

# Computer Science at Poly

## Computer Science

Prerequisite: *Open to seniors and juniors.*

**The *Computer Science* introductory course presents students with an opportunity to learn computational thinking and computer programming using the Python language.** Topics of study include problem analysis, data structures, control structures, program design and basic algorithms, supplemented with discussion of some of the legal, social, and ethical issues associated with the use of technology. Assignments consist of short programming exercises, readings, and larger-scale programming projects. In class, each student will need a wireless-capable laptop computer with an Apple, Microsoft, or Linux operating system installed. Some class time will be available for working on assignments, but students will also spend significant time working on projects outside of class.

## Notes

Both this class and the *AP Computer Science* course are considered introductory classes, and this one is the gentler of the two. It's a one-semester inauguration into *computational thinking* and *computer science*, and it uses the Python programming language which was specifically designed as an educational language. The course is technical in nature, of course, but students get plenty of support in this class as they wrestle with the material. No prior programming knowledge is necessary for enrolling in this course. It is ideal for students who want to learn a little bit about programming, but aren't ready to commit to the full year of the more technical AP Computer Science course.

Gender distribution 2015-2016: 8 boys, 4 girls

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## AP Computer Science A

Prerequisite: *Consent of the instructor*

**The *AP Computer Science A* course is designed to provide students with an introduction to topics in computer science and software engineering, including problem analysis, design of algorithms, data structures, control structures, and writing computer programs using the Java programming language.** Advanced topics in the course include object-oriented programming, recursion, and searching and sorting algorithms. The course will be centered on the College Board's *AP Computer Science A* curriculum, with supplementary study of graphical interfaces, game design, design and use of databases, designing and coding for the web, and technology in modern culture. Assignments, projects, and assessments will be both hand-written and coded on computers, and will range from short, individual assignments to long-term, team-based projects. In class, each student will need a wireless-capable laptop computer with an Apple, Microsoft, or Linux operating system installed. Some class time will be available for working on assignments, but students will also spend significant time working on projects outside of class. Taking the AP Examination is a requirement of the course.

## Notes

Both this class and the *AP Computer Science* course are considered introductory classes, with this one the more challenging of the two. It's a one-year exploration of some of the more initial topics in *computer science* and *object-oriented design*, and it uses Java, a popular but relatively technical language. The pace of this course is relatively fast, and it is expected that students will spend more time on their own struggling with the material. Although some students come in to the course having experimented with Python or Java, no prior programming knowledge is necessary. This course is ideal for students who have a passion for computers, who enjoy problem-solving, and who are comfortable committing to a full year of technical study.

Gender distribution, 2015-2016: 11 boys, 8 girls

*See other side for additional courses.*

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# Computer Science at Poly

## Advanced Topics in Computer Science

Prerequisite: *an A- or better in Computer Science or AP Computer Science A and consent of the instructor*

**The one-semester *Advanced Topics in Computer Science* course offers highly motivated students the opportunity to study topics that continue where the introductory Computer Science and AP Computer Science A courses leave off.** Subjects of study include sorting and searching, algorithm analysis with O-notation, stacks, queues, and linked lists, recursion, trees, and graphs. Development of these theoretical topics is reinforced by assignments, projects, and assessments that are hand-written and/or coded on computers using the Python language. (Prior experience with the Python language is helpful but not mandatory.) In class, each student will need a wireless-capable laptop computer with an Apple, Microsoft, or Linux operating system installed. Some class time will be available for working on assignments, but students will also spend significant time working on projects outside of class.

## Notes

This is a new course for the 2016-2017 school year. Either one of the introductory courses—*Computer Science* or *AP Computer Science*—is a prerequisite for taking this course, which is more advanced and abstract, and an excellent option for students leaning towards majoring in computer sciences. The course will begin with a one-week Python "bootcamp" to bring everyone up to speed in that language, and from there we'll immediately jump into the course material.

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*See other side for additional courses.*

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