HOLTON
HOLTON-ARMS SCHOOL

COMPUTER SCIENCE DEPARTMENT

OVERVIEW

It is increasingly obvious that the future of our world is digital, and coding languages are the backbone of that interconnected world. Computer skills are no longer just vocational but rather foundational. No matter what fields graduates enter, computer science is often among the skills necessary to succeed. Learning to code provides students with a rich foundation in integral thinking and problem solving skills that will be valuable for future success, regardless of the pursued discipline. The ability to write and understand code becomes more important in a world where computer programs underlie everything from business, marketing, science, and medicine, to the simplest basic daily activities. The rapid pace of technology change creates a need for students to be taught the underlying principles and concepts upon which digital technology is built. Believing in the strength, intellect and vitality of women in computing, the Computer Science Department teaches students how to leverage the power of the computer to implement algorithms for solving problems and engage in creative self-expression.

UPPER SCHOOL COURSE OFFERINGS

Students entering Upper School are required to complete at least 1 Computer Science credit by the time they graduate. This requirement can be completed by taking one or more of the following courses:

Introduction to Computer Science

Holton's Introduction to Computer Science is a course covering several different areas of computer science including the history of computer science, technology's impact locally and globally, and a light introduction to programming. This asynchronous course is highly collaborative and discussion based with a handful of required readings and videos. The programming portion of the course is taken directly from code.org's CS Principles curriculum. Taking this class will help any student as they navigate an increasingly digital world.

Computer Science: Web Development

Students taking Web Development need not have any prior knowledge of web design, and take Codecademy's free online version of their HTML and CSS tutorials to gain a strong foothold of these markup languages. Students are challenged with mini-projects, which they must complete on *Sublime*, a text editor used by some professional website developers. The course begins by learning the basics – how to insert tags, elements, links, and images – and check for understanding through mini-projects. As we learn a new skill, such as adding fonts, shadowing, formatting, margins, navigation bars, students' ideas for their own final website grow and evolve. Final projects often amaze their peers and teachers alike.

Introduction to Engineering

Introduction to Engineering is a project-based course where students learn about different types of engineering. Students work to solve problems faced by biomedical, civil, and architectural engineers. Basic concepts of the engineering design process, creativity, and teamwork are central to each activity. Students are engaged in hands-on experiences and learn through doing. The course relies on modeling, problem-solving, and documenting the progress of each project through write-ups and video. The course also discusses the ethical choices of engineering and how technology can make an impact on society. Introduction to Engineering is designed to encourage problem solving and communication.

Computer Programming and Robotics

- Trimester elective, offered during the second trimester
- Required for Juniors and Seniors who participate in an engineering internship
- Required for the STEM scholars program

Computer Programming and Robotics focuses on programming, modeling, and problem solving explored through a variety of methods. Students will develop their technical problem solving skills using a variety of software (including MATLAB). Students will use logic, problem solving, and programming techniques to create algorithms and functions to solve challenges. Projects will have a group focus and presentations and report summaries will be required for each project. **(This course is required for students pursuing a science research internship in engineering, but open to all eligible students)**

Approved Computer Science course through One Schoolhouse

- Introduction to Computer Science
- Computer Science by Design: Mobile App Development

COMPUTER SCIENCE FACULTY

Linda Baily
Lower Science, Design Technology
Chair, Computer Science Department

Elizabeth Davis
Introduction to Engineering
Chair, Science Department

Mary Dobroth
Assistant Academic Dean
Computer Science, Upper School and Grade 8

Adri Dobson
Academic Technology
Computer Science, Grade 7

Lucia Hassell
Academic Technology
Design Technology, Grade 6

Mike Robertson
Director, Library and Information Technology
Computer Science, Grade 7

Tucker Sowers
Grade 9 Class Dean
Upper School Mathematics
Computer Science, Upper School and Grade 8