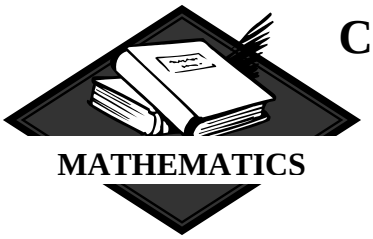
Parent / Student Course Information



MATHEMATICS

ADVANCED PLACEMENT COMPUTER SCIENCE

Counselors are available to assist parents and students with course selections and career planning. Parents may arrange to meet with the counselor by calling the school's guidance department.

COURSE DESCRIPTION
This Java-based, introductory college-level course parallels the shift by colleges and industry toward a more object-oriented style of programming. The course meets the requirements set forth in the syllabus of the College Board. Topics include computer systems, object-oriented program design concepts and implementation, classes, strings, arrays, recursion, data structures, and analysis of algorithms. Standard Java classes and methods will be used. Students will develop Java applications using Sun Microsystems Java Development Kit and applets for Internet use.

PREREQUISITE
Algebra II or Algebra II/Trigonometry

REQUIRED STUDENT TEXTBOOK
Java™ Software Solutions for AP Computer Science A, Second Edition*, John Lewis, William Loftus, and Cara Cocking, Pearson/Addison-Wesley (2007)

RECOMMENDED CALCULATOR
TI-83 Plus or TI-84 Plus

Virginia Beach Instructional Objectives
AP Computer Science A – MA3185

VBO #	Objective
	Introduction to Computer Systems
MA.APCS.1.1	The student will demonstrate knowledge of the historical landmarks in the evolution of computing systems, including key people, types of system software, system hardware components, and major computer languages.
MA.APCS.1.2	The student will be able to distinguish between networks and single-user systems as well as demonstrate conversion mastery between decimal, binary, and hexadecimal systems.
MA.APCS.1.3	The student will be able to demonstrate responsible use of a computer system, including privacy, legal, social, and ethical issues.
	Program Design Concepts
MA.APCS.2.1	The student will be able to identify an object, its characteristics and functions, and discuss the software development process as it relates to object-oriented programming.
MA.APCS.2.2	The student will be able to list various characteristics of program design, identify boundary cases, and generate appropriate test data.
	Program Implementation
MA.APCS.3.1	The student will be able to discuss implementation techniques and compare and contrast built-in primitive data types.
MA.APCS.3.2	The student will be able to create meaningful identifiers, describe string and numeric constants, use arithmetic expressions, including casting, perform interactive input and output, and use import to include packages.
MA.APCS.3.3	The student will be able to categorize errors as compile-time, run-time, or logic, and use various debugging techniques.
	Strings
MA.APCS.4.1	The student will be able to construct and concatenate strings, use string methods, and convert to and from strings.
	Classes
MA.APCS.5.1	The student will be able to implement an object, including its characteristics and functions, and use the software development process as it relates to object-oriented programming.
MA.APCS.5.2	The student will be able to use the characteristics of program design to identify boundary cases and generate appropriate test data.
MA.APCS.5.3	The student will be able to construct objects and supply constructor parameters, invoke accessor and modifier methods, and modify classes.
MA.APCS.5.4	The student will design and use methods and constructors, pass arguments to methods and constructors, and return values from methods.
MA.APCS.5.5	The student will be able to design a class and an interface, test classes and libraries in isolation, and perform integration testing.
	Control Structures
MA.APCS.6.1	The student will be able to construct and analyze Boolean expressions including short-circuit evaluation.
MA.APCS.6.2	The student will be able to design and implement selection and repetition structures.

	Arrays, ArrayLists, and Generics
MA.APCS.7.1	The student will be able to create one-dimensional arrays.
MA.APCS.7.2	The student will be able to initialize named arrays, access individual elements, iterate over the elements, and determine the length of an array.
MA.APCS.7.3	The student will be able to sort one-dimensional arrays using the Selection Sort and Insertion Sort Algorithms.
MA.APCS.7.4	The student will be able to search an array for a specific value using the Sequential Search and Binary Search Algorithms.
MA.APCS.7.5	The student will be able to use wrapper classes and the ArrayList class using Generics.
MA.APCS.7.6	The student will be able to implement the "for each" loop.
	Inheritance, Polymorphisms, and Interfaces
MA.APCS.8.1	The student will be able to implement a class and an interface, test classes and libraries in isolation, and perform integration testing.
MA.APCS.8.2	The student will be able to create hierarchies (inheritance), use and modify abstract classes and interfaces, use super, and cast up and down in an inheritance hierarchy.
	Exceptions, Streams, and Files
MA.APCS.9.1	The student will be able to select an appropriate stream for input and output, construct and open a stream, read from or write to a stream, and handle input/output exceptions.
	Recursion
MA.APCS.10.1	The student will be able to identify the base case and iterative case, implement recursive methods and recursive sorting algorithms, and compare and contrast iterative and recursive algorithms.

VIRGINIA BEACH CITY PUBLIC SCHOOLS
AHEAD OF THE CURVE

MISSION STATEMENT

The Virginia Beach City Public Schools, in partnership with the entire community, will empower every student to become a life-long learner who is a responsible, productive and engaged citizen within the global community.

Dr. James G. Merrill, Superintendent

DEPARTMENT OF CURRICULUM AND INSTRUCTION
2512 George Mason Drive • P.O. Box 6038 • Virginia Beach, Virginia 23456-0038

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For further information on notice of non-discrimination, visit http://wdcrobcolp01.ed.gov/CFAPPS/OCR/contactus.cfm for the address and phone number of the office that serves your area, or call 1-800-421-3481.

Alternative formats of this publication which may include taped, Braille, or large print materials are available upon request for individuals with disabilities. Call or write The Department of Curriculum and Instruction, Virginia Beach City Public Schools, 2512 George Mason Drive, P.O. Box 6038, Virginia Beach, VA 23456-0038. Telephone (757) 263-1070 or (757) 263-1429; fax (757) 263-1424; TDD (757) 263-1240

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