GENERAL CURRICULUM IN COMPUTER SCIENCE

Technical Electives
Select from the lists in Technical Electives Guidelines below.¹ ²

Mathematics/Statistics Elective
Select from the following:

- MATH 241 Calculus IV
- MATH 248 Methods of Proof in Mathematics
- MATH 306 Linear Algebra II
- MATH 334 Combinatorial Math
- MATH 335 Graph Theory
- MATH 437 Game Theory
- MATH 470 Selected Advanced Topics
- STAT 305 Introduction to Probability and Simulation
- STAT 323 Design and Analysis of Experiments I
- STAT 324 Applied Regression Analysis
- STAT 330 Statistical Computing with SAS
- STAT 331 Statistical Computing with R
- STAT 334 Applied Linear Models
- STAT 416 Statistical Analysis of Time Series
- STAT 418 Categorical Data Analysis
- STAT 419 Applied Multivariate Statistics
- STAT 434 Statistical Learning: Methods and Applications

Total units: 24

¹ Consultation with advisor is recommended prior to selecting technical electives; bear in mind your selections may impact pursuit of post-baccalaureate studies and/or goals.
² An additional 4 units of CPE/CSC Technical Electives is needed if CPE/CSC 123 (http://catalog.calpoly.edu/search/?P=CSC%20123) is not taken in the major.

Technical Electives Guidelines
Courses used to satisfy any other Major, Support, or General Education requirement are not allowed to count toward the Technical Electives Elective requirement. Credit/No Credit grading is not allowed.

Select Technical Electives from the following:

- CSC 305 Individual Software Design and Development
- CSC 309 Software Engineering II
- CSC 313 Teaching Computing
- CSC 321 Introduction to Computer Security
- CSC 323 Cryptography Engineering
- CSC 325 Introduction to Privacy: Policy and Technology
- CSC 344 Music Programming
- CSC 366 Database Modeling, Design and Implementation
- CSC 369 Introduction to Distributed Computing
- CSC 371 Game Design
- CSC 377 Introduction to Mixed Reality
- CSC 378 Interactive Entertainment Engineering
- CSC 400 Special Problems ²
- CSC 402 Software Requirements Engineering
- CSC 405 Software Construction
- CSC 406 Senior Project - Software Deployment
- CSC 409 Current Topics in Software Engineering
- CSC 410 Software Evaluation
- CSC 421 Binary Exploitation: Tools and Techniques
- CSC 422 Network Security
- CSC 424 Software Security
- CSC/CPE 425 Wireless Security
- CSC 429 Current Topics in Computer Security
- CSC 431 Compiler Construction
- CSC 436 Mobile Application Development
- CSC 437 Dynamic Web Development
- CSC 448 Bioinformatics Algorithms
- CSC/CPE 454 Implementation of Operating Systems
- CSC/CPE 458 Current Topics in Computer Systems
- CSC 466 Knowledge Discovery from Data
- CSC 468 Database Management Systems Implementation
- CSC/CPE 469 Distributed Systems
- CSC/CPE 471 Introduction to Computer Graphics
- CSC 473 Advanced Rendering Techniques
- CSC 474 Computer Animation
- CSC/CPE 476 Real-Time 3D Computer Graphics Software
- CSC 477 Scientific and Information Visualization
- CSC 478 Current Topics in Computer Graphics
- CSC 480 Artificial Intelligence
- CSC 481 Knowledge Based Systems
- CSC 482 Speech and Language Processing
- CSC 484 User-Centered Interface Design and Development
- CSC 486 Human-Computer Interaction Theory and Design
- CSC 487 Deep Learning
- CSC 490 Selected Advanced Topics ²
- CSC 493 Cooperative Education Experience ²
- CSC 496 Selected Advanced Laboratory ²
- CSC 508 Software Engineering I
- CSC 509 Software Engineering II
- CSC 513 Computing Education Research and Practice
- CSC/CPE 515 Computer Architecture
CSC 521 Computer Security
CSC 522 Advanced Network Security
CSC 524 System Security
CSC 530 Languages and Translators
CSC 540 Theory of Computation II
CSC 549 Advanced Algorithm Design and Analysis
CSC 550 Operating Systems
CSC 560 Database Systems
CSC/CPE 564 Computer Networks: Research Topics
CSC 566 Topics in Advanced Data Mining
CSC/CPE 569 Distributed Computing
CSC 570 Current Topics in Computer Science
CSC 572 Computer Graphics
CSC 580 Artificial Intelligence
CSC 581 Computer Support for Knowledge Management
CSC 582 Computational Linguistics
CSC 587 Advanced Deep Learning
CPE 315 Computer Architecture
CPE 316 Microcontrollers and Embedded Applications
CPE/PHY 345 Quantum Computing
CPE 400 Special Problems for Undergraduates
CPE 416 Autonomous Mobile Robotics
CPE 419 Applied Parallel Computing
CPE/EE 428 Computer Vision
CPE/EE 442 Real Time Embedded Systems
CPE 464 Introduction to Computer Networks
CPE 465 Advanced Computer Networks
CPE 488 Microelectronics and Electronics Packaging
DATA 301 Introduction to Data Science

The following restrictions must be satisfied.

4 units must be satisfied by a course that has as a prerequisite either

1) An upper-division course required by the major (excluding CSC 357) or
2) Another Technical Elective.

Select from the following:

CSC 366 Database Modeling, Design and Implementation
CSC 402 Software Requirements Engineering
CSC 405 Software Construction
CSC 406 Senior Project - Software Deployment
CSC 409 Current Topics in Software Engineering
CSC 410 Software Evaluation
CSC 421 Binary Exploitation: Tools and Techniques
CSC 422 Network Security
CSC 424 Software Security
CSC/CPE 425 Wireless Security
CSC 529 Current Topics in Computer Security
CSC 437 Dynamic Web Development
CSC 448 Bioinformatics Algorithms
CSC/CPE 454 Implementation of Operating Systems
CSC 466 Knowledge Discovery from Data
CSC 468 Database Management Systems Implementation
CSC 473 Advanced Rendering Techniques
CSC 474 Computer Animation
CSC/CPE 476 Real-Time 3D Computer Graphics Software
CSC 477 Scientific and Information Visualization
CSC 478 Current Topics in Computer Graphics
CSC 481 Knowledge Based Systems
CSC 482 Speech and Language Processing
CSC 484 User-Centered Interface Design and Development
CSC 486 Human-Computer Interaction Theory and Design
CSC 487 Deep Learning
CSC 508 Software Engineering I
CSC 509 Software Engineering II
CSC/CPE 515 Computer Architecture
CSC 521 Computer Security
CSC 522 Advanced Network Security
CSC 530 Languages and Translators
CSC 540 Theory of Computation II
CSC 549 Advanced Algorithm Design and Analysis
CSC 550 Operating Systems
CSC 560 Database Systems
CSC/CPE 564 Computer Networks: Research Topics
CSC 566 Topics in Advanced Data Mining
CSC 572 Computer Graphics
CSC 580 Artificial Intelligence
CSC 581 Computer Support for Knowledge Management
CSC 582 Computational Linguistics
CSC 587 Advanced Deep Learning
CSC 588 Microelectronics and Electronics Packaging
DATA 301 Introduction to Data Science

Up to 4 units may be taken from the Approved External Electives listed below:

AERO 450 Introduction to Aerospace Systems Engineering
ART 376 The Art of Mixed Reality
ART 384 Digital 3D Modeling and Design
BUS 310 Introduction to Entrepreneurship
CHEM 216 Organic Chemistry I
CHEM 217 Organic Chemistry II
CHEM 218 Organic Chemistry III
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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<tbody>
<tr>
<td>CHEM 312</td>
<td>Organic Chemistry: Fundamentals and Applications</td>
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<tr>
<td>ECON 339</td>
<td>Econometrics</td>
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<tr>
<td>EE 201 &amp; EE 251</td>
<td>Electric Circuit Theory and Electric Circuits Laboratory</td>
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<td>EE 314</td>
<td>Introduction to Communication Systems</td>
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<td>EE/CPE 336</td>
<td>Microprocessor System Design</td>
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<td>EE 424</td>
<td>Introduction to Remote Sensing</td>
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<td>ENVE 542</td>
<td>Sustainable Environmental Engineering</td>
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<tr>
<td>IME 301</td>
<td>Operations Research I</td>
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<tr>
<td>IME 314</td>
<td>Engineering Economics</td>
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<td>IME 315</td>
<td>Financial Decision Making for Engineers</td>
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<td>IME 356</td>
<td>Manufacturing Automation</td>
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<tr>
<td>MATH 241</td>
<td>Calculus IV</td>
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<td>Differential Equations I</td>
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<td>Methods of Proof in Mathematics</td>
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<td>Theory of Numbers</td>
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<td>MATH 350</td>
<td>Mathematical Software</td>
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<td>MATH 412</td>
<td>Introduction to Analysis I</td>
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<td>ME 211</td>
<td>Engineering Statics</td>
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<td>Mechatronics</td>
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<td>PHIL 412</td>
<td>Epistemology</td>
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<td>PHIL 422</td>
<td>Philosophy of Mind</td>
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<td>PHYS 211</td>
<td>Modern Physics I</td>
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<td>PSY 329</td>
<td>Research Methods in Psychology</td>
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<td>PSY 333</td>
<td>Quantitative Research Methods for the Behavioral Sciences</td>
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<td>Cognition</td>
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1 A total of 20 Technical Elective units selected from upper-division and graduate CSC and CPE courses open to those in the major and not otherwise required by the major. An additional 4 units of CPE/CSC Technical Electives is needed if CPE/CSC 123 is not taken in the major.

2 Up to a combined 4 units may be taken from CSC 400, CPE 400, CSC 490, CSC 493, or CSC 496.