



PIEDMONT

PIEDMONT HIGH SCHOOL

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Proposal for a New Course

Course Title: AP Computer Science Principles

Department: Computer Science

Grade Level: 10 - 12 Grades

Proposed date of implementation: 2016 - 17

Origin of Request

Teacher: Nathan Mattix

Department: Computer Science

School: Piedmont High School

Date: March 16, 2016

Course Description: (Please write a brief course description)

Mobile Applications Development introduces students to mobile application development. This year-long course will cover many topics not found in other computer science courses, such as: managing lifecycles, databases (including SQLite), background threading, and best practices for memory-efficient coding. This hands-on course will culminate in a final project in which students create and produce a unique application to be published on the Google Play marketplace.

Students will apply their programming skills and knowledge of internet architecture by using the “App Inventor” programming language, developed by MIT and Google, on the Android Operating systems-based phones or tablets.

This course will be modeled after a similar course at Gunn High School, Palo Alto, as well as one developed by Professor Dave Wolber from the University of San Francisco. Prof. Wolber is also a co-author of an online course and professional development materials for the new *Computational Thinking* Advanced Placement (AP) course for US High Schools (mobile-csp.org). Wolber recently completed a sabbatical at MIT where he contributed to the release of App Inventor 2.

The University of San Francisco is currently developing a mobile apps curriculum for high school students (NSA grant) and has offered to help local schools implement this curriculum.

Mobile CSP lesson plans are organized around the *seven big ideas* of the College Board's emerging Advanced Placement (AP) CS Principles curriculum: Creativity, Abstraction, Data, Algorithms, Programming, Internet, and Impact.

Resources:

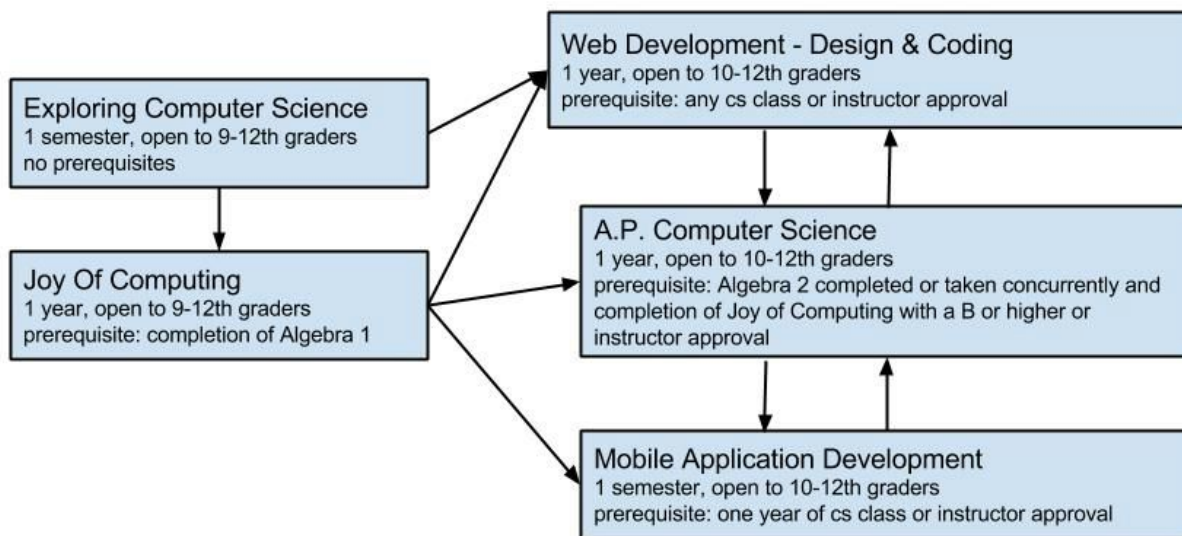
Mobile Computing in App Inventor, by Prof. Dave Wolber
<http://mobile-csp.org/>

Gunn High School, Palo Alto, California
<http://gunn.pausd.org/course/programming-mobile-devices>

Teaching Mobile CS principles, Teacher and other Resources
https://ram8647.appspot.com/teach_mobileCSP/preview
<https://ram8647.appspot.com/mobileCSP/resources>

Advanced Placement Computer Science Principles
<http://apcspprinciples.org/>

Course Sequence Options



1. Needs Statement/Needs Assessment

What need will this course fulfill?

PHS needs advanced computer classes so that students who have completed all the courses we currently offer will have an opportunity for additional more in-depth study. Whether it is 3-D animation, engineering, music, app development, medicine, visual design, robotics, or political analysis, computer science is the engine that powers the technology, productivity, and innovation that drive the world. Computer science experience has become an imperative for today's students and the workforce of tomorrow.

The AP Program designed AP Computer Science Principles with the goal of creating leaders in computer science fields and attracting and engaging those who are traditionally underrepresented with essential computing tools and multidisciplinary opportunities.

How was this need determined?

In the 2013 – 2014 school year, the computer department went through a yearlong review that included teachers, administrators, parents, and students. The need for higher standards and more computer class offerings came out of these discussions. The *Mobile Applications Development* class was part of the recommendation of this group. This has broad support from all stakeholders.

As part of the process of approving the CSTA Standards and subsequent discussions, it was agreed that having a variety of "Topics in Computer Science" courses, would offer the most options to PHS students and engage the underrepresented students in the computer science fields. A Mobile Applications Development course was suggested by CSTA as a possible first course in a series.

Why is this need not be met by the current curriculum?

This course replaces our current semester-long Mobile Apps class. The semester-long class was intended to be a precursor into the new AP Computer Principles class. Computer Science has been rapidly expanding, and the College Board added this new class to meet the educational needs that were not currently being addressed in the existing AP class.

Have you considered other alternatives to meet this need? If so, explain.

We have considered a class with other advanced computer topics but decided on this class based on strong student and parent input and support by the CSTA and the current popularity of mobile devices.

What pre-requisites will there be?

This is an advanced programming class and will require one year of computer programming, either *Joy of Computing* or *AP Computer Science A*, as a prerequisite. Algebra II or Integrated Math 2 is also a prerequisite.

Why do you think this course is the best solution in meeting the need?

Student interest, community support, and the current popularity of mobile devices were all critical variables that yielded this decision. Recently the CSTA held a meeting on high school mobile apps classes at UC Berkeley, and it was strongly urged by local universities (USF and UC Berkeley) that high schools move in this direction.

2. Effect on Other Aspects of the School Program

Since this class is replacing a class that already exists, the effects should be minimal. Initially there probably will be a decrease in size of the current AP Computer Science A class as more students opt to take the new class.

From what other subjects do you anticipate that students will be drawn?

So far we have seen a decrease in enrollment in our Web Design and Web Development courses, which would hopefully minimally impact the enrollment of our other current electives, such as art, music, and dance.

Will the course require specially trained teachers not now on the staff?

We are adapting the course to the curriculum implemented at USF. Professional development offered by the College Board may be necessary.

3. Projected Cost

We have already purchased Android tablets and deployed these for our current Mobile Apps class. There may be additional cost if enrollment is greater than the current enrollment in the semester class. Otherwise, we already have the equipment that we need.

4. Graduation Requirement

How does this course fulfill PHS Graduation Requirements? Is it UC Approved? Which UC Subject Requirement does it meet (a-g)?

This course will fully satisfy the PHS computers graduation requirement.

The course will be submitted to UC and College Board for approval.

5. Similar School Comparison

List any schools similar to PHS that have the particular course as one of their offerings.

Gunn High School in Palo Alto, California has some elements of the proposed course. Schools that currently use the Mobile CSP curriculum are on the East Coast (e.g. Connecticut, Massachusetts).