

COMPUTER SCIENCES, PH.D.

REQUIREMENTS

MINIMUM GRADUATE SCHOOL REQUIREMENTS

Review the Graduate School minimum academic progress and degree requirements (<http://guide.wisc.edu/graduate/#policiesandrequirements>), in addition to the program requirements listed below.

MAJOR REQUIREMENTS

MODE OF INSTRUCTION

Face to Face	Evening/ Weekend	Online	Hybrid	Accelerated
Yes	No	No	No	No

Mode of Instruction Definitions

Accelerated: Accelerated programs are offered at a fast pace that condenses the time to completion. Students are able to complete a program with minimal disruptions to careers and other commitments.

Evening/Weekend: Courses meet on the UW–Madison campus only in evenings and/or on weekends to accommodate typical business schedules. Students have the advantages of face-to-face courses with the flexibility to keep work and other life commitments.

Face-to-Face: Courses typically meet during weekdays on the UW-Madison Campus.

Hybrid: These programs combine face-to-face and online learning formats. Contact the program for more specific information.

Online: These programs are offered 100% online. Some programs may require an on-campus orientation or residency experience, but the courses will be facilitated in an online format.

CURRICULAR REQUIREMENTS

Requirements Detail

Minimum Credit Requirement 51 credits

Minimum Residence Credit Requirement 32 credits

Minimum Graduate Coursework Requirement Half of degree coursework (26 credits out of 51 total credits) must be completed graduate-level coursework; courses with the Graduate Level Coursework attribute are identified and searchable in the university's Course Guide.

Overall Graduate GPA Requirement 3.00 GPA required.

Other Grade Requirements All grades must be at least AB in all required breadth courses.

Assessments and Examinations Doctoral students must complete a qualifying process, a preliminary examination, and a dissertation requirement. The qualifying process includes both completion of "breadth courses" (see Required Courses, below) as well as satisfactory completion of a depth examination in a selected focus area. The preliminary examination is an oral examination demonstrating depth of knowledge in the area of specialization in which research for the dissertation will be conducted. The dissertation requirement consists of conducting a substantial piece of original research in computer science, reporting it in a dissertation that meets the highest standards of scholarship, and explaining and defending the contents of the dissertation in a final oral examination and defense.

Language Requirements No language requirements.

Doctoral Minor/Breadth Requirements All doctoral students are required to complete a minor.

REQUIRED COURSES

Additional Breadth Requirement

Ph.D. students must take at least one course from each of the bands 1, 2 and 3 listed below; the courses must be distinct from the research area of the student's qualifying exam activity. This requirement can be satisfied with 3 700-level courses, or 2 700-level and 2 500-level courses. Grades in all courses used for breadth must be at least AB. Details on which courses may be used for breadth are in the Graduate Program Handbook.

Code	Title	Credits
Band 1		
<i>Computer Architecture:</i>		
COMP SCI/E C E 552	Introduction to Computer Architecture	3
COMP SCI/E C E 752	Advanced Computer Architecture I	3
COMP SCI/E C E 755	VLSI Systems Design	3
COMP SCI/E C E 757	Advanced Computer Architecture II	3
COMP SCI 758	Advanced Topics in Computer Architecture	3
<i>Computer Networks:</i>		
COMP SCI 640	Introduction to Computer Networks	3
COMP SCI/E C E 707	Mobile and Wireless Networking	3
COMP SCI 740	Advanced Computer Networks	3
<i>Computer Security:</i>		
COMP SCI 642	Introduction to Information Security	3
<i>Operating Systems:</i>		
COMP SCI 537	Introduction to Operating Systems	4
COMP SCI 736	Advanced Operating Systems	3
COMP SCI 739	Distributed Systems	3
COMP SCI 744	Big Data Systems	3
<i>Programming Languages and Compilers:</i>		
COMP SCI/E C E 506	Software Engineering	3
COMP SCI 536	Introduction to Programming Languages and Compilers	3
COMP SCI 538	Introduction to the Theory and Design of Programming Languages	3

COMP SCI 701	Construction of Compilers	3
COMP SCI 703	Program Verification and Synthesis	3
COMP SCI 704	Principles of Programming Languages	3
COMP SCI 706	Analysis of Software Artifacts	3
Band 2		
<i>Artificial Intelligence:</i>		
COMP SCI 534	Computational Photography	3
COMP SCI 540	Introduction to Artificial Intelligence	3
COMP SCI 545	Natural Language and Computing	3
COMP SCI 760	Machine Learning	3
COMP SCI/E C E 761	Mathematical Foundations of Machine Learning	3
COMP SCI 766	Computer Vision	3
COMP SCI 769	Advanced Natural Language Processing	3
<i>Bioinformatics:</i>		
COMP SCI/B M I 576	Introduction to Bioinformatics	3
COMP SCI/B M I 776	Advanced Bioinformatics	3
<i>Computer Graphics:</i>		
COMP SCI 559	Computer Graphics	3
COMP SCI 679	Computer Game Technology	3
COMP SCI 765	Data Visualization	3
COMP SCI 777	Computer Animation	3
<i>Database Systems:</i>		
COMP SCI 564	Database Management Systems: Design and Implementation	4
COMP SCI 764	Topics in Database Management Systems	3
COMP SCI 784	Foundations of Data Management	3
<i>Human-Computer Interaction:</i>		
COMP SCI 570	Introduction to Human-Computer Interaction	4
COMP SCI/ED PSYCH/PSYCH 770	Human-Computer Interaction	3
Band 3		
<i>Numerical Analysis:</i>		
COMP SCI/MATH 513	Numerical Linear Algebra	3
COMP SCI/MATH 514	Numerical Analysis	3
<i>Optimization:</i>		
COMP SCI/E C E/ I SY E 524	Introduction to Optimization	3
COMP SCI/I SY E/MATH/STAT 525	Linear Optimization	3
COMP SCI/I SY E 635	Tools and Environments for Optimization	3
COMP SCI/I SY E 719	Stochastic Programming	3
COMP SCI/I SY E/MATH/STAT 726	Nonlinear Optimization I	3
COMP SCI/I SY E/MATH 728	Integer Optimization	3

COMP SCI/I SY E/MATH 730	Nonlinear Optimization II	3
<i>Theory of Computing:</i>		
COMP SCI 520	Introduction to Theory of Computing	3
COMP SCI 577	Introduction to Algorithms	4
COMP SCI 710	Computational Complexity	3
COMP SCI 787	Advanced Algorithms	3
COMP SCI 880	Topics in Theoretical Computer Science	3

In addition, some offerings of COMP SCI 838 (<http://www.cs.wisc.edu/courses/838/>) count towards the breadth requirement. Before each term, it is announced which sections do and what area/band they are in.

One course taken as a graduate student elsewhere may be counted for breadth. A request for this must be made in writing to the GAC Chair. The request should indicate the corresponding UW–Madison course, include a transcript showing a grade of AB or better, and suggest a faculty member who can evaluate the course. GAC will ask this faculty member to evaluate the outside course's syllabus and other course materials and vouch for the choice of UW–Madison course.