Computer Science, B.S.

Degree Offered

- Bachelor of Science

Nature of the Program

Computer scientists are distinguished from other computer professionals, such as information technology specialists and system administrators, by the higher level of theoretical expertise, the innovation they apply to complex problems, and the extensive knowledge and experience they possess in software engineering. A computer scientist can often expect to work on multidisciplinary projects such as robotics, human - computer interaction, advanced computer graphics, and artificial intelligence based systems.

The first two years of study in the Bachelor of Science in Computer Science (BS CS) program focus on the fundamentals of computer science concepts and provide a firm foundation in mathematics. During the junior and senior years, students are introduced to advanced concepts in the science of computation and are presented the opportunity to take elective courses such as video game development, cryptology, computer graphics, artificial intelligence and image processing. The two semester senior project sequence provides the culminating experience for the Computer Science students. Students may also have the opportunity to participate in undergraduate research projects with the computer science faculty.

Educational Objectives

In three to five years after graduation, the graduates of the WVU Tech BS degree program in Computer Science will do the following:

- Demonstrate success in the professional practice of Computer Science through recognition of their contributions to an organization or entrepreneurial accomplishments.
- Alternatively or additionally, demonstrate success in the field of computing by continuing formal education through earning post graduate degrees, technical certificates, or other technical training.
- Demonstrate lifelong learning habits either as a professional or a researcher in their field.

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.

Curriculum Requirements

Code	Title	Hours
University Requirements		22
Program Requirements		32

Computer Science Major Requirements	67
Total Hours	121

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, 5, 6, 7, and 8		18
WVUE 191	First Year Seminar	1
General Electives (Students are free to choose any college level course to fulfill this requirement)		3
Total Hours		22

Program Requirements

Code	Title	Hours
Laboratory Science, Students may select any of the two courses from the following list: (also fulfills GEF 2 and GEF 8)		**8**
BIOL 111	General Biology	
BIOL 112	General Biology	
CHEM 111 & 111L	Survey of General, Organic, and Biological Chemistry 1 and Survey of Chemistry 1 Laboratory	
CHEM 112 & 112L	Survey of General Organic Biological Chemistry 2 and Survey of Chemistry 2 Laboratory	
CHEM 115 & 115L	Fundamentals of Chemistry 1 and Fundamentals of Chemistry 1 Laboratory	
CHEM 116 & 116L	Fundamentals of Chemistry 2 and Fundamentals of Chemistry 2 Laboratory	
PHYS 101 & 101L	Introductory Physics 1 and Introductory Physics 1 Laboratory	
PHYS 102 & 102L	Introductory Physics 2 and Introductory Physics 2 Laboratory	
PHYS 111 & 111L	General Physics 1 and General Physics 1 Laboratory	
PHYS 112 & 112L	General Physics 2 and General Physics 2 Laboratory	
MATH 155	Calculus 1 (GEF 3)	4
MATH 156	Calculus 2 (GEF 8)	4
MATH 251	Multivariable Calculus	4
MATH 441	Applied Linear Algebra	3
MATH 448	Probability and Statistics	3
ECON 401	Managerial Economics (GEF 4)	3
WRIT 305	Technical Writing	3
Total Hours		32

Computer Science Major Requirements

Code	Title	Hours
An overall GPA of 2.0 is required for all CS and CYBE courses.		
CS 121	Computer Science 1	4
CS 122	Computer Science 2	4
CS 201	Data Structures	3
CS 220	Discrete Mathematics	3
CS 222	Intro Software Engineering	3
CS 231	Introduction to Computer Organization	3
CS 265	C Programming	2
CS 310	Principles of Programming Languages	3
CS 320	Analysis of Algorithms	3

CS 321	Introduction to Networking	3
CS 324	Database Management	3
CS 355	Computer Systems	3
CS 410	Compiler Construction	3
CS 450	Operating Systems Structure	4
CS 479	Advanced Computer Science Mathematics	3
CS 480	Capstone Project - Design	2
CS 481	Capstone Project - Implementation	3
Select one of the following: AOE in Cybersecurity or Coursework Option		**15**
Coursework Option:		
Upper Division Computer Science Electives consist of (300 and 400 level CS courses). Students may choose to complete 3 credits in CYBE 366, CYBE 466, or CYBE 467 as part of this requirement. CS 491 is excluded from this requriement. (9 credits)		
Technical Electives (6 credits) (See approved list) *		
Total Hours		67

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Any Student completing a minor is not required to take the Technical Electives. Cybersecurity minor is not available for Computer Science majors.

Approved Technical Electives

Code	Title	Hours
Accounting		
ACCT 201	Principles of Accounting 1	
ACCT 202	Principles of Accounting 2	
Biology		
BIOL 111	General Biology **	
BIOL 112	General Biology **	
Chemistry		
CHEM 111 & 111L	Survey of General, Organic, and Biological Chemistry 1 and Survey of Chemistry 1 Laboratory **	
CHEM 112 & 112L	Survey of General Organic Biological Chemistry 2 and Survey of Chemistry 2 Laboratory **	
CHEM 115 & 115L	Fundamentals of Chemistry 1 and Fundamentals of Chemistry 1 Laboratory **	
CHEM 116 & 116L	Fundamentals of Chemistry 2 and Fundamentals of Chemistry 2 Laboratory **	
Computer Engineering		
CPE 271	Introduction to Digital Logic Design	
Computer Science		
CS 300+ or 400+ (Except CS 491)		
Cybersecurity		
CYBE 266	Foundations of Cybersecurity	
CYBE 366	Secure Software Development	
CYBE 466	Host Based Cyber Defense	
CYBE 467	Ethical Hacking & Penetration Testing	
Electrical Engineering		
EE 221	Introduction to Electrical Engineering	
EE 223	Electrical Circuits	
Mechanical Engineering		
MAE 241	Statics	
MAE 242	Dynamics	
MAE 243	Mechanics of Materials	
MAE 331	Fluid Mechanics	
Information Systems		

ISYS 270	Linux
ISYS 325	C#
ISYS 366	e-Commerce
Mathematics	
MATH 261	Elementary Differential Equations
Physics	
PHYS 101 & 101L	Introductory Physics 1 and Introductory Physics 1 Laboratory **
PHYS 102 & 102L	Introductory Physics 2 and Introductory Physics 2 Laboratory **
PHYS 111 & 111L	General Physics 1 and General Physics 1 Laboratory **
PHYS 112 & 112L	General Physics 2 and General Physics 2 Laboratory **

**** Unless taken as a science requirement**

Other courses are accepted as technical electives only with advance approval from the department. Most of the 300-400 level ACCT, BIOL, CHEE, CHEM, CPE, CE, EE, MAE, MATH, and PHYS courses are considered acceptable.

Suggested Plan of Study

First Year

Fall	Hours	Spring	Hours
ENGL 101 (GEF 1)	3	ENGL 102 (GEF 1)	3
CS 121	4	CS 122	4
WVUE 191	1	GEF 6	3
General Elective	3	GEF 7	3
GEF 5	3	GEF 8	3
	14		16

Second Year

Fall	Hours	Spring	Hours
MATH 155 (GEF 3)	4	MATH 156	4
CS 201	3	CS 220	3
CS 231	3	CS 222	3
CS 265	2	CS 310	3
GEF 2 (Laboratory Science)	4	GEF 8 (Laboratory Science)	4
	16		17

Third Year

Fall	Hours	Spring	Hours
ECON 401 (GEF 4)	3	MATH 441	3
MATH 251	4	WRIT 305	3
CS 320	3	CS 324	3
CS 321	3	CS 355	3
		Computer Science Elective/AOE Course	3
	13		15

Fourth Year

Fall	Hours	Spring	Hours
MATH 448	3	CS 410	3
CS 450	4	CS 479	3
CS 480	2	CS 481	3
Computer Science Elective/AOE Course	3	CS/CYBE Elective/AOE Course	3
Technical Elective/AOE Course	3	Technical Elective/AOE Course	3
	15		15

Total credit hours: 121

Area of Emphasis Offered

- Cybersecurity (p. 5)

Cybersecurity Area of Emphasis

Code	Title	Hours
CYBE 266	Foundations of Cybersecurity	3
CYBE 366	Secure Software Development	3
CYBE 465	Cybersecurity Principles and Practice	3
MATH 373	Introduction to Cryptography	3
Select one of the following:		3
CYBE 466	Host Based Cyber Defense	
CYBE 467	Ethical Hacking & Penetration Testing	
Total Hours		15

Major Learning Outcomes

COMPUTER SCIENCE

Graduates with a BS degree in Computer Science at WVU Tech will have an ability to:

- Analyze a complex computing problem and to apply principles of computing and other relevant disciplines to identify solutions.
- Design, implement, and evaluate a computing-based solution to meet a given set of computing requirements in the context of the program's discipline.
- Communicate effectively in a variety of professional contexts.
- Recognize professional responsibilities and make informed judgments in computing practice based on legal and ethical principles.
- Function effectively as a member or leader of a team engaged in activities appropriate to the program's discipline.
- Apply computer science theory and software development fundamentals to produce computing-based solutions.