

GENERAL CURRICULUM IN COMPUTER SCIENCE

Technical Electives

Select from the lists in Technical Electives Guidelines below ^{1,2} 20

Mathematics/Statistics Elective

Select from the following: 4

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| 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: ^{1,2}

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| 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 |

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| 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 |

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| 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/PHYS 345 | Quantum Computing |
| CPE 400 | Special Problems for Undergraduates 2 |
| 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:

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| 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 |

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|-------------|--|
| CSC 429 | 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 |
| CPE 416 | Autonomous Mobile Robotics |
| CPE 465 | Advanced Computer Networks |

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

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| 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 |

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| CHEM 312 | Organic Chemistry: Fundamentals and Applications |
| ECON 339 | Econometrics |
| EE 201 & EE 251 | Electric Circuit Theory and Electric Circuits Laboratory |
| EE 314 | Introduction to Communication Systems |
| EE/CPE 336 | Microprocessor System Design |
| EE 424 | Introduction to Remote Sensing |
| ENVE 542 | Sustainable Environmental Engineering |
| IME 301 | Operations Research I |
| IME 314 | Engineering Economics |
| IME 315 | Financial Decision Making for Engineers |
| IME 356 | Manufacturing Automation |
| MATH 241 | Calculus IV |
| MATH 242 | Differential Equations I |
| MATH 248 | Methods of Proof in Mathematics |
| MATH 341 | Theory of Numbers |
| MATH 350 | Mathematical Software |
| MATH 412 | Introduction to Analysis I |
| ME 211 | Engineering Statics |
| ME 212 | Engineering Dynamics |
| ME 405 | Mechatronics |
| PHIL 412 | Epistemology |
| PHIL 422 | Philosophy of Mind |
| PHYS 211 | Modern Physics I |
| PSY 329 | Research Methods in Psychology |
| PSY 333 | Quantitative Research Methods for the Behavioral Sciences |
| PSY 357 | Cognition |
| 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 |

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.