

TRECS: Technology- Robotics, Engineering & Computer Science

Information & Communications Technology

ICT course offerings at Berkeley High School Include:

- ▶ Intro to Computer Programming (P) (CTE)
- ▶ AP Computer Science Principles (P) (CTE)
- ▶ AP Java Computer Programming (P) (CTE)
- ▶ Computer Science IB SL (P) (CTE)
- ▶ Computer Science IB HL2 (P) (CTE)

INTRODUCTION TO COMPUTER PROGRAMMING (P) (CTE)

YEAR · 10 CREDITS

This course includes an introduction to the Python computer programming language and an introduction to web programming using HTML, CSS, Javascript, and JQuery. Students will be able to create sophisticated web sites, gain experience creating functions, conditionals and loops. They will learn to use structured data types such as arrays and strings. Optional topics may include Computer Aided 3D design, 3D printing, robotics or exploring other programming languages such as Ruby, PHP or Java. UC/CSU (g)

AP COMPUTER SCIENCE PRINCIPLES (P) (CTE)

YEAR · 10 CREDITS

Computing is dramatically changing our world, giving us new ways to interact with each other and technology itself. However, using a computer is only a small part of the picture. The real transformative and empowering experience comes when one learns to program, to translate ideas to code. This Advanced Placement course teaches students how to program using Snap! but it teaches more than just how to program. This course provides an excellent opportunity to develop understanding of skills relevant to a broad range of industries. The focus will be on some of the “Big Ideas” of computing, such as abstraction, design, recursion, concurrency, privacy concerns, simulations,

and the limits of computation. In addition the course will look at some of the beautiful applications of computing that have changed the world, talk about the history of computing, and discuss where it will go in the future. Part of the student’s AP score will come from tasks completely of the students’ choosing, on topics most interesting to them. The overarching theme is to expose students to the beauty and joy of computing. **PREREQUISITES:** 10-12 grade or permission of instructor. UC/CSU (g)

AP JAVA COMPUTER PROGRAMMING (P) (CTE)

YEAR · 10 CREDITS

This computer programming course introduces students to core topics in computer science, such as problem solving strategies; designing programs; storing and organizing data in a computer; and informal reasoning about how programs work. The course will introduce students to the basics of the Java programming language, and how it can be used to write programs relevant to data analysis, natural language processing, art, and media (No prior, specific experience in Java is necessary.) This AP course uses Java in preparation for the Advanced Placement Computer Science A Exam. The course introduces students to computer science with fundamental topics that include problem solving, design strategies and methodologies, organization of data (data structures), approaches to processing data (algorithms), analysis of potential solutions, and touches on the ethical and social implications of computing. The course emphasizes object-oriented problem solving and design using the Java language. These techniques represent proven approaches for developing solutions that can scale up from small, simple problems to large, complex problems. Complex programming assignments give students experience in more advanced programming methodology. This course may be taken in preparation for the Advanced Placement Exam in Computer Science. **PREREQUISITES:** previous programming experience or permission of instructor. UC/CSU (g)

KEY TO ABBREVIATIONS: UCOP—University of California Office of the President; “a-g” subjects: (a)—Social Science, (b)—English, (c)—Math, (d)—Lab Science, (e)—Foreign Language, (f)—Visual and Performing Arts, (g)—Elective; (P) or (P-Pending)—UCOP has certified (P) or is considering certification (P-Pending) as fulfilling a requirement for admission; (CTE)—Career Technical Education; (ROP)—Regional Occupational Program; (H)—UC certified honors course; (AP)—Advanced Placement; (IB)—International Baccalaureate.

**IB COMPUTER SCIENCE SL/HL
(P) (CTE)**

YEAR · 10 CREDITS

This course is normally taken over two years (unless otherwise approved by the teacher). Basic topics include system fundamentals, planning, computer organization, hardware, networks, computational thinking, problem-solving and programming. Advanced topics include abstract data structures, resource management, and control systems. Students learn about object-oriented programming using the Java programming language. Students complete a programming project and a case study. This course may be taken in preparation for the International Baccalaureate Computer Science examination. Students will have the option to take the SL test after one year or the HL test in their senior year if they choose to take two years of the class. UC/CSU (g)

Engineering Technology

The Engineering Technology pathway provides learning opportunities for students interested in preparing for careers in the design, production, or maintenance of mechanical, electrical, electronics, or electromechanical products and systems.

ELECTRONIC TECH

YEAR · 10 CREDITS

BUSD is moving on Facilities upgrades to support an Electronic Tech Course. Electronic Tech curriculum is being constructed in coordination with Los Medanos College and in partnership with EBMUD and other regional Utilities. The highly contextualized Applied Math for Electronic Tech course will launch in the new classroom at Berkeley Adult School in Fall 2018. The Electronic Tech & Robotics Courses and ICT pathway students will have access to a Fabrication Lab at that same time.

**INTRODUCTION TO ROBOTICS
ENGINEERING**

YEAR · 10 CREDITS

This robotics course introduces students to robotics and the engineering process. Students will learn how to design, prototype, build, and program VEX EDR robots to complete multiple challenges in the fall. Students can work at their own pace using the VEX Cortex Video Trainer. In the second semester students will use the skills they developed in the fall to build a robot to compete in the VEX Robotics Competition. Throughout the course students will keep an engineering notebook and produce online newsletters highlighting their work. No Prerequisites or Corequisites. Scheduled Afternoon Meeting Times: Tuesday, Wednesday, Thursday after school. UC/CSU (g)

Sample Units from the VEX Cortex robotics curriculum developed by Carnegie Mellon:

- ▶ Overview/Team Building/Engineering Notebooks
- ▶ Safety, Organization and “The Engineering Process”
- ▶ Vex Cortex Robot Set Up
- ▶ The Labyrinth Challenge/Autonomous Robots and Movement
- ▶ The Minefield Challenge/Remote Control
- ▶ The Grand Challenge/Sensing: rangefinding; controlling arm movements; turning using integrated encoders and gyros; and how to follow following a path
- ▶ The VEX Robotics Competition

Building Trades and Construction

Carpentry

With the Fall 2018 completion of a Carpentry shop and Fabrication Laboratory on the BHS campus we will launch the first course in our carpentry pathway.

INTRODUCTION TO CARPENTRY (CTE)

YEAR · 10 CREDITS
The Carpentry Pathway will introduce students to career opportunities within the sector and provide an overview of the planning, design, layout, and technical drawing interpretation for practical use in woodworking, cabinet-making, and millworking. Students will be introduced to the different construction processes in the cabinetmaking, furniture making, and millworking industries. Students will learn to safely use woodworking tools and machines to produce a quality furniture project. Students will also be introduced to carpentry through model design and construction. Safety is stressed throughout the program.

STAGECRAFT (P) (CTE)

YEAR · 10 CREDITS

The Entertainment Technician course introduces and develops students in four departments of entertainment technician expertise; **Rigging, Carpentry, Lighting and Audio-Video**. The course concentrates on fundamental and advanced elements of expertise an entertainment technician must have to succeed and thrive in the broad industry of presenting Performing Arts in its many forms. Strong emphasis is placed on safe working practices for all aspects of producing entertainment presentations. The course departments each require a semester of training totaling 2 years, or 4 semesters to complete the full requirement. Individual departments may be completed for proportional credit, but only the full course will claim a credential and career placement advantage. Coursework includes classroom training on concepts and skills and practical application in an entertainment production environment of those skills to achieve confidence and mastery.

KEY TO ABBREVIATIONS: UCOP—University of California Office of the President; “a-g” subjects: (a)—Social Science, (b)—English, (c)—Math, (d)—Lab Science, (e)—Foreign Language, (f)—Visual and Performing Arts, (g)—Elective; (P) or (P-Pending)—UCOP has certified (P) or is considering certification (P-Pending) as fulfilling a requirement for admission; (CTE)—Career Technical Education; (ROP)—Regional Occupational Program; (H)—UC certified honors course; (AP)—Advanced Placement; (IB)—International Baccalaureate.