Computer Science, B.S.C.S.

Degree Offered

- Bachelor of Science in Computer Science (B.S.C.S.)

Nature of the Program

Computer science is a discipline that involves the understanding and design of computational processes. The discipline ranges from a theoretical study of algorithms and information processing in general, to a practical design of efficient and reliable software that meets given specifications. This differs from most physical sciences, engineering included, that separate theoretical underpinnings of the science from applications within it. The computer science major prepares students for careers in fields such as software development, cybersecurity, machine learning, data analytics, virtual reality, and human computer interfaces. The Bachelor of Science degree in Computer Science is accredited by the Computing Accreditation Commission of ABET, http://www.abet.org, under the General Criteria and the Program Criteria for Computer Science.

Program Educational Objectives

The Program Educational Objectives (PEO) of the Bachelor of Science in Computer Science (B.S.C.S.) program at West Virginia University is to produce graduates who will apply their knowledge and skills to achieve success in their careers in industry, research, government service or graduate study. It is expected that in the first five years after graduation our graduate will achieve success and proficiency in their profession, be recognized as leaders, and contribute to the well-being of society.

Click here to view the Suggested Plan of Study (p. 3)

Curriculum in Computer Science

General Education Foundations

Please use this link to view a list of courses that meet each GEF requirement. **(**http://registrar.wvu.edu/gef/**)**

NOTE: Some major requirements will fulfill specific GEF requirements. Please see the curriculum requirements listed below for details on which GEFs you will need to select.

Code	Title	Hours
General Education Foundations		
F1 - Composition & Rhetoric		3-6
ENGL 101 & ENGL 102	Introduction to Composition and Rhetoric and Composition, Rhetoric, and Research	
or ENGL 103	Accelerated Academic Writing	
F2A/F2B - Science & Technology		4-6
F3 - Math & Quantitative Reasoning		3-4
F4 - Society & Connections		3
F5 - Human Inquiry & the Past		3
F6 - The Arts & Creativity		3
F7 - Global Studies & Diversity		3
F8 - Focus (may be satisfied by completion of a minor, double major, or dual degree)		9
Total Hours		31-37

Please note that not all of the GEF courses are offered at all campuses. Students should consult with their advisor or academic department regarding the GEF course offerings available at their campus.

Degree Requirements

Students must meet the following criteria to qualify for a Bachelor of Science in Computer Science degree:

- Complete a minimum of 122 credit hours
- Satisfy WVU's undergraduate degree requirements
- Satisfy Statler College's undergraduate degree requirements (http://catalog.wvu.edu/undergraduate/collegeofengineeringandmineralresources/#policiestext)
- Complete all courses listed in the curriculum requirements with the required minimum grades
- Attain an overall grade point average of 2.00 or better

- Attain a WVU grade point average of 2.00 or better
- Attain a Statler grade point average of 2.00 or better
- A maximum of one math or science courses with a grade of D+, D, or D- may apply towards a Statler College degree
- Complete a survey regarding their academic and professional experiences at WVU, as well as post-graduation job placement or continuing education plans.

The Statler GPA is computed based on all work taken at WVU with a subject code within Statler College (BIOM, BMEG, CE, CHE, CPE, CS, CSEE, CYBE, EE, ENGR, ENVE, ETEC, IENG, IH&S, MAE, MINE, PDA, PNGE, ROBE, SAFM, SENG) excluding ENGR 140, ENGR 150, and CS 101. The WVU GPA is computed based on all work taken at WVU. The Overall GPA is computed based on all work taken at WVU and transfer work.

Curriculum Requirements

Code	Title	Hours
University Requirements		19
Fundamentals of Engineering Requirements		2
Math and Science Requirements		28
Computer Science Program Requirements		73
Total Hours		122

University Requirements

Code	Title	Hours
General Education Foundations (GEF) 1, 2, 3, 4, 5, 6, 7, and 8 (31-37 Credits)		
Outstanding GEF Requirements 1, 4, 5, 6, and 7		18
ENGR 191	First-Year Seminar	1
Total Hours		19

Fundamentals of Engineering Requirements

Code	Title	Hours
A minimum grade of C- is required in all Fundamentals of Engineering courses.		
ENGR 101	Engineering Problem Solving 1	2
Total Hours		2

Math and Science Requirements

Code	Title	Hours
A minimum grade of C- is required in all Math and Science courses except CS 220, MATH 303, and MATH 378.		
Core Requirements		
Calculus 1 (GEF 3):		4
MATH 155	Calculus 1	
MATH 153 & MATH 154	Calculus 1a with Precalculus and Calculus 1b with Precalculus	
MATH 156	Calculus 2 (GEF 8)	4
STAT 215	Introduction to Probability and Statistics (GEF 8)	3
Lab Science Electives I (GEF 2B) & II (GEF 8): Select two GEF 2B courses and accompanying labs		8
Math and Statistics Elective: Select one MATH course numbered 251 or higher or STAT course numbered 300 or higher		3
Discrete Mathematics Requirement: Select one option from below:		**6**
Option A		
CS 220	Discrete Mathematics	
Elective: Select one additional MATH course numbered 251 or higher or STAT course numbered 300 or higher		
Option B		
MATH 303	Introduction to the Concepts of Mathematics	
MATH 378	Discrete Mathematics	
Total Hours		28

Computer Science Program Requirements

Code	Title	Hours
A minimum grade of C- is required in CS 110, CS 110L, CS 111, and CS 111L.		
CS 110 & 110L	Introduction to Computer Science and Introduction to Computer Science Laboratory	4
CS 111 & 111L	Introduction to Data Structures and Introduction to Data Structures Laboratory	4
CS 210	File and Data Structures	4
CS 310	Principles of Programming Languages	3
CS 320	Analysis of Algorithms	3
CS 330 & 330L	Introduction to Software Engineering and Introduction to Software Engineering Laboratory	4
CS 350	Computer System Concepts	3
CS 410	Compiler Construction	3
or CS 422	Automata Theory	
CS 450	Operating Systems Structure	4
CPE 271 & 271L	Introduction to Digital Logic Design and Digital Logic Laboratory	4
CPE 310	Microprocessor Systems	3
CPE 453	Data and Computer Communications	3
CSEE 380	Engineering for Societal Impact	2
CSEE 480S	Capstone Project - Design	2
or CSEE 480	Capstone Project - Design	
CSEE 481S	Capstone Project - Implementation	3
or CSEE 481	Capstone Project - Implementation	
WRIT 304	Business and Professional Writing	3
or WRIT 305	Technical Writing	
or WRIT 403	Grant Proposal Writing for Community & Industry	
Free Elective [*, **, ***]		3
CS Elective (400-level or higher course in CS subject code) [**, ***]		3
Lane Department Electives (300-level or higher courses in BIOM, CPE, CS, CSEE, CYBE, EE, or ROBE subject codes) [*, **, ***]		12
Statler College Elective (Course offered by Statler College) [**, ***]		3
Total Hours		73

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Students choosing an AOE in Cybersecurity are not required to fulfill the Free Elective requirement and must choose only a total of 3 credits from Lane Departmental Electives.

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A maximum of 3 credits from any applicable 490 course may be used toward elective requirements.

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A maximum of 3 credits from any applicable 491 course may be used toward elective requirements.

Suggested Plan of Study

It is important for students to take courses in the order specified as closely as possible; all prerequisites and concurrent requirements must be observed. A typical B.S. degree program that completes degree requirements in four years is as follows.

First Year

Fall	Hours	Spring	Hours
CS 110 & 110L	4	CS 111 & 111L	4
ENGR 101	2	ENGL 101 (GEF 1)	3
ENGR 191	1	MATH 156 (GEF 8)	4
MATH 155 (GEF 3)	4	Lab Science Elective II (GEF 8)	4

Lab Science Elective I (GEF 2B)		4	
		15	15

Second Year

Fall	Hours	Spring	Hours
CS 210		4 CPE 271 & 271L	4
CS 330 & 330L		4 STAT 215 (GEF 8)	3
ENGL 102 (GEF 1)		3 GEF 5	3
GEF 4		3 GEF 6	3
Discrete Mathematics Requirement Course		3 Discrete Mathematics Requirement Course	3
		17	16

Third Year

Fall	Hours	Spring	Hours
CS 310		3 CPE 310	3
CS 320		3 CSEE 380	2
CS 350		3 Lane Department Elective	3
WRIT 304, 305, or 403		3 Lane Department Elective	3
Lane Department Elective		3 Math and Statistics Elective	3
		15	14

Fourth Year

Fall	Hours	Spring	Hours
CS 410 or 422		3 CSEE 481S	3
CS 450		4 Lane Department Elective	3
CPE 453		3 CS Elective	3
CSEE 480S		2 Free Elective	3
GEF 7		3 Statler College Elective	3
		15	15

Total credit hours: 122

Area of Emphasis

- Cybersecurity

AREA OF EMPHASIS IN CYBERSECURITY

Code	Title	Hours
CPE 453	Data and Computer Communications	3
CYBE 366	Secure Software Development	3
CYBE 465	Cybersecurity Principles and Practice	3
CYBE 467	Ethical Hacking & Penetration Testing	3
Select one of the following:		3
CYBE 435	Computer Incident Response	
CYBE 466	Host Based Cyber Defense	
Total Hours		15

Student Outcomes

Upon graduation, all Bachelor of Science students in Computer Science will have an ability to:

1. Analyze a complex computing problem and to apply principles of computing and other relevant disciplines to identify solutions.
2. Design, implement, and evaluate a computing-based solution to meet a given set of computing requirements in the context of the program's discipline.
3. Communicate effectively in a variety of professional contexts.
4. Recognize professional responsibilities and make informed judgments in computing practice based on legal and ethical principles.

5. Function effectively as a member or leader of a team engaged in activities appropriate to the program's discipline.
6. Apply computer science theory and software development fundamentals to produce computing-based solutions.