

# B.S. in Computer Science

## College of Sciences and Technology

2007-2008 Academic Advising Center Old Main 380 360.650.3850 Advising@cc.wvu.edu

This document has been created for advising purposes only. Please contact the appropriate department for major and/or graduation requirements.

### 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 a Computer Science 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.

### Declaring a Computer Science Major:

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, 211, 241

##### Science sequence:

Biology, Geology, Chemistry or Physics, plus 2 supporting science courses.

#### Other Activities:

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

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

Apply for Honors/Fast Track Program as a third-quarter junior (if applicable).

#### Contact Information:

<http://www.wvu.edu/cms/WWU.CS/>

#### Department Chair:

David Bover

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#### Undergraduate Advisor:

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#### Transfer Advisor:

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#### Sample Career Fields:

- 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
- Information Scientist



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# Computer Science Major Requirements: 89-93 Credits

CSCI 141\* Computer Programming I (4)  
CSCI 145\* Computer Programming II (4)  
    \*or CSCI 146 Accelerated Computer Programming (4)  
CSCI 211 Discrete Structures/Functional Programming I (4)  
CSCI 225 Social and Ethical Issues in CS (3)  
CSCI 227 Computer Organization I (4)  
CSCI 241 Data Structures I (4)  
CSCI 305 Analysis of Algorithms & Data Structures (3)  
CSCI 322 Principles of Concurrent Programming (3)  
CSCI 341 Data Structures II (4)  
CSCI 344 Software Engineering (3)  
CSCI 347 Computer Organization II (3)  
CSCI 351 WIN32 Software Development (3)  
CSCI 352 UNIX Software Development (3)  
CSCI 367 Computer Networks I (3)  
CSCI 401 Formal Languages/Automata (3)  
CSCI 405 Design/Analysis of Algorithms (3)  
CSCI 410 Programming Languages (3)  
CSCI 460 Operating Systems (3)  
CSCI 496 Senior Project (3)  
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: (14-15 credits)

BIOL 204 Intro. to Evolution, Ecology, Biodiversity (4); BIOL 205 Intro. to Cellular and Molecular Biology (5); BIOL 206 Intro. to Organismal Biology (5)  
CHEM 121 General Chemistry I (5); CHEM 122 General Chemistry II (5); CHEM 123 General Chemistry III (4)  
GEOL 211 Physical Geology (5), 212 Historical Geology (4), and one from: GEOL 308 Earthquake Geology (3); GEOL 309 Volcanology (3); GEOL 310 Geomorphology (5); GEOL 314 Engineering Geology (3)  
PHYS 121/131 Physics with calculus I/ Lab (4)(1); PHYS 122/132 Physics with calculus II/ Lab (4)(1); PHYS 123/133 Physics with calculus III/ Lab (4)(1)

Plus 2 additional science courses (see major advisor).

## These required courses will also satisfy the GUR or other Graduation Requirement:

**QSR:** MATH 124, 125

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

**WP:** CSCI 344, 496

## Other Computer Science options:

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

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

Minor in Computer Science (38-40 credits)

## 12 credits chosen from:

(Of which a maximum of 4 credits may be from CSCI 400 or 494 projects)

CSCI 311 Discrete Structures/Functional Programming II (4)  
CSCI 321 Game Programming (4)  
CSCI 342 Web Script Programming (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 III (4)  
CSCI 430 Database Theory (4)  
CSCI 442 Adv Web Programming in Java (4)  
CSCI 444 Software Testing (4)  
CSCI 450 Compiler Theory and Design (4)  
CSCI 461 Computer Security (4)  
CSCI 467 Computer Networks II (4)  
CSCI 480 Computer Graphics (4)  
CSCI 483 Computer Animation (4)  
CSCI 494 Professional Work Experience (4)  
CSCI 514 Research Methods in Computer Science (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)

Note: Undergraduate students may take 500-level courses only if they have a GPA of at least 3.0 and instructor permission.