Regardless of your major, you can _enhance your career_ with a background in computer sciences. The computer sciences certificate is designed to _deepen and validate your computing savvy_ for your future career prospects and/or graduate school. Compared to a major in computer sciences, the certificate requires fewer courses and offers more _flexibility in course selection._

### HOW TO GET IN

All undergraduate, degree-seeking students are eligible to declare the computer sciences certificate, except for students majoring in Computer Sciences and Computer Engineering.

### DECLARATION REQUIREMENTS

To declare the computer sciences certificate, students must meet the following requirements:

- Completion of COMP SCI 300
- Grade of BC or higher in one of these introductory programming course, taken at UW-Madison: COMP SCI 300, COMP SCI/E CE 354 or COMP SCI 400

Students having difficulties meeting the above requirements should schedule a meeting with a computer sciences advisor to discuss alternatives.

For instructions on declaring the certificate, see the Department of Computer Sciences website (https://www.cs.wisc.edu/undergraduate/certificate-in-computer-sciences/).

### REQUIREMENTS

#### REQUIREMENTS FOR THE CERTIFICATE

Five courses and at least 14 credits from: 1

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMP SCI 300</td>
<td>Programming II</td>
<td>3</td>
</tr>
<tr>
<td>Two courses numbered 400-679:</td>
<td></td>
<td>6-8</td>
</tr>
<tr>
<td>COMP SCI 400</td>
<td>Programming III</td>
<td></td>
</tr>
<tr>
<td>COMP SCI 407</td>
<td>Foundations of Mobile Systems and Applications</td>
<td></td>
</tr>
<tr>
<td>COMP SCI 412</td>
<td>Introduction to Numerical Methods</td>
<td></td>
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<tr>
<td>COMP SCI/I SY E/</td>
<td>Introduction to Combinatorial</td>
<td></td>
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<tr>
<td>MATH 425</td>
<td>Optimization</td>
<td></td>
</tr>
<tr>
<td>COMP SCI/E CE/E</td>
<td>Introduction to Cryptography</td>
<td></td>
</tr>
<tr>
<td>MATH 435</td>
<td></td>
<td></td>
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<tr>
<td>COMP SCI/STAT 471</td>
<td>Introduction to Computational</td>
<td></td>
</tr>
</tbody>
</table>

1. COMP SCI/MATH/STAT 475 Introduction to Combinatorics
2. COMP SCI/E CE 506 Software Engineering
3. COMP SCI/MATH 513 Numerical Linear Algebra
4. COMP SCI/MATH 514 Numerical Analysis
5. COMP SCI/DS/I SY E 518 Wearable Technology
6. COMP SCI 520 Introduction to Theory of Computing
7. COMP SCI/E CE/I SY E 524 Introduction to Optimization
8. COMP SCI/I SY E/ Linear Optimization MATH/STAT 525
9. COMP SCI/I SY E 526 Advanced Linear Programming
10. COMP SCI/E CE/I SY E 532 Matrix Methods in Machine Learning
11. COMP SCI/E CE 533 Image Processing
12. COMP SCI 534 Computational Photography
13. COMP SCI 536 Introduction to Programming Languages and Compilers
14. COMP SCI 537 Introduction to Operating Systems
15. COMP SCI 538 Introduction to the Theory and Design of Programming Languages
16. COMP SCI/E CE/I SY E 539 Introduction to Artificial Neural Networks
17. COMP SCI 540 Introduction to Artificial Intelligence
18. COMP SCI 542 Introduction to Software Security
19. COMP SCI 544 Introduction to Big Data Systems
20. COMP SCI 545 Natural Language and Computing
21. COMP SCI/E CE 552 Introduction to Computer Architecture
22. COMP SCI/I SY E/I SY E 558 Introduction to Computational Geometry
23. COMP SCI 559 Computer Graphics
24. COMP SCI/E CE 561 Probability and Information Theory in Machine Learning
25. COMP SCI 564 Database Management Systems: Design and Implementation
26. COMP SCI 566 Introduction to Computer Vision
27. COMP SCI/B M I 567 Medical Image Analysis
28. COMP SCI 570 Introduction to Human-Computer Interaction
29. COMP SCI 571 Building User Interfaces
30. COMP SCI/B M I 576 Introduction to Bioinformatics
31. COMP SCI 577 Introduction to Algorithms
32. COMP SCI/DS 579 Virtual Reality
33. COMP SCI/I SY E 635 Tools and Environments for Optimization
COMP SCI 640  Introduction to Computer Networks
COMP SCI 642  Introduction to Information Security
COMP SCI 639  Undergraduate Elective Topics in Computing

Two additional courses, chosen from courses numbered 400-679 (above) or these:
- COMP SCI/MATH 240: Introduction to Discrete Mathematics
- COMP SCI/ECE 252: Introduction to Computer Engineering
- COMP SCI 270: Fundamentals of Human-Computer Interaction
- COMP SCI/ECE 352: Digital System Fundamentals
- COMP SCI 310: Problem Solving Using Computers
- COMP SCI 320: Data Science Programming II
- COMP SCI/ECE 354: Machine Organization and Programming

Total Credits 14

Courses taken Pass/Fail do not meet requirements of the Certificate.

RESIDENCE AND QUALITY OF WORK
- At least 7 Certificate credits must be completed in Residence
- Minimum 2.000 GPA on all COMP SCI and Certificate courses

UNDERGRADUATE/SPECIAL STUDENT CERTIFICATE
This certificate is intended to be completed in the context of an undergraduate degree and for those seeking this certificate that is preferred. For students who have substantially completed this certificate at UW–Madison and may need one or two courses to complete the certificate, they may do so immediately after completion of the bachelor’s degree by enrolling in the course as a University Special (nondegree) student. The certificate must be completed within a year of completion of the bachelor’s degree. Students should keep in mind that University Special students have the last registration priority and that may limit availability of desired courses. Financial aid is not available when enrolled as a University Special student to complete an undergraduate certificate.

LEARNING OUTCOMES
1. Recognize and apply the core principles of Computing (abstractions and algorithms) to solve real-world problems.
2. Use fundamental and detailed knowledge, skills, and tools (e.g., specific algorithms, techniques methods, etc.) of computer science and develop the ability to acquire new knowledge, skills, and tools.
3. Design, implement, and evaluate software in multiple programming paradigms and languages.
4. Can solve problems by applying a broad toolbox of knowledge and techniques.

ADVISING AND CAREERS
ADVISING
The undergraduate coordinators in the Department of Computer Sciences are ready to help students with questions about the major, L&S degree requirements and policy, and course selection. Information on academic advising for students interested or declared in the computer sciences major is posted to the Computer Sciences advising page (https://www.cs.wisc.edu/undergraduate/undergraduate-advisors/).

L&S CAREER RESOURCES
Every L&S major opens a world of possibilities. SuccessWorks (https://successworks.wisc.edu/) at the College of Letters & Science helps students turn the academic skills learned in their major, certificates, and other coursework into fulfilling lives after graduation, whether that means jobs, public service, graduate school or other career pursuits.

In addition to providing basic support like resume reviews and interview practice, SuccessWorks offers ways to explore interests and build career skills from their very first semester/term at UW all the way through graduation and beyond.

Students can explore careers in one-on-one advising, try out different career paths, complete internships, prepare for the job search and/or graduate school applications, and connect with supportive alumni and even employers in the fields that inspire them.

- SuccessWorks (https://careers.ls.wisc.edu/)
- Set up a career advising appointment (https://successworks.wisc.edu/make-an-appointment/)
- Enroll in a Career Course (https://successworks.wisc.edu/career-courses/) - a great idea for first- and second-year students:
  - INTER-LS 210 L&S Career Development: Taking Initiative (1 credit)
  - INTER-LS 215 Communicating About Careers (3 credits, fulfills Comm B General Education Requirement)
- Learn about internships and internship funding (https://successworks.wisc.edu/finding-a-job-or-internship/)
- INTER-LS 260 Internship in the Liberal Arts and Sciences
- Activate your Handshake account (https://successworks.wisc.edu/handshake/) to apply for jobs and internships from 200,000+ employers recruiting UW-Madison students
- Learn about the impact SuccessWorks has on students’ lives (https://successworks.wisc.edu/about/mission/)

PEOPLE
Visit the CS website to view our department faculty (https://www.cs.wisc.edu/people/faculty/) and staff (https://www.cs.wisc.edu/people/staff/).