

REQUIREMENTS FOR BACHELOR OF SCIENCE IN COMPUTER SCIENCE

for students matriculated Fall 2026 or after

To receive the BS degree in Computer Science (CS), students must earn a minimum of 126 credit hours, including transfer credits, with a minimum grade-point average (GPA) of 2.0 (C) in CS major courses, and a minimum cumulative GPA of 2.0.

Credit Requirements - A minimum of 126 semester credits, of which: at least 60 credits must be in liberal arts and sciences courses; at least 40 credits must be earned in the Watson College School of Computing; and at least 45 credits must be completed at the 300-level or above.

Area Requirements

1. **Communications**.....8 credits
 - One course that meets the Binghamton University General Education Composition (C or J) requirement.
 - CS 301. Ethical, Social and Global Issues in Computing.
2. **Humanities/Social Science Electives**:.....20 credits
 - A course that fulfills the Communications requirement above may not also count toward the Humanities/Social Science requirement
3. **Science**.....8 or 10 credits¹
 - Two or three course sequence: BIOL 113, 114, & 115; or CHEM 104, 105, & 106; or CHEM 107 & 108; or PHYS 131 & 132²
4. **Mathematics**².....20 credits
 - MATH 224 & 225. Differential/Integral Calculus
 - MATH 226 & 227. Integration Tech. & Appl/Infinite Series
 - MATH 314. Discrete Math. (or MATH 330. Number Systems)
 - One elective chosen from:
 - MATH 304. Linear Algebra
 - MATH 371. Ordinary Diff. Equations
 - MATH 381. Graph Theory
 - MATH 386. Combinatorics
 - MATH 407. Intro. to the Theory of Numbers
 - MATH 327. Probability with Statistical Methods (or MATH 448. Mathematical Statistics)
5. **Science Elective or Math Alternative**4 credits
 - MATH 323. Calculus III or a Science Elective chosen from courses that meet the General Education Laboratory Science requirement (L)
6. **Free Electives**.....12 or 14 credits¹

At least four credits must be in liberal arts and science. At most one free elective in liberal arts and science may be taken pass/fail instead of for a letter grade. At most 2 credits of activity/wellness (S & Y, or B) may be used as free elective credit.
7. **Computer Science (prerequisites are listed in the tables on Page 2)**.....52 credits
 - CS 101. Professional Skills, Ethics and CS Trends
 - CS 120. Programming and Hardware Fundamentals³
 - CS 210. Programming with Objects and Data Structures³
 - CS 220. Architecture from Programmer's Perspective
 - CS 310. Data Structures and Algorithms
 - CS 320. Advanced Computer Architecture
 - CS 350. Operating Systems
 - CS 373. Automata Theory & Formal Languages
 - CS 375. Design & Analysis of Algorithms
 - CS 471. Programming Languages
 - **Computer Science Electives (at least 15 credits).** At least one course must be chosen from each of the Breadth Areas A, B and C. A single course may be used to satisfy multiple breadth requirements. Courses from areas D and E are optional. A total of at most three credits from courses in Area E may count toward this requirement. Prerequisites are listed in the tables on Page 2:
 - A: Networking and Communications**
 - B: Large Software Development**
 - C: Data and Information Management**
 - D: Other courses**
 - E. Internship, Co-op, Research (see list below)**
 - CS 402. Software and Engineering Project Management (D)
 - CS 415. Social Media Data Science Pipeline (C)
 - CS 417: Intro to Human Comp Interaction (D)
 - CS 418: Natural Language Processing (D)
 - CS 419: Multi-Modal ML in Biomedicine (D)
 - CS 424. Intelligent Mobile Robotics (D)
 - CS 425: Robot Perception (B)
 - CS 426. Internet of Things (A)
 - CS 427. Mobile Systems Security (A)
 - CS 428. Computer Networks (A, B)
 - CS 432. Database Systems (B, C)
 - CS 433. Information Retrieval (B, C)
 - CS 435. Introduction to Data Mining (C)
 - CS 436. Introduction to Machine Learning (C)
 - CS 437: Introduction to Deep Learning (D)
 - CS 440. Advanced Topics in OO Programming (A, B)
 - CS 441. Game Dev. for Mobile Platforms (D)
 - CS 442. Design Patterns (A, B)
 - CS 444. Programming for the Web (A, B)
 - CS 445. Software Engineering (D)
 - CS 447. High Performance Computing (A, B)
 - CS 451. Systems Programming (A, B)
 - CS 452. Intro. To Cloud Computing (A)
 - CS 453. Software Security (D)
 - CS 455. Intro. to Visual Info. Processing (B, C)
 - CS 456. Intro. to Computer Vision (D)
 - CS 457. Intro. to Distributed Systems (A, B)
 - CS 458. Intro. to Computer Security (A)
 - CS 459: Science of Cyber Security (D)
 - CS 460. Computer Graphics (B)
 - CS 461: Topics in Data Privacy (D)
 - CS 465. Intro. to Artificial Intelligence (C)
 - CS 472. Compiler Design (B)
 - CS 476. Programming Models for Emerging Platforms (B)
 - CS 480 or 481. CS Topics course (D, others as appropriate)
 - Any future 400-level course (D, others as appropriate)

E. To count toward the CS elective credit, CS 395, CS 396, and CS 499 must be taken for 3 credits in one semester

- CS 391: Senior Course Assistant (2 credits)
- CS 395. Computer Science Internship. Prerequisites: CS 220, 310, junior or senior standing and School of Computing approval
- CS 396. Computer Science Co-op. Prerequisites: CS 220, 310, junior or senior standing and School of Computing approval
- CS 499. Undergraduate Research. Prerequisites vary by research area.

Requires junior or senior standing, supervision by a School of Computing faculty member, and School of Computing approval.

General Education Requirements Students must fulfill the University General Education Requirements for Computer Science. Students normally complete these requirements within the 126-credit program described above.

¹ The total of the science and free elective credits (Blocks 3 and 6) should be 22 credits.

² Prerequisites for Mathematics and Science courses appear in the University Bulletin entries for the Mathematics and Science programs.

³ CS 110 is a prerequisite. CS Majors may request a waiver from the Undergraduate Director based on prior programming experience.

Supplemental information regarding the BSCS Degree Requirements

The following information supplements the University Academic Guide.

All required CS courses, except CS 101, are offered every semester. Students must earn at least a D in CS 301 and CS 471, and at least a C- in all other required CS classes. A CS class may not be taken until a grade of C- or above has been earned in all of its CS prerequisites, with the lone exception of CS 301, for which a D is required.

Calculus I and II comprise MATH 224, MATH 225, MATH 226 and MATH 227

Humanities/Social Science – May be filled by courses offered by the Division of Humanities, the Division of Social Sciences, the Psychology Department and HDEV courses offered by the College of Community and Public Affairs. Many of the courses taken to meet the General Education requirements will fulfill the Humanities/Social Science requirement.

Mathematics - Students who are strong in math are encouraged to take MATH 330 (Number Systems) instead of MATH 314 (Discrete Mathematics). Students with a strong math background may take MATH 381 (Graph Theory) as their math elective. MATH 448 (Mathematical Statistics) may be taken to substitute for MATH 327 but it has the prerequisites MATH 323 and MATH 447.

Free Electives – May be filled by extra courses from any of the areas listed above, SOM courses, or additional Computer Science courses. A maximum of 2 HWS credits may be counted as free elective credits. At least four free elective credits must be in liberal arts and sciences in order to ensure the 60 credits needed for a BS degree. CS 110 counts as free elective and is not counted in the 52 CS credits.

Prerequisites for Computer Science Courses

All MATH and CS pre-requisites must have a grade of at least C- (except CS 301).

Course	Prerequisites
CS 101	None
CS 110	MATH 225 ¹
CS 120	CS 110, MATH 225 ¹
CS 210	CS 110, MATH 225
CS 220	CS 120, 210
CS 310	CS 120, 210, MATH 226 ¹
CS 301	CS 101, Gen Ed C/J course, CS 220/310 ²
CS 320	CS 220
CS 350	CS 220, 310, 301 ¹
CS 373	CS 310, MATH 314/330 ^{2,3}
CS 375	CS 310, MATH 227, 314/330 ^{2,3} , CS 301 ¹
CS 402	CS 220, 310
CS 415	CS 350, 375, MATH 327/448 ^{2,3}
CS 418	CS 350, 375, MATH 327/448 ^{2,3}
CS 419	CS 375, MATH 327
CS 424	CS 350, 375
CS 425	CS 375, MATH 304
CS 426	CS 320/350
CS 427	CS 350, CS 375
CS 428	CS 350
CS 432	CS 375
CS 433	CS 375

Course	Prerequisites
CS 435	CS 375, MATH 304, 327/448 ^{2,3}
CS 436	CS 375, MATH 327/448 ^{2,3}
CS 437	CS 375, Math 304, Math 327/448
CS 440	CS 310, 350
CS 441	CS 210, 375
CS 442	CS 210, 375
CS 444	CS 320/350/375 ²
CS 445	CS 350/375
CS 447	CS 220, CS 310, (CS 320/350 ²)
CS 451	CS 350
CS 452	CS 350
CS 453	CS 350
CS 455	CS 375
CS 456	CS 375
CS 457	CS 350
CS 458	CS 350, 375
CS 459	CS 375, MATH 327/448 ^{2,3}
CS 460	CS 375
CS 461	CS 375, MATH 327/448 ^{2,3}
CS 465	CS 375
CS 471	CS 373, 375
CS 472	CS 373, 375
CS 476	CS 210, 320, 350

¹ Can be taken concurrently with the course in the left column

² The notation Course1/Course2 indicates that these courses are alternatives: take either Course1 or Course2.

³ Prerequisites for MATH courses are found in the University Academic Guide for the Mathematics Programs.

Tracks

- To complete the *Artificial Intelligence Track* in the BSCS, students must select four of their electives (while observing the breadth area requirements) as follows: CS 436, 465 and two artificial intelligence electives chosen from the following list: CS 415, 418, 419, 424, 425, 435, 437, 455, 456, certain CS 480 courses listed on the Department website.
- To complete the *Cybersecurity Track* in the BSCS, students must select four of their electives (while observing the breadth area requirements) as follows: CS 458, 459 and two cybersecurity electives chosen from the following list: CS 427, 428, 436 or 437, 453, 461, certain CS 480 courses listed on the Department website.

4+1 Combined Degrees

- The 4+1 BSCS/MSCS degree program is described on a separate handout and in the **Academic Guide** under the heading “4+1 BS-MS Computer Science Program” in the pages for the Thomas J. Watson College of Engineering and Applied Science.
- Information concerning the 4+1 BSCS/MBA program is obtained by visiting (i) the Watson College Advising Office for questions regarding the curriculum for the undergraduate degree and (ii) the School of Management graduate advising office for questions regarding the MBA program (for students in this program MGMT 501 can be used as an E breadth area elective).