum of 12.0 units.

CSCI 699P Master's Project 1.0–6.0 Fa/Spr
Prerequisites: Classified graduate standing and completion of graduate literacy requirement.
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 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.

CSCI 699T Master's Thesis 1.0–6.0 Fa/Spr
Prerequisites: Classified graduate standing.
This course is offered for 1.0–6.0 units. Credit/no credit grading only. 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.