

# COMPUTER SCIENCE

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Rock Creek Campus  
Building 2, Room 230  
971-722-7331 or 971-722-7604

Sylvania Campus  
Technology Classroom Building (TCB), Room 312  
971-722-4393 or 971-722-4287

[www.pcc.edu/programs/computer-science/](http://www.pcc.edu/programs/computer-science/)

## DESCRIPTION

Computer science is the study of information systems, their representation, architecture, and implementation, used for a variety of practical and theoretical purposes. Computer science addresses methods by which data is accessed, stored, and retrieved, which include areas such as representational computation, programming languages, algorithmic modeling, and software design, testing and development. Computer scientists apply their knowledge of mathematics, physics, and logic to solve a variety of problems using diverse technology.

Students learn practical methods of reasoning, problem-solving, and theoretical analysis to develop their skills in computer science. While exploring general courses in programming, systems analysis, mathematics, and physics, students apply their skills to core challenges within the field. PCC offers students the opportunity to earn an Associate of Arts Oregon Transfer (AAOT) degree. Students may also complete courses as preparation for a bachelor's or advanced degree or update skills to industry standards. Students wishing to transfer credits must check the specific requirements of the college/university to which they intend to transfer. Articulation agreements exist with Portland State University, Oregon State University, and the Oregon Institute of Technology for the two-year transfer degree. See the Course Description (CS prefix) section of this catalog for individual computer science courses and their prerequisites.

## COURSE DESCRIPTIONS

**CS 133G Introduction to Computer Games 4.00** Introduces fundamentals of computer game development, including a survey of computer game categories and platforms, major game components, the game development process, and game graphics. Design and development of elementary two-dimensional computer games. Prerequisites: WR 115, RD 115 and MTH 20 or equivalent or equivalent placement test scores. Audit available.

**CS 133U Introduction to C 4.00** Introduces computer programming through development of C programs to solve practical problems. Recommended: CS 160. Audit available.

**CS 140U Intro to UNIX 4.00** Provides an in-depth introduction into the UNIX operating system, including: task scheduling and management, memory management, input/output processing, internal and external commands, shell configuration, and shell customization. Explores the use of operating system utilities such as text editors, text formatters, electronic mail, and file management, scripting, and C/C++ compilers. Discusses trends in UNIX, including use of graphical user interfaces. Recommended: Computer literacy (such as completion of CIS 120); MTH 95; placement at WR 121. Additional lab hours may be required. Audit available.

**CS 160 Exploring Computer Science 4.00** Explores the field of computer science. Provides an overview of computer architecture, software development engineering, data organization, problem-solving strategies, ethics, and theory of computation. Explores career options and develops rudimentary software development skills. Recommended: Computer Literacy (such as completion of CIS 120); placement at MTH 65 and RD 115. Audit available.

**CS 161 Computer Science I 4.00** Introduces the concepts of computer science. Explores problem solving, algorithm and program design, data types, loops, control structures, subprograms, and arrays. Introduces writing programs in a high level programming language. Surveys current social and ethical aspects of computer science. Recommended: MTH 111B or MTH 111C, WR 121, and CS 160. Audit available.

**CS 162 Computer Science II 4.00** Explores classes, pointers, dynamic memory, linear linked lists, multi-dimensional arrays, program correctness, verification, and testing. Recommended: MTH 112, WR 121 and CS 161. Audit available.

**CS 201 Computer Systems 4.00** Introduces computer systems from a software perspective. Provides an overview of C and assembly language programming and reading skills. Explores basic systems programming skills and tools to measure and improve program performance based on an understanding of key aspects of machine architecture. Recommended: CS 140U and CS 162. Audit available.

**CS 233G Game Programming 4.00** Introduces object-oriented architectures and software design patterns used for game design. Explores a game engine software framework to design and implement several kinds of games, animation techniques, physics simulation, user controls, graphical methods, and intelligent behaviors. Recommended: one term of a programming language such as C, C++, Java or C#. Audit available.

**CS 233U Advanced C Programming 4.00** Advanced C programming including the preprocessor, advanced pointers, data structures, algorithms, and program structure. Lab exercises. Recommend: CS 133U, MTH 112, WR 121, CS 140U. Additional lab hours may be required. Audit available.

**CS 250 Discrete Structures I 4.00** Discrete Structures I Introduces discrete structures and techniques for computing sets, graphs and trees. Construct simple functions, and recursive definitions. Other topics include relational properties, equivalent, partial order, proof techniques, inductive proof, counting techniques and discrete probability. Student will not get credit for both (CS 250 and CS 251) and (MTH 231 and MTH 232). Recommended: MTH 111B or MTH 111C. Audit available.

**CS 251 Discrete Structures II 4.00** Introduces formal logic including propositional calculus and first-order predicate calculus. Presents techniques of formal reasoning including natural deduction and resolution with application to program correctness and automatic reasoning. Introduction to algebraic structures in computing. Recommended: CS 250. Audit available.

**CS 260 Data Structures 4.00** Data structures including stacks, queues, lists, vectors, graphs, and trees. Algorithms including hash tables, sorting, searching and iterating over structures. Includes an in depth examination of recursion. Lab exercises. Recommended: CS 162 or CS 234u. Additional lab hours may be required. Audit available.

**CS 261 Programming Systems 4.00** Operator overloading, single and multiple inheritance, virtual functions, polymorphism, templates, exceptions. STL containers and algorithms. Recommended: CS 260. Audit available.