



Santa Rosa City Schools Course Proposal - Advanced Placement Computer Science A

Proposal Submitted By:

Needs Statement: Discuss how this course fits into your Site and/or the District's goals. Attach minutes of meetings where this course was approved at site or district leadership meetings.

As a STEM school, the lack of Computer Science is a serious hole in our course offerings and program. Basic computer science and programming schools will likely be crucial for many students interested in any STEM major, be it for data analysis in a science program, computational analysis in a math program, or modeling and visualization in an engineering program. Computer science tools are at work in every STEM workplace, and though not everyone needs to be an expert in programming, an understanding of the fundamentals that govern technical computing will be a boon to anyone in the 21st century workplace.

Graduation Requirements: Specify which requirement is met. (High School only)

4th year of Math, Math A-G elective.

UC a-g Requirements: Specify which requirement is met. (High School only)

C- Mathematics

Explain the rationale for course addition or modification. How does this fit in with district/site goals. If this course is replacing a current course, which course is it replacing and why? Will this course require new sections? Be explicit.

This course is not replacing an existing course. Students across our district are looking for computer science education and are not able to find it in our schools, and are instead turning to the Junior College. This course will fill the regular demand our students have for high-quality computer science instruction.

Explain the measurable learning outcomes

- 1.A Determine an appropriate program design to solve a problem or accomplish a task (not assessed).
- 1.B Determine code that would be used to complete code segments.
- 1.C Determine code that would be used to interact with completed program code.

- 2.A Apply the meaning of specific operators.
- 2.B Determine the result or output based on statement execution order in a code segment without method calls (other than output).
- 2.C Determine the result or output based on the statement execution order in a code segment containing method calls.
- 2.D Determine the number of times a code segment will execute.

- 3.A Write program code to create objects of a class and call methods.
- 3.B Write program code to define a new type by creating a class.
- 3.C Write program code to satisfy method specifications using expressions, conditional statements, and iterative statements.
- 3.D Write program code to create, traverse, and manipulate elements in 1D array or ArrayList objects.
- 3.E Write program code to create, traverse, and manipulate elements in 2D array objects.

- 4.A Use test-cases to find errors or validate results.
- 4.B Identify errors in program code.
- 4.C Determine if two or more code segments yield equivalent results.

- 5.A Describe the behavior of a given segment of program code.
- 5.B Explain why a code segment will not compile or work as intended.
- 5.C Explain how the result of program code changes, given a change to the initial code.
- 5.D Describe the initial conditions that must be met for a program segment to work as intended or described.

Course Description (To be used in the course catalog)

AP Computer Science A introduces students to computer science through programming. Fundamental topics in this course include the design of solutions to problems, the use of data structures to organize large sets of data, the development and implementation of algorithms to process data and discover new information, the analysis of potential solutions, and the ethical and social implications of computing systems. The course emphasizes object-oriented programming and design using the Java programming language.

Detailed Course Design

(Course design should include the objectives, activities, assessments, and standards to be addressed in this course.)

The course content is organized into ten commonly taught units:

- Unit 1: Primitive Types
- Unit 2: Using Objects
- Unit 3: Boolean Expressions and if Statements
- Unit 4: Iteration
- Unit 5: Writing Classes
- Unit 6: Array
- Unit 7: ArrayList
- Unit 8: 2D Array
- Unit 9: Inheritance
- Unit 10: Recursion

The following big ideas serve as the foundation of the course, enabling students to create meaningful connections among concepts:

- Modularity: Modularity in object-oriented programming allows us to use abstraction to break complex programs down into individual classes and methods.
- Variables: Variables create data abstractions, as they can represent a set of possible values or a group of related values.
- Control: Doing things in order, making decisions, and doing the same process multiple times are represented in code by using control structures.
- Impact of Computing: Computers and computing have revolutionized our lives. To use computing safely and responsibly, we need to be aware of privacy, security, and ethical issues.

Budget- budget figures must be included even if they are an estimate.

Projected Costs	Start-up	Ongoing
Personnel (Not to include classroom instructor unless a new section is needed)	CTE ^{or} /Math Credentialed Teacher	CTE ^{or} /Math Credentialed Teacher
Instructional Material Supplies per student (textbooks, software, etc.)	AP Computer Science A Textbook - Free online course (CS Awesome)	see below ↓

Services (training, equipment maintenance, contracts, etc.)		
Capital Outlay (remodeling, technology, etc.)		
Total Projected Costs	0	\$ 4596.20

Instructional Materials- must include estimate for new materials even if none have been selected. Place in chart above.

Here is an example of 2 texts we could purchase. We would only choose 1.

Type	Publisher	Title	ISBN	Author	Copyright	# Have/Need
		- Introduction to Programming with Java: A Problem Solving Approach \$131.26 https://www.amazon.com/Introduction-Programming-Java-Problem-Approach/dp/007337606X		John Dean and Raymond Dean		Approx. cost would be 35 total needed. Approx. \$4596.20
		-Java: An introduction to problem solving and programming \$133.32 https://www.amazon.com/Java-Introduction-Problem-Solving-Programming/dp/0134462033		Walter Savitch		

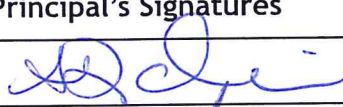

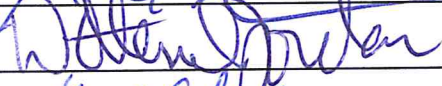
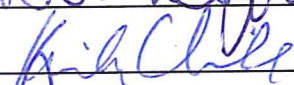
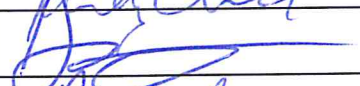
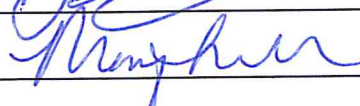
Funding Source(s) for Costs and Instructional Materials

Grants (indicate specific grant and grant timeline)	
Categorical Funds (include related programs)	
Career Technical Education (must be for an approved CTE course)	
Department Funds	
Other (be specific)	

Appendix of Additional Documents

<i>* Required additional documents include meeting minutes where the course was discussed and approved</i>

District Principal Review and Approvals:

Principal's Signatures	Site	Approved / Not Approved
	PHS	approved
	SAHS	Approved
	RHS	Approved
	SRHS	Approved
	M ₂ U	Approved
	MCAS	Approved

District Department Chair Review and Approvals:

Department Chair Signatures	Site	Approved / Not Approved
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Eric J. Bohn	SRHS	Approved
Jon Giacomini	EAHS	Approved
Eric Bohn	SRHS	Approved
DOB Ted Seche	MHS	Approved (Verbal)
MBradylang	MCHS	Approved
na	Ridgway	