AP Computer Science Principles

General Information

Description

This class focuses on preparing students to pass the AP CS Principles exam. The AP CS Principles class has been designed to give students an introductory step into the world of computer science and technology. The class is foundational in nature and covers a wide range of topics from programming, big data, cybersecurity, and some of the societal impacts of technology and computation. Since this course covers many topics in computer science, it is a springboard into many other fields of interest in computer science including software development, AI, and cybersecurity.

Expectations and Outcomes

Rex is dedicated to demonstrating tangible outcomes that change student perceptions of computer science. We use pre and post exams to test students' ability. Our curriculum has a track record of improving AP scores across the board. We also help interested students acquire industry certifications to boost their college and post high school resumes. Here are some additional outcomes:

- Students will become more confident in using technology and computer science in solving problems in the future.
- Students will consider computer science as a possible career path for their futures.
- Students will improve.
- The school will increase the diversity and equity in computer science by offering this course through Rex Academy.
- Students will be able to analyze various artifacts and determine their functions, correct any types of errors, and explain how the artifact works.
- Students will behave ethically and responsibly when using technology.
- Students can articulate how technology affects their lives and how it impacts various parts of our society today, both in a positive and a negative way.

Course Materials

Prerequisites

This course does not have many prerequisites. Most students taking AP CS Principles should have basic typing skills and the ability to navigate the Internet. In addition, understanding Algebra can be beneficial but is not required.

Device Requirements

Rex assumes that each student has access to the Internet and a device that can access the Internet. While phones and tablets suffice, an actual computer is preferred since phones and tablets often have compatibility issues with the screen size.

Additional Information and Resources

Course Length	Delivery Method	Recommended Age Group
180 hours / 2 Semesters	**Online / Classroom**	**High School (Ages 14+)**

Standards Aligned

AP
CollegeBoard

Attention to Equity and Diversity

Rex Academy is dedicated to bringing this course to all interested students, regardless of their backgrounds or the zip code which they reside in.

Since not every school can have access to computer labs, the AP CS Principles course is offered in a browser-based format. That means any device with a simple Internet connection can access these materials, allowing any child from any zip code to access the content. Furthermore, Rex provides 24/7 support and can provide a classroom teacher at the request of a school district to teach the class, thus removing the biggest obstacles associated with teaching computer science, lack of curriculum and the lack of a qualified teacher. Rex is determined to partner with school districts that have been historically underserved and to increase participation among women and minorities in computer science.

Interdisciplinary Instruction

Rex Academy combines technology instructional materials with common core alignment to infuse other disciplines into the curriculum.

Beyond just teaching the basics of computer science, Rex also incorporates other fields of study into its curriculum. In the case of AP CS Principles, we have incorporated math, English, and various degrees of science into some of our problem statements.

Course Syllabus

Unit Number	Topic		Brief Description
Big Idea 1: Creative Development	**Chapter 1: Collaboration** **Chapter 2 - Part 1 - Program Function and Purpose: Scratch Basics** **Chapter 2 - Part 2 - Program Function and Purpose: Sprites and Backdrops** **Chapter 2 - Part 3 - Program Function and Purpose: Custom Backdrop and Sprite** **Chapter 2 - Part 3 - Program Function and Purpose: Custom Backdrop and Sprite** **Chapter 2 - Part 4 - Program Function and Purpose: Costumes and Animations** **Chapter 2 - Part 5 - Program Function and Purpose: Cat and Ghost Project** **Chapter 2 - Part 6 - Program Function and Purpose: Boolean OperatorsUnit 3: Charter Box App** **Chapter 3 - Part 1 - Program Function and Purpose: Variables, Sensing Blocks** **Chapter 3 - Part 2 - Program Function and Purpose: Rotation Styles** **Chapter 4 - Part 1: Lists in Scratch** **Chapter 4 - Part 2: Translate and Text to Speech** **Unit 5: Program Design and Development (SDLC)**		In this section, students will use MIT Scratch to build a series of projects. Along the way, they will collaborate, design, and share their results with each other and the online community.

Unit Number	Topic		Brief Description
Big Idea 2: Algorithms and Programmin g	Chapter 6: Variables and Assignments Chapter 7: Mathematical Expressions Chapter 8: Strings Chapter 9: Boolean Conditions Chapter 10: Iteration Chapter 11: Developing Algorithms Chapter 12: Lists Chapter 13: Procedures and Libraries Chapter 14: Simulations, Efficiency, Undecidable Problems		In this section, students learn the fundamental paradigms of programming and program design. Along the way, they will develop algorithms to solve problems.
Big Idea 3: Big Data	Chapter 15: Binary Numbers Chapter 16: Data Compression Chapter 17: Extracting Information from Data Chapter 18: Using Programs with Data		In this part, students examine how computing systems store and retrieve data. They will also fetch various data sets and use them in their programs and draw conclusions.
Big Idea 4: Computer Systems and Network	Chapter 19: The Internet Chapter 20: Fault Tolerance Chapter 21: Parallel and Distributing Systems		For this part, we examine the Internet and its various features that enable our society to remain connected.
Big Idea 5: Impacts of Computing	Chapter 22: Beneficial and Harmful Effects Chapter 23: The Digital Divide Chapter 24: Computing Bias Chapter 25: Crowdsourcing Chapter 26: Legal and Ethical Concerns Chapter 27: Safe Computing		In the final section, we take a deep dive into the societal impacts (both good and bad) of modern technology. We explore how new innovations have made it possible for a new type of globalization to emerge.

Unit Number	Topic		Brief Description
Exam Preparation	**Chapter 28: Create Your Artifact**		As we approach the end of this course, we help students prepare their artifacts and prepare for the AP CS P Exam.