## COMPUTER SCIENCE MINOR

### Required Courses

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSC/CPE 101</td>
<td>Fundamentals of Computer Science</td>
<td>4</td>
</tr>
<tr>
<td>CSC/CPE 202</td>
<td>Data Structures</td>
<td>4</td>
</tr>
<tr>
<td>CSC/CPE 203</td>
<td>Project-Based Object-Oriented Programming and Design</td>
<td>4</td>
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</tbody>
</table>

### Approved Electives

Select from the following: 12 credits

- CPE 315 Computer Architecture
- CPE 316 Microcontrollers and Embedded Applications
- CPE 329 Microcontroller-Based Systems Design
- CPE 333 Computer Hardware Architecture and Design
- CPE 416 Autonomous Mobile Robotics
- CPE 426 Introduction to Hardware Security
- CPE/EE 428 Computer Vision
- CPE 439 Introduction to Real-Time Operating Systems
- CPE/EE 442 Real Time Embedded Systems
- CPE 446 Design of Fault-Tolerant Digital Systems
- CPE 464 Introduction to Computer Networks
- CPE 465 Advanced Computer Networks
- CSC 300 Professional Responsibilities
- CSC 305 Individual Software Design and Development
- CSC 307 Introduction to Software Engineering
- CSC 308 Software Engineering I
- CSC 309 Software Engineering II
- CSC 313 Teaching Computing
- CSC 320 Practical Computer Security for Everyone
- CSC/CPE 321 Introduction to Computer Security
- CSC 323 Cryptography Engineering
- CSC 325 Introduction to Privacy: Policy and Technology
- CSC 344 Music Programming
- CSC 349 Design and Analysis of Algorithms
- CSC/CPE 357 Systems Programming
- CSC 364 Introduction to Networked, Distributed, and Parallel Computing
- CSC 365 Introduction to Database Systems
- 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 409 Current Topics in Software Engineering
- CSC 410 Software Evaluation
- CSC 421 Binary Exploitation: Tools and Techniques
- CSC/CPE 422 Network Security
- CSC 424 Software Security
- CSC/CPE 425 Wireless Security
- CSC 429 Current Topics in Computer Security
- CSC 430 Programming Languages
- CSC/CPE 431 Compiler Construction
- CSC 436 Mobile Application Development
- CSC 437 Dynamic Web Development
- CSC 445 Theory of Computation I
- CSC 448 Bioinformatics Algorithms
- CSC/CPE 453 Introduction to Operating Systems
- 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
- 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 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
<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
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</thead>
<tbody>
<tr>
<td>CSC 566</td>
<td>Topics in Advanced Data Mining</td>
</tr>
<tr>
<td>CSC 569</td>
<td>Distributed Computing</td>
</tr>
<tr>
<td>CSC 570</td>
<td>Current Topics in Computer Science ³</td>
</tr>
<tr>
<td>CSC 572</td>
<td>Computer Graphics</td>
</tr>
<tr>
<td>CSC 580</td>
<td>Artificial Intelligence</td>
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<tr>
<td>CSC 581</td>
<td>Computer Support for Knowledge Management</td>
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<tr>
<td>CSC 582</td>
<td>Computational Linguistics</td>
</tr>
<tr>
<td>CSC 587</td>
<td>Advanced Deep Learning</td>
</tr>
<tr>
<td>DATA 301</td>
<td>Introduction to Data Science</td>
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</table>

**Total units** 24

¹ Choose from CSC/CPE upper-division courses open to CSC majors. Must be approved via the CSC minor form upon acceptance to the minor.

² Cannot take both CSC 320 and CSC 321 as Approved Electives.

³ Must be approved via the CSC minor form, signed by the minor advisor.