Computer Science, BS 2024-25

General Education Requirements (44 Hours) - The science taken in D fulfills part or all of the Science Inquiry. MAT 1110 fulfills the Quantitative Literacy requirement.

Major Requirements (67-69 Hours) - Not including up to 12 hours counted in General Education. 2.0 major GPA is required for graduation. Major GPA calculation will include all courses taken in Sections A, B, C, and D below. Minimum of 18 semester hours of courses taken to fulfill major requirements must be courses offered by Appalachian.

A. Computer Science (41 Hours)

CS 1440 - Computer Science I (4) Prerequisite: MAT 1025 or equivalent with a minimum grade of "C-" (1.7) or satisfactory Calculus Readiness Test score.

CS 2440 - Computer Science II (4) Prerequisite: CS 1440 or CS 2435 with minimum grade of "C" (2.0). Corequisite: CS 1100.

CS 2450 - Introduction to Computer Systems (3) Prerequisite: CS 1100 & CS 2440 with minimum grade of "C" in each.

CS 2490 - Introduction to Theoretical Computer Science (3) Prerequisite: : CS 1100 & CS 2440 with minimum grade of "C" in each.

CS 3430 - Database (3) Prerequisite: CS 2440 with a grade of "C" (2.0) or higher.

CS 3460 - Data Structures (3) Prerequisite: CS 2490 with a minimum grade of "C" (2.0).

CS 3481 - Computer Systems I (3) Prerequisites: CS 2450 and CS 2490 with a minimum grade of "C-" (1.7) in each. Corequisite: CS 3460.

CS 3482 - Computer Systems II (3) Prerequisites: CS 3460 with minimum grade of "C-" (1.7) and C S 3481.

CS 3490 - Programming Languages (3) Prerequisites: CS 2490 & CS 3460 with a minimum grade of "C-" (1.7) in each.

CS 3667 - Software Engineering (3) Prerequisite: CS 2440 with a grade of "C" (2.0) or higher.

ENG 3695 - Technical Writing for Computer Science (3) Prerequisite: R C 2001 or its equivalent, and must have at least junior (CS 2440) standing as a declared CS major.	OR	**CS 3100** - Junior Seminar (3) Prerequisite: CS 2440 or its equivalent, R C 2001 or its equivalent.

CS 4100 - Senior Seminar (3) Prerequisites: CS 3460; CS 3100 or ENG 3695.

CS 4800 - Capstone Project (3) Prerequisites: senior standing and C S 3667; and CS 3460 with a minimum grade of "C-" (1.7).	OR	**CS 4510** - Senior Honors Thesis (1-3 hours, 1+2 format) Prerequisites: completion of 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 Mathematics (3) Prerequisite: MAT 1025 or equivalent with a grade of "C-" (1.7) or higher or satisfactory Calculus Readiness Test score.

MAT 1110 - Calculus with Analytic Geometry I (4) Prerequisite: MAT 1025 (with a grade of "C-" (1.7) or higher) or equivalent. Demonstrated Readiness for College-level Math.

MAT 1120 - Calculus with Analytic Geometry II (4) Prerequisite: MAT 1110 (with a grade of "C-" (1.7) or higher). Demonstrated Readiness for College-level Math.

MAT 2240 - Introduction to Linear Algebra (3) Prerequisite: MAT 1120 or permission of the instructor.

STT 3850 - Statistical Data Analysis I (4) Prerequisite: MAT 1110. Demonstrated Readiness for College-level Math.

C. CS Elective Requirements (12 hours)

CS 2530-2549 - Selected Topics (1-3).

CS 3240 - Mobile Device Programming (3) Prerequisite: C S 2440.

CS 3341 - Incident Response with Threat Intelligence (3) Prerequisite: C S 2440 with a grade of "C" (2.0) or higher.

CS 3440 - Client-side Web Programming (3) Prerequisite: C S 2440 with a grade of "C" (2.0) or higher.

CS 3463 - Simulation (3) Prerequisites: C S 3460 and STT 2810.

CS 3500 - Independent Study in Computer Science (1-3)

CS 3515 - Junior Honors Seminar (3) Prerequisites: change with topic but always include C S 2450 and C S 2490.

CS 3530-3549 - Selected Topics (1-4)

CS 3750 - Applied Neural Networks (3) Prerequisites: CS 3460 with a minimum grade of "C-" or CS 3435; MAT 2240.

CS 3760 - System Administration and Security (3) Prerequisite: C S 3460 with a grade of "C" (2.0) or higher. Unix experience recommended.

CS 3770 - Computational Cryptography (3) Prerequisite: C S 3460.

CS 4435 - Server-side Web Programming (3) Prerequisites: C S 3430 and C S 3440.

CS 4440 - Artificial Intelligence (3) Prerequisite: CS 3460 with minimum grade of "C-" (1.7) or CS 3435; STT 3850.

CS 4450 - Data Communications and Networking (3) Prerequisite: C S 3481.
CS 4460 – Algorithms (3) Prerequisites: CS 3460 with a minimum grade of C- (1.7)
CS 4465 - Computer Graphics (3) Prerequisites: C S 3460 with a minimum grade of "C-" (1.7); and MAT 2240.
CS 4521 - Operating Systems (3) Prerequisite: C S 3482.
CS 4530-4549 - Selected Topics (1-3).
CS 4550 - Theoretical Computer Science (3) Prerequisite: C S 2490 with a minimum grade of "C-" (1.7).
CS 4570 - Human-Computer Interfaces (3) Prerequisite: permission of the instructor.
CS 4620 - Real-time Systems (4) Prerequisite: C S 3482.
CS 4680 - Embedded Systems (3) Prerequisite: C S 3481.
CS 4740 - Digital Image Processing (3) Prerequisites: C S 1440 with a grade of "C" (2.0) or higher and MAT 2240.
CS 4755 - Applied Machine Learning (3) Prerequisites: C S 3460 with a minimum grade of "C-" (1.7) or C S 3435; MAT 2240.
CS 4900 - Internship (1-12) Prerequisite: junior standing and approval of the departmental internship coordinator.
MAT 4310 - Numerical Methods (3) Prerequisite: MAT 2240 and MAT 2310 or permission of the instructor, with MAT 2130 or MAT 3130 recommended.
MAT 4990 - Numerical Linear Algebra (3) Prerequisite: MAT 4310.

D. Science Requirements (8-10 hours in one of the following sequences)

AST 1001 - Introductory Astronomy I - The Solar System (4) Prerequisite: Demonstrated Readiness for College-level Math.
AST 1002 - Introductory Astronomy II - Stars and Galaxies (4) Prerequisite: AST 1001. Demonstrated Readiness for College-level Math.

BIO 1801 - Biological Concepts I (4) Corequisite: CHE 1101. (Biology Dept. waives CHE for CS majors per request)
BIO 1802 - Biological Concepts II (4) Prerequisite: BIO 1801 with a grade of "C" (2.0) or higher.

CHE 1101 - Introductory Chemistry I (3) Prerequisites: M-SAT=550+, or M-ACT=22+, or passing the math portion of the TCPE (Toledo Chemistry Placement Exam), or MAT 1020 or higher; corequisite or prerequisite: CHE 1110.
CHE 1110 - Introductory Chemistry Laboratory I (1) Corequisite or prerequisite: CHE 1101.
CHE 1102 - Introductory Chemistry II (3) Prerequisites: CHE 1101 and CHE 1110, M-SAT=550+, or M-ACT=22+, or passing the math portion of the TCPE (Toledo Chemistry Placement Exam), or MAT 1020 or higher; corequisite or prerequisite: CHE 1120.
CHE 1120 - Introductory Chemistry Laboratory II (1) Corequisite or prerequisite: CHE 1102.

GES 1101 - Introduction to Physical Geology (4) Prerequisite: Demonstrated Readiness for College-level Math. AND
GES 1102 - Introduction to Historical Geology (4) Prerequisite: Demonstrated Readiness for College-level Math.
GES 1103 - Environmental Change, Hazards, and Resources (4) Prerequisite: Demonstrated Readiness for College-level Math.

PHY 1103 - General Physics I (4) Prerequisite: Demonstrated Readiness for College-level Math. Corequisite for PHY 1103: MAT 1020 or MAT 1025 or the equivalent.
PHY 1104 - General Physics II (4) Prerequisite for PHY 1104: PHY 1103 or the equivalent. Demonstrated Readiness for College-level Math.

PHY 1150 - Analytical Physics I (5) Prerequisite: Demonstrated Readiness for College-level Math. Corequisite for PHY 1150: MAT 1110.
PHY 1151 - Analytical Physics II (5) Prerequisite: PHY 1103 or PHY 1150. Corequisite: MAT 1120.

Free Electives (7-9 Hours) Taken to total a minimum for the degree, normally **120** hours.

Data Science Certificate Requirements (A five course program):

- CS 2435 -- Introduction to Scientific Programming (Python)*
- CS 3435 -- Data Collection and Visualization (Python)**
- MAT 2240 -- Linear Algebra
- STT 3850 -- Statistical Data Analysis I
- CS 4755 -- Applied Machine Learning

* Students with credit for CS 1445 or CS 2440 may skip CS 2435.
** This course doesn't count toward CS electives.