

# COMPUTER SCIENCE

Computer Science focuses on the design, modeling, analysis, and applications of computer-related systems. The Computer Science program at Ventura College prepares students for further study in computer technologies and training necessary to understand, design, implement and use the software and hardware of digital computers and digital systems.

## CS V11 Programming Fundamentals 3 Units

*In-Class Hours:* 43.75 lecture, 26.25 laboratory

*Advisories/Rec Prep:* MATH V03

This course introduces the student to fundamental concepts of procedural programming. Topics include data types, control structures, functions, arrays, files, and the mechanics of running, testing, and debugging. The course emphasizes good software engineering principles and developing fundamental programming skills in the context of a functional programming language.

**Grade Modes:** Letter Graded

**Field Trips:** May be required

**Degree Applicability:** Applies to Associate Degree

**AA/AS GE:** D2

**Transfer Credit:** CSU, UC

**UC Credit Limitations:** None

**CSU GE-Breadth:** None

**IGETC:** None

## CS V13 Object-Oriented Programming 3 Units

*In-Class Hours:* 43.75 lecture, 26.25 laboratory

*Prerequisites:* CS V11 or equivalent; and MATH V03 or 1 year of high school intermediate algebra (Algebra II) or any higher-level math course with grade of C or better

This course introduces the concepts of object-oriented programming to students with a background in the procedural paradigm. The course begins with a review of control structures and data types, with emphasis on structured data types and array processing. It then moves on to introduce the object-oriented programming paradigm, focusing on the definition and use of classes along with the fundamentals of object-oriented design. Other topics include an overview of programming language principles, simple analysis of algorithms, basic searching and sorting techniques, and an introduction to software engineering issues.

**Grade Modes:** Letter Graded

**Degree Applicability:** Applies to Associate Degree

**AA/AS GE:** D2

**Transfer Credit:** CSU, UC

**UC Credit Limitations:** None

**CSU GE-Breadth:** None

**IGETC:** None

## CS V15 Data Structures and Algorithms 3 Units

*In-Class Hours:* 43.75 lecture, 26.25 laboratory

*Prerequisites:* CS V11 or equivalent with grade of C or better; and MATH V20 or both MATH V04 and MATH V05 with grade(s) of C or better

*Advisories/Rec Prep:* CS V13 or equivalent

This course builds on the foundation provided by the programming fundamentals/object-oriented programming sequence to introduce the fundamental concepts of data structures and the algorithms that proceed from them. Topics include recursion, the underlying philosophy of object-oriented programming, fundamental data structures (including stacks, queues, linked lists, hash tables, trees, and graphs), the basics of algorithmic analysis, and an introduction to the principles of language translation.

**Grade Modes:** Letter Graded

**Field Trips:** May be required

**Degree Applicability:** Applies to Associate Degree

**AA/AS GE:** D2

**Transfer Credit:** CSU, UC

**UC Credit Limitations:** None

**CSU GE-Breadth:** None

**IGETC:** None

## CS V17 Discrete Structures 3 Units

*Same-As:* MATH V52

*In-Class Hours:* 52.5 lecture

*Prerequisites:* MATH V20 or both MATH V04 and MATH V05 or MATH V19; or placement as measured by the college assessment process

*Advisories/Rec Prep:* CS V11 or equivalent

*C-ID:* MATH 160, COMP 152

This course introduces the student to discrete mathematics as it is used in computer science. Topics include formal logic, proofs, sets, combinatorics, probability, functions, graph theory, Boolean Algebra, and Modeling with programming.

**Grade Modes:** Letter Graded

**Field Trips:** May be required

**Credit Limitations:** see counselor.

**Degree Applicability:** Applies to Associate Degree

**AA/AS GE:** D2

**Transfer Credit:** CSU, UC

**UC Credit Limitations:** None

**CSU GE-Breadth:** B4

**IGETC:** 2A

## CS V19 Computer Architecture and Organization 3 Units

*In-Class Hours:* 43.75 lecture, 26.25 laboratory

*Prerequisites:* CS V15 or equivalent; and CS V17 or MATH V52 or equivalent

*C-ID:* COMP 142

This course introduces students to the organization and architecture of computer systems, beginning with the standard von Neumann model and then moving forward to more recent architectural concepts. This course also offers the student an introduction to assembly language for low-level programming of system software and computer applications.

**Grade Modes:** Letter Graded

**Field Trips:** May be required

**Degree Applicability:** Applies to Associate Degree

**AA/AS GE:** None

**Transfer Credit:** CSU, UC

**UC Credit Limitations:** None

**CSU GE-Breadth:** None

**IGETC:** None

**CS V30 Beginning C++ 3 Units***Formerly:* MATH V55*In-Class Hours:* 43.75 lecture, 26.25 laboratory

*Prerequisites:* MATH V03 or 1 year of high school intermediate algebra (Algebra II) or any higher-level math course with grade of C or better  
 This course introduces the student to the concepts of object-oriented programming. The course reviews control structures and data types with emphasis on structured data types and array processing. It introduces the object-oriented programming paradigm, focusing on the definition and use of classes along with the fundamentals of object-oriented design. Other topics include an overview of programming language principles, analysis of algorithms, and an introduction to software engineering issues. A complete object-oriented development framework is presented that encourages extensibility, reusability, and manages complexity.

**Grade Modes:** Letter Graded**Field Trips:** May be required**Degree Applicability:** Applies to Associate Degree**AA/AS GE:** D2**Transfer Credit:** CSU, UC**UC Credit Limitations:** None**CSU GE-Breadth:** None**IGETC:** None**CS V40 Beginning Java 3 Units***Formerly:* MATH V56*In-Class Hours:* 43.75 lecture, 26.25 laboratory

*Prerequisites:* MATH V03 or 1 year of high school intermediate algebra (Algebra II) or any higher-level math course with grade of C or better  
 This course introduces the student to fundamental concepts of object-oriented programming with Java. Topics include data types, control structures, functions, arrays, files, and the mechanics of running, testing, and debugging. It then moves on to introduce the object-oriented programming paradigm, focusing on the definition and use of classes along with the fundamentals of object-oriented design. The course also offers an introduction to the historical and social context of computing and an overview of computer science as a discipline.

**Grade Modes:** Letter Graded**Degree Applicability:** Applies to Associate Degree**AA/AS GE:** D2**Transfer Credit:** CSU, UC**UC Credit Limitations:** None**CSU GE-Breadth:** None**IGETC:** None**CS V42 Intermediate Java 3 Units***In-Class Hours:* 43.75 lecture, 26.25 laboratory*Prerequisites:* CS V40 with a grade of C or better, or equivalent*Advisories/Rec Prep:* CS V13

This course builds on the students' knowledge of object-oriented design and provides the student with the skills and techniques to create Java applications and applets. Topics included in this course are the Java language, Java API, Java programming techniques, integrating graphics, data structures, security issues, Java tools, Java applets, and Java database connectivity.

**Grade Modes:** Letter Graded**Field Trips:** May be required**Degree Applicability:** Applies to Associate Degree**AA/AS GE:** D2**Transfer Credit:** CSU, UC**UC Credit Limitations:** None**CSU GE-Breadth:** None**IGETC:** None**CS V45 Linux Fundamentals 4 Units***In-Class Hours:* 70 lecture*Advisories/Rec Prep:* Basic computer skills such as using a keyboard and mouse and accessing the Internet

This course provides instruction and hands-on training on the open-source Linux operating system. Students will gain knowledge about open-source software, learn how to install Linux from various media, and create and manage files and folders. Students will also perform tasks such as navigating the Linux file system, installing hardware and software, configuring file settings, administering group and user accounts, and setting up the appropriate permissions on files and folders as well. Students will learn to write shell and Python scripts using commands to automate system tasks. This course is taught using a combination of lectures, hands-on projects, demonstrations, and discussions.

**Grade Modes:** Letter Graded**Field Trips:** May be required**Degree Applicability:** Applies to Associate Degree**AA/AS GE:** None**Transfer Credit:** CSU**UC Credit Limitations:** None**CSU GE-Breadth:** None**IGETC:** None**CS V61 Cisco CCNA Networking I 4 Units***In-Class Hours:* 70 lecture*Advisories/Rec Prep:* BUS V64

This course introduces the Open Systems Interconnection (OSI) networking reference model, networking industry standards, networking topologies and medium, numbering systems, IP addressing and subnetting. It covers how networks operate and introduces the basic configurations for routers, switches, and wireless access points. The course content is based on the material from the CISCO Network Academy. This is the first of three courses that prepares a student for the CCNA (Cisco Certified Network Associate) Certification Exam.

**Grade Modes:** Letter Graded, Student Option- Letter/Credit, Pass/No Pass Grading**Degree Applicability:** Applies to Associate Degree**AA/AS GE:** None**Transfer Credit:** CSU**UC Credit Limitations:** None**CSU GE-Breadth:** None**IGETC:** None

**CS V62 Cisco CCNA Networking II 4 Units***In-Class Hours:* 70 lecture*Prerequisites:* CS V61

This course provides intermediate-level instruction on routing and LAN (local area network) switching, VLANs (virtual local area networks), routing protocols, access control lists (ACLs), and network management. It covers WANs (wide area networks), WANs design, virtual private networking, and network management. Students learn how to deploy a variety of security best practices, and includes automation and programming of network services. The course content is based on the material from the CISCO Network Academy. This course along with the others prepare students for the CCNA (Cisco Certified Network Associate) Certification Exam.

**Grade Modes:** Letter Graded, Student Option- Letter/Credit, Pass/No Pass Grading

**Degree Applicability:** Applies to Associate Degree

**AA/AS GE:** None

**Transfer Credit:** CSU

**UC Credit Limitations:** None

**CSU GE-Breadth:** None

**IGETC:** None

**CS V63 Cisco CCNA Networking III 4 Units***In-Class Hours:* 70 lecture*Prerequisites:* CS V62

This third and last course in the Cisco Certified Networking Associate (CCNA) curriculum provides students with knowledge and skills to describe the architecture, components, operations, and security of large networks. It covers routing protocols, access control list (ACL), network address translation (NAT), wide area network (WAN), WAN designs, virtual private network (VPN), and network management tools. Students learn how to deploy a variety of security best practices including network virtualization, software defined network (SDN), and network automation to program network services. The course content is based on the material from the CISCO Network Academy. This course along with the others prepare students for the CCNA (Cisco Certified Network Associate) Certification Exam.

**Grade Modes:** Letter Graded, Student Option- Letter/Credit, Pass/No Pass Grading

**Degree Applicability:** Applies to Associate Degree

**AA/AS GE:** None

**Transfer Credit:** CSU

**UC Credit Limitations:** None

**CSU GE-Breadth:** None

**IGETC:** None

**CS V90 Directed Studies in Computer Science 1-6 Units***In-Class Hours:* 52.5-315.0 laboratory

This course offers specialized study opportunities for students who wish to pursue projects not included in the regular curriculum. Students are accepted only by a written project proposal approved by the discipline prior to enrollment.

**Grade Modes:** Letter Graded, Student Option- Letter/Credit, Pass/No Pass Grading

**Degree Applicability:** Applies to Associate Degree

**AA/AS GE:** None

**Transfer Credit:** CSU

**UC Credit Limitations:** None

**CSU GE-Breadth:** None

**IGETC:** None

**CS V95 Computer Science Internship I 1-4 Units***In-Class Hours:* 60-240 unpaid cooperative

*Prerequisites:* Completion of or concurrent enrollment in one course in the discipline

*Corequisites:* Enrolled in a minimum of 7 units to include internship

*Enrollment Limitations:* Department Chair approval.

This course offers students who are volunteers (unpaid) an opportunity to obtain work experience related to their field of study. Students are accepted as a result of consultation with a designate faculty member in the discipline and the acceptance of an approved work proposal. This is an unpaid occupational work experience course, where 1 unit of credit is earned for each 60 hours of unpaid internship. A maximum of 4 units can be completed in a semester, and no more than 16 units can be earned in total.

**Grade Modes:** Pass/No Pass Grading

**Repeatable for Credit:** Course may be taken up to 3 times for credit.

**Degree Applicability:** Applies to Associate Degree

**AA/AS GE:** None

**Transfer Credit:** CSU

**UC Credit Limitations:** None

**CSU GE-Breadth:** None

**IGETC:** None

**CS V96 Computer Science Internship II 1-4 Units***In-Class Hours:* 75-300 paid cooperative

*Prerequisites:* Completion of or concurrent enrollment in one course in the discipline

*Corequisites:* Enrolled in a minimum of 7 units to include internship

*Enrollment Limitations:* Department Chair approval.

This course offers students who are employed in the field an opportunity to expand their work experience related to their field of study. Students are accepted as a result of consultation with a designated faculty member in the discipline and the acceptance of an approved work proposal. This is a paid occupational work experience course, where 1 unit of credit is earned for each 75 hours of paid internship. A maximum of 4 units can be completed in a semester, and no more than 16 units can be earned in total.

**Grade Modes:** Pass/No Pass Grading

**Repeatable for Credit:** Course may be taken up to 3 times for credit.

**Degree Applicability:** Applies to Associate Degree

**AA/AS GE:** None

**Transfer Credit:** CSU

**UC Credit Limitations:** None

**CSU GE-Breadth:** None

**IGETC:** None