COMPUTER SCIENCES, BS

REQUIREMENTS

UNIVERSITY GENERAL EDUCATION REQUIREMENTS

All undergraduate students at the University of Wisconsin–Madison are required to fulfill a minimum set of common university general education requirements to ensure that every graduate acquires the essential core of an undergraduate education. This core establishes a foundation for living a productive life, being a citizen of the world, appreciating aesthetic values, and engaging in lifelong learning in a continually changing world. Various schools and colleges will have requirements in addition to the requirements listed below. Consult your advisor for assistance, as needed. For additional information, see the university Undergraduate General Education Requirements (http://guide.wisc.edu/undergraduate/#requirementsforundergraduatestudytext) section of the *Guide*.

General Education	• Breadth–Humanities/Literature/Arts: 6 credits • Breadth–Natural Science: 4 to 6 credits, consisting of one 4- or 5-credit course with a laboratory component; or two courses providing a total of 6 credits • Breadth–Social Studies: 3 credits • Communication Part A & Part B * • Ethnic Studies * • Quantitative Reasoning Part A & Part B *
	* The mortarboard symbol appears before the title of any course that fulfills one of the Communication Part A or Part B, Ethnic Studies, or Quantitative Reasoning Part A or Part B requirements.

COLLEGE OF LETTERS & SCIENCE DEGREE REQUIREMENTS: BACHELOR OF SCIENCE (BS)

Students pursuing a Bachelor of Science degree in the College of Letters & Science must complete all of the requirements below. The College of Letters & Science allows this major to be paired with either the Bachelor of Arts or the Bachelor of Science degree requirements.

BACHELOR OF SCIENCE DEGREE REQUIREMENTS

Mathematics	Complete two courses of 3+ credits at the Intermediate or Advanced level in MATH, COMP SCI, or STAT subjects. A maximum of one course in each of COMP SCI and STAT subjects counts toward this requirement.
Language	Complete the third unit of a language other than English.

L&S Breadth	Complete: • 12 credits of Humanities, which must include at least 6 credits of Literature; and • 12 credits of Social Science; and • 12 credits of Natural Science, which must include 6 credits of Biological Science and 6 credits of Physical Science.
Liberal Arts and Science Coursework	Complete at least 108 credits.
Depth of Intermediate/ Advanced Coursework	Complete at least 60 credits at the Intermediate or Advanced level.
Major	Declare and complete at least one major.
Total Credits	Complete at least 120 credits.
UW-Madison Experience	Complete both: • 30 credits in residence, overall, and • 30 credits in residence after the 86th credit.
Quality of Work	• 2.000 in all coursework at UW–Madison • 2.000 in Intermediate/Advanced level coursework at UW–Madison

NON–L&S STUDENTS PURSUING AN L&S MAJOR

Non–L&S students who have permission from their school/college to pursue an additional major within L&S only need to fulfill the major requirements. They do not need to complete the L&S Degree Requirements above.

REQUIREMENTS FOR THE MAJOR

Students must complete a minimum of 48 total credits as detailed below.

BASIC COMPUTER SCIENCES

Code	Title	Credits
COMP SCI/ MATH 240	Introduction to Discrete Mathematics	3
COMP SCI/ E C E 252	Introduction to Computer Engineering	3
COMP SCI 300	Programming II	3
COMP SCI/ E C E 354	Machine Organization and Programming	3
COMP SCI 400	Programming III	3
Total Credits		**15**

BASIC CALCULUS

Code	Title	Credits
Complete one of these sequences:		**9–14**
MATH 221 & MATH 222	Calculus and Analytic Geometry 1 and Calculus and Analytic Geometry 2	

MATH 171 & MATH 217 & MATH 222	Calculus with Algebra and Trigonometry I and Calculus with Algebra and Trigonometry II and Calculus and Analytic Geometry 2	
Total Credits		**9-14**

ADDITIONAL MATHEMATICS
Linear Algebra

Code	Title	Credits
Complete one:		
MATH 320	Linear Algebra and Differential Equations	3
MATH 340	Elementary Matrix and Linear Algebra	3
MATH 341	Linear Algebra	3
MATH 375	Topics in Multi-Variable Calculus and Linear Algebra	5

Probability or Statistics

Code	Title	Credits
Complete one:		
STAT/MATH 309	Introduction to Probability and Mathematical Statistics I	3
STAT 311	Introduction to Theory and Methods of Mathematical Statistics I	3
STAT 324	Introductory Applied Statistics for Engineers	3
MATH 331	Introductory Probability	3
STAT 333	Applied Regression Analysis	3
STAT 340	Data Science Modeling II	4
STAT 371	Introductory Applied Statistics for the Life Sciences	3
STAT/MATH 431	Introduction to the Theory of Probability	3
MATH 531	Probability Theory	3

ADVANCED COMPUTER SCIENCE COURSES [1]
Theory of Computer Science

Code	Title	Credits
Complete one:		**3**
COMP SCI 577	Introduction to Algorithms	
COMP SCI 520	Introduction to Theory of Computing	

Software & Hardware

Code	Title	Credits
Complete two:		**6-8**
COMP SCI 407	Foundations of Mobile Systems and Applications	
COMP SCI/ E C E 506	Software Engineering	
COMP SCI 536	Introduction to Programming Languages and Compilers	
or COMP SCI 53	Introduction to the Theory and Design of Programming Languages	

COMP SCI 537	Introduction to Operating Systems	
COMP SCI 542	Introduction to Software Security	
COMP SCI 544	Introduction to Big Data Systems	
COMP SCI/ E C E 552	Introduction to Computer Architecture	
COMP SCI 564	Database Management Systems: Design and Implementation	
COMP SCI 640	Introduction to Computer Networks	
COMP SCI 642	Introduction to Information Security	

Applications

Code	Title	Credits
Complete one:		**3**
COMP SCI 412	Introduction to Numerical Methods	
COMP SCI/I SY E/ MATH 425	Introduction to Combinatorial Optimization	
COMP SCI/ MATH 513	Numerical Linear Algebra	
COMP SCI/ MATH 514	Numerical Analysis	
COMP SCI/E C E/ I SY E 524	Introduction to Optimization	
COMP SCI/I SY E/ MATH/STAT 525	Linear Optimization	
COMP SCI 534	Computational Photography	
COMP SCI 540	Introduction to Artificial Intelligence	
COMP SCI 541	Theory & Algorithms for Data Science	
COMP SCI 559	Computer Graphics	
COMP SCI 565	Introduction to Data Visualization	
COMP SCI 566	Introduction to Computer Vision	
COMP SCI 570	Introduction to Human-Computer Interaction	
COMP SCI 571	Building User Interfaces	

Electives [1]

Code	Title	Credits
Complete two:		**6-8**
COMP SCI 407	Foundations of Mobile Systems and Applications	
COMP SCI 412	Introduction to Numerical Methods	
COMP SCI/I SY E/ MATH 425	Introduction to Combinatorial Optimization	
COMP SCI/E C E/ MATH 435	Introduction to Cryptography	
COMP SCI/ STAT 471	Introduction to Computational Statistics	
COMP SCI/ MATH/STAT 475	Introduction to Combinatorics	
COMP SCI/ E C E 506	Software Engineering	
COMP SCI/ MATH 513	Numerical Linear Algebra	
COMP SCI/ MATH 514	Numerical Analysis	

COMP SCI/DS/ I SY E 518	Wearable Technology
COMP SCI 520	Introduction to Theory of Computing
COMP SCI/E C E/ I SY E 524	Introduction to Optimization
COMP SCI/I SY E/ MATH/STAT 525	Linear Optimization
COMP SCI/ I SY E 526	Advanced Linear Programming
COMP SCI/E C E/ M E 532	Matrix Methods in Machine Learning
COMP SCI/ E C E 533	Image Processing
COMP SCI 534	Computational Photography
COMP SCI 536	Introduction to Programming Languages and Compilers
COMP SCI 537	Introduction to Operating Systems
COMP SCI 538	Introduction to the Theory and Design of Programming Languages
COMP SCI/E C E/ M E 539	Introduction to Artificial Neural Networks
COMP SCI 540	Introduction to Artificial Intelligence
COMP SCI 541	Theory & Algorithms for Data Science
COMP SCI 542	Introduction to Software Security
COMP SCI 544	Introduction to Big Data Systems
COMP SCI/ E C E 552	Introduction to Computer Architecture
COMP SCI/I SY E/ M E 558	Introduction to Computational Geometry
COMP SCI 559	Computer Graphics
COMP SCI/ E C E 561	Probability and Information Theory in Machine Learning
COMP SCI 564	Database Management Systems: Design and Implementation
COMP SCI 565	Introduction to Data Visualization
COMP SCI 566	Introduction to Computer Vision
COMP SCI/ B M I 567	Medical Image Analysis
COMP SCI 570	Introduction to Human-Computer Interaction
COMP SCI 571	Building User Interfaces
COMP SCI/ B M I 576	Introduction to Bioinformatics
COMP SCI 577	Introduction to Algorithms
COMP SCI/ DS 579	Virtual Reality
COMP SCI 620	Computer Sciences Capstone
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

RESIDENCE AND QUALITY OF WORK

- 2.000 GPA in all COMP SCI courses and courses counting toward the major
- 2.000 GPA on 15 upper-level credits, taken in residence[2]
- 15 credits in COMP SCI, taken on campus

HONORS IN THE MAJOR

Students may declare Honors in the Computer Sciences Major in consultation with the Computer Sciences undergraduate coordinator(s). To earn Honors in the Major in Computer Sciences, students must satisfy both the requirements for the major (above) and the following additional requirements:

- Earn a minimum 3.300 University GPA
- Earn a minimum 3.500 GPA for all COMP SCI and major courses
- Complete one COMP SCI course numbered 500 through 699, taken for Honors with a grade of B or higher
- Complete COMP SCI 681 and COMP SCI 682 for a total of 6 credits.[3]

FOOTNOTES

[1] COMP SCI courses may only fulfill one COMP SCI major requirement area. For example, if you take a course for the COMP SCI Applications requirement, it cannot also apply to the COMP SCI Elective requirement.

[2] COMP SCI courses numbered 400 through 699 count as Upper Level.

[3] Senior Honors Thesis proposal must be approved by the thesis/ project advisor and student must be declared as Honors in the Major before enrollment in COMP SCI 681. A final thesis or project must be completed before a final grade for COMP SCI 682 can be awarded.