

# Computer Science BS - 2025-2026 Requirements

## I. General Education Requirements (41 hours)

The General Education 3.0 program begins Fall 2025. Changing to this catalog year requires satisfying all updated GenEd 3.0 requirements. The science taken in II.D. Science Requirement fulfills the Science Inquiry. MAT 1110 fulfills the Quantitative Literacy requirement.

## II. Major Requirements (67 hours)

The 67 hours is not including 12 hours counted in Area I (General Education). A major GPA of 2.0 or higher is required for graduation. Major GPA calculation includes all courses taken in the major discipline, plus all courses satisfying major requirements. Minimum of 18 semester hours of courses taken to fulfill major requirements must be courses offered by Appalachian.

### A. Required Computer Science (41 Hours)

CS 1440 - Computer Science I (4) Prereq: MAT 1025 or MAT 1110 with a minimum grade of C- or corequisite with MAT 1110 or satisfactory score on the Calculus Readiness Test		
CS 2440 - Computer Science II (4) Prereq: CS 1440 or CS 2435 with a minimum grade of C (2.0) Coreq: CS 1100		
CS 2450 - Intro to Computer Systems (3) Prereq: CS 1100 & CS 2440 with a minimum grade of C (2.0) in each		
CS 2490 - Intro to Theoretical Computer Science (3) Prereq: CS 1100 & CS 2440 with a minimum grade of C (2.0) in each		
CS 3430 - Database (3) Prereq: CS 1100 and CS 1440 with a minimum grade of C (2.0) in each		
CS 3460 - Data Structures (3) Prereq: CS 1100 and CS 2440 with a minimum grade of C (2.0)		
CS 3481 - Computer Systems I (3) Prereq: CS 2450 and CS 2490 with a minimum grade of C- (1.7) in each. Coreq: CS 3460		
CS 3482 - Computer Systems II (3) Prereq: CS 3460 (and/or CS 348) with a minimum grade of C- (1.7)		
CS 3490 - Programming Languages (3) Prereq: CS 2490 & CS 3460 with a minimum grade of C- (1.7) in each		
CS 3667 - Software Engineering (3) Prereq: CS 1100 and CS 2440 with a minimum grade of C (2.0)		
ENG 3695 - Technical Writing for Computer Science (3) Prereq: CS 2440; RC 2001 or equivalent; junior standing as a declared CS major	or	CS 3100 - Junior Seminar (3) Prereq: C_S 2440; R_C 2001 or equivalent; junior standing as a declared CS major
CS 4100 - Senior Seminar (3) Prereq: CS 3460, CS 3100, or ENG 3695		
CS 4800 - Capstone Project (3) Prereq: Senior standing and CS 3667 and CS 3460 with a minimum grade of C- (1.7)	or	CS 4510 - Senior Honors Thesis (1-3, 1+2 format) Prereq: Complete six semester hours of departmental honors courses at the 2000 level or higher with a grade of B (3.0) or higher in each

### B. Math Requirements (18 Hours)

CS 1100 - Discrete Math (3) Prereq: MAT 1025 with a grade of C- (1.7) or Mat 1110 or satisfactory score on the Calculus Readiness Test
MAT 1110 - Calculus I (4) Prereq: MAT 1025 with a grade of C- (1.7) or satisfactory Calculus Readiness Test score.
MAT 1120 - Calculus II (4) Prereq: MAT 1110 with a grade of C- (1.7) or demonstrated Readiness for College-level Math.
MAT 2240 - Intro to Linear Algebra (3) Prereq: MAT 1120 or permission of the instructor
STT 3850 - Statistical Data Analysis I (4) Prereq: MAT 1110 and demonstrate Readiness for College-level Math

### C. CS Departmental Elective Requirements (12 Hours)

CS 2530-2539 - Selected Topics (1-4) No more than 3 hours can satisfy departmental electives.
CS 3530-3549 - Selected Topics (1-4)
CS 4530-4549 - Selected Topics (1-4)
CS 3500 - Independent Study in Computer Science (1-3)
CS 3515 - Junior Honors Seminar (3) Prereq: Changes with topic but always includes CS 2450 and CS 2490
CS 4900 - Internship (1-12) Prereq: 2.0 major GPA and departmental approval
CS 3240 - Mobile Device Programming (3) Prereq: CS 2440 with a grade of C (2.0) or higher
CS 3440 - Client-side Web Programming Prereq: CS 2440 with a grade of C (2.0) or higher
CS 4435 - Server-side Web Programming Prereq: CS 3430 and CS 3440
Cloud Computing (recently offered special topics course)
Full Stack Web Development (recently offered special topics course)
Applied Scrum (recently offered special topics course)
Single Page Applications (recently offered special topics course)
CS 3760 - System Administration and Security (3) Prereq: CS 3460 with a grade of C (2.0) or higher. UNIX experience recommended.
CS 4450 - Data Communications and Networking (3) Prereq: CS 3481
CS 4465 - Computer Graphics (3) Prereq: CS 3460 with a minimum grade of C- and MAT 2240
CS 4521 - Operating Systems (3) Prereq: CS 3482
CS 4680 - Embedded Systems (3) Prereq: CS 3481
Linux System Programming (recently offered special topics course)
Parallel Programming (recently offered special topics course)

<b>GPU Programming</b> (recently offered special topics course)
<b>CS 4460 - Algorithms</b> (3) Prereq: CS 3460 with a minimum grade of C- (1.7)
<b>CS 4550 - Theoretical Computer Science</b> (3) Prereq: CS 2490 with a minimum grade of C- (1.7)
<b>Functional Programming</b> (recently offered special topics course)
<b>Graph Theory</b> (recently offered special topics course)
<b>Computational Reasoning</b> (recently offered special topics course)

<b>CS 3341 - Incident Response with Threat Intelligence</b> (3) Prereq: CS 2440 with a grade of C (2.0) or higher
<b>CS 3760 - System Administration and Security</b> (3) Prereq: CS 3460 with a minimum grade of "C" (2.0). Unix experience recommended.
<b>Forensic Computing</b> (recently offered special topics course)
<b>Information Security &amp; Privacy</b> (recently offered special topics course)
<b>Security Analytics</b> (recently offered special topics course)
<b>Intro to Cybersecurity</b> (recently offered special topics course)

<b>CS 3750 - Applied Neural Networks</b> (3) Prereq: CS 3460 with a minimum grade of C- or CS 3425/MAT 2240
<b>CS 4440 - Artificial Intelligence</b> (3) Prereq: CS 3460 with a minimum grade of C- (1.7) or CS 3435/STT 3850
<b>CS 4740 - Data Image Processing</b> (3) Prereq: CS 1440 with a minimum grade of C (2.0) and MAT 2240
<b>CS 4755 - Applied Machine Learning</b> (3) Prereq: CS 3460 with a minimum grade of C (2.0) or CS 3435; and MAT 2240
<b>Visual Analytics Design</b> (recently offered special topics course)
<b>Machine Learning</b> (recently offered special topics course)
<b>Deep Learning</b> (recently offered special topics course)
<b>Reinforcement Learning</b> (recently offered special topics course)

<b>MAT 4310 - Numerical Methods</b> (3) Prereq: MAT 2240 and MAT 2310 or permission from instructor (MAT 2130 or MAT 3130 recommended)
<b>MAT 4990 - Numerical Linear Algebra</b> (3) prereq: MAT 4310 (Dual-listed with MAT 5390; Dual-listed courses require senior standing, juniors may enroll with permission of the department)

#### D. Science Requirement (8 hours)

Complete a minimum of 8 semester hours from any of the General Education Science Inquiry course options. (Courses used to complete this requirement may also double count within the General Education curriculum.)

#### III. Free Electives (12 hours)

Taken to total 120 hours for the degree.

#### Data Science Certificate Requirements

##### Programming Fundamentals (4 hours)

**CS 2435 - Intro to Scientific Programming** (4 hours) Coreq: MAT 1020 or MAT 1025 or MAT 1110 or equivalent with a minimum grade of C- (1.7) or satisfactory Calculus Readiness Test score [*Students with credit for CS 2440 may skip this course*]

##### Data Science Foundations (10 hours)

**CS 3435 - Data Collection and Visualization** (3) Prereq: CS 2440 or CS 2435 [*This course does not count toward CS electives*]

**MAT 2240 - Linear Algebra** (3) Prereq: MAT 1110 with a minimum grade of C- (1.7) or permission of the instructor

**STT 3850 - Statistical Data Analysis I** (4) Prereq: MAT 1110 or demonstrated Readiness for College-level Math

##### Data Science Algorithms and Applications (3 Hours)

Choose one:

**CS 3750 - Applied Neural Networks** (3) Prereq: CS 3460 with a minimum grade of C- or CS 3425/MAT 2240

**CS 4440 - Artificial Intelligence** (3) Prereq: CS 3460 with a minimum grade of C- (1.7) or CS 3435/STT 3850

**CS 4755 - Applied Machine Learning** (3) Prereq: CS 3460 with a minimum grade of C (2.0) or CS 3435; and MAT 2240