

2009-2010

B.S. in Computer Science

College of Sciences and Technology

What Is the Study of Computer Science?

Computer Science at Western is organized around the study of design and analysis techniques used to write software or programs in various application areas, along with details about the internal workings of computers (known as computer architecture and operating systems). The design and analysis techniques encompass many areas of study such as (1) algorithms and data structures (ways to organize instructions and information efficiently), (2) programming languages (specific methods of delivering instructions to computers), (3) software methodology and engineering (processes to develop software and ways to organize groups of instructions), (4) databases and information retrieval, and (5) artificial intelligence.

Why Should I Consider This Major?

With the Bachelor of Science degree, students are prepared for graduate study or careers in industry as systems analysts and/or designers. Systems analysts assess the needs of a project for computer hardware and software, and then proceed to design systems that meet those needs. Systems analyst positions are not entry-level. They are the typical career path for students with Bachelor of Science degrees in Computer Science.

Graduates often begin their careers doing computer programming, which is a creative process spanning a wide range of areas of expertise that is heavily influenced by the application for which the programs or software are being developed. The Bachelor of Science degree provides a problem-solving and analytical background that is typical of the creative expertise employed by very good programmers and systems analysts to obtain programming solutions.

How to Declare:

Admission to the major is determined by performance in CSCI 211 and 241. For transfer students with equivalences in those courses, admission is based on other required Computer Science courses.

Complete a *Computer Science Major Application for Admission* form available at Communications Facility 459, or online. Students who are not yet majors should seek advice in the department office as soon as possible.

Mid-Program Checkpoint:

Students intending to complete a Bachelor's of Science degree in Computer Science within four years should complete the following courses by the start of their junior year. Students are expected to follow all prerequisite requirements for courses and seek early departmental advisement.

Coursework:

Math Series:

MATH: 124, 125 Calc/Analytic Geometry

Computer Programming Series:

CSCI: 141 & 145 (or 146), 211, 241

Science sequence:

Biology, Geology, Chemistry or Physics

Other Activities:

Meet with departmental advisor by the time you have taken CSCI 211 and CSCI 241; apply for major.

Meet with faculty advisor to complete plan of study during junior year.

Apply for Honors/Fast Track Program as a third-quarter junior.

Contact Information:

Computer Science Department
Website: <http://cs.www.wvu.edu>

Department Chair:

David Bover
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Undergraduate Advisor:

Julie Marx
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Sample Careers:

Research Analyst

Systems Analyst

Applied Science
Technologist

Data Control Administrator

Software Engineer

Robotics Programmer

Computer Engineer

Artificial Intelligence
Programmer

Technical Writer

Systems Engineer

Inventory Control Specialist



Computer Science Major Requirements: 89-93 Credits

CSCI 141* Computer Programming I (4)

CSCI 145* Computer Programming and Linear Data Structures (4)

*or CSCI 146 Accelerated Computer Programming (4)

CSCI 211 Discrete Structures and Functional Programming I (4)

CSCI 227 Computer Organization I (4)

CSCI 241 Data Structures (4)

CSCI 245 Object-Oriented Programming in C++ (4)

CSCI 305 Analysis of Algorithms & Data Structures I (3)

CSCI 322 Principles of Concurrent Programming (3)

CSCI 347 Computer Organization II (3)

CSCI 351 Windows Software Development (3)

CSCI 352 UNIX Software Development (3)

CSCI 367 Computer Networks I (3)

CSCI 401 Formal Languages and Automata (3)

CSCI 405 Design and Analysis of Advanced Algorithms and Data Structures (3)

CSCI 410 Programming Languages (3)

CSCI 460 Operating Systems (3)

CSCI 491 Software Project Requirements Analysis (3) (WP2)

CSCI 492 software Project Design (3) (WP2)

CSCI 493 Software Project Implementation (3) (WP1)

A minimum of 23 credit hours of mathematics, and a *total* minimum of 45 credit hours of mathematics and science

MATH 124 Calculus/Analytical Geometry (5)

MATH 125 Calculus/Analytical Geometry (5)

MATH 204 Elementary Linear Algebra (4)

MATH 341 Probability and Statistics (4)

A supporting sequence chosen from:

BIOL 204 Introduction to Evolution, Ecology, Biodiversity (4)

BIOL 205 Introduction to Cellular and Molecular Biology (5)

BIOL 206 Introduction to Organismal Biology (5)

CHEM 121, 122, 123 General Chemistry I, II, III (5, 5, 4)

GEOL 211 Physical Geology (5)

GEOL 212 Historical Geology (4)

PHYS 121, 122, 123 Physics with Calculus I, II, III (5 each)

And one course from:

• GEOL 308 Earthquake Geology (3)

• GEOL 309 Volcanology (3)

• GEOL 310 Geomorphology (5)

• GEOL 314 Engineering Geology (3)

12 credits chosen from:

CSCI 311 Discrete Structures and Functional Programming II (4)

CSCI 321 Game Programming (4)

CSCI 342 Web Scripting (4)

CSCI 343 Programming Workshop (1)

CSCI 380 Numerical Computations (4)

CSCI 400 Independent Study (varies)

CSCI 402 Artificial Intelligence (4)

CSCI 417 Seminar Topics in Comp Science (varies)

CSCI 420 Computer Architecture (4)

CSCI 430 Database Theory (4)

CSCI 442 Adv Web Programming in Java (4)

CSCI 450 Compiler Theory and Design (4)

CSCI 461 Computer Security (4)

CSCI 462 Operating Systems Device Drivers (4)

CSCI 467 Computer Networks II (4)

CSCI 480 Computer Graphics (4)

CSCI 483 Computer Animation (4)

CSCI 515 Parallel Computation (4)

CSCI 517 Seminar Topics in Computer Sciences (varies)

CSCI 520 Advanced Compiler Design (4)

CSCI 525 Advanced Topics in Operating Systems (4)

CSCI 527 Embedded Systems (4)

CSCI 528 CORBA Applied to SCADA Systems (4)

CSCI 530 Advanced Database Theory (4)

CSCI 536 Web Services (4)

CSCI 540 Theory & Practice of Programming Language Design (4)

CSCI 545 Distributed File Systems (4)

CSCI 571 Machine Learning Algorithms (4)

CSCI 572 Robotics (4)

CSCI 573 Computational Linguistics (4)

CSCI 577 Data Mining (4)

CSCI 578 Cryptography (4)

CSCI 580 Advanced Computer Graphics (4)

CSCI 584 Scientific Visualization (4)

CSCI 585 Image Processing (4)

M/CS 335 Linear Optimization (4)

M/CS 375 Numerical Computation (4)

M/CS 435 Nonlinear Optimization (4)

M/CS 475 Numerical Analysis (4)

Notes:

- Undergraduate students may take 500-level courses only if they have a GPA of at least 3.0 and instructor permission.
- A maximum of 4 credits must be from CSCI 400 projects
- Exit requirements: Major Field examination administered externally

Other Computer Science Options:

B.A. Accounting-Computer Science (109 credits)

B.S. Mathematics-Computer Science (92 credits)

Minor in Computer Science (3239 credits)

Minor in Computer Systems (24 credits)

Minor Internet Resource Creation & Management (28-29 credits)

These courses are required (or advised) for this major and may be used to satisfy GUR or Writing Proficiency requirements.

QSR: MATH 124, 125

LSCI: Major-level BIOL, CHEM, GEOL, or PHYS sequence

WP: Three Writing Proficiency points are required for graduation (they are noted as WP1, WP2, and WP3). Check [Classfinder](#) or [Online Timetable](#) for departmental offerings each quarter.