

Exploring Computer Science Syllabus

Garfield High School, Fall 2014 semester

Instructor Contact Information:

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Introduction:

Computers are ever-present in our daily lives and continue to bring us innovations and challenges personally and professionally. From the computing power in our cell phones to the personal computer used to access the Internet and do business, from microprocessors that keep our cars running efficiently to the multiprocessors that control and analyze data in hospital instruments, computers are used in practically every industry: communications, medicine, retail, manufacturing, transportation, entertainment and education. It is amazing what computers have been able to accomplish and the future will surely hold many innovations that will continue to improve our lives and the workplace. Gaining an understanding of the concepts of computer science and how these devices can be applied to solve problems is essential to building 21st century skills, productively participating in our society and becoming an effective employee.

Description:

Exploring Computer Science is designed for students who are curious about how computing affects their lives, want to use computers more effectively and may consider becoming technology producers. By exploring the roles we play as consumers, users and ultimately developers of technology, we will learn how computers operate, examine how new computing technologies are invented and explore major programming building blocks by creating games and animations. Throughout the course, we will work to develop problem-solving skills by learning to approach computing challenges systematically and become more comfortable trying out new computer tools.

We will also uncover a variety of different things programmers and computer scientists do by exploring research projects, meeting industry professionals and reading about interesting sub-fields. Understanding who technologists are and how they work is important for everyone as more and more jobs involve computing technology. In addition to these skills and knowledge, this class will teach students safe, legal and ethical behavior to be a good digital citizen.

Course Objectives:

Successful completion of this course and its projects will provide students with a broad understanding of the computing fields.

Skills: Students in this course will be able to:

- identify and discuss the major hardware and software components of a computer system
- think algorithmically, how a computer program processes data
- design and build small scale web sites
- make appropriate use of powerful web 2.0 and mobile phone tools
- discuss the role of computer science in a variety of fields

- assess whether a career in a computing field is interesting to them
- design, implement and debug computer-based solutions to small-scale problems
- recognize the ethical ramifications of software creation and online safety
- *better function professionally in a real world workplace*

Knowledge: Students in this course will know:

- how a personal computer operates and executes programs
- how browsers work to provide access to websites on the Internet
- the syntax of HTML (Hypertext Meta Language) and CSS (Cascading Style Sheet)
- the design process to preview, fix and iterate on a project design until it is correct
- safe practices, legal restrictions, and ethical considerations of online behavior
- the variety of possible career opportunities in technology & computer science
- how computers are used in their preferred field of study and career path

Prerequisite

None, recommended curiosity on how computers, programs and the Internet work

No previous programming course or experience needed! Earns CTE/Occupational Education credits (.5 for the semester class).

Corporate Classroom Environment:

In this Career and Technical Education (CTE) course, the classroom culture will be that of a professional workplace, and students will be treated as responsible employees working together to produce quality products – their assignments and projects. Students will be taught business practices and given significant leadership roles in running the class; this will demonstrate the higher level of expectations and distributed management of a real workplace. Collaboration, innovation, and critical thinking as well as safe technology practices will be stressed to ensure students are developing solid 21st Century skills. Detailed classroom standards, procedures and rules will be established together, discussed and clearly posted. Leadership, employability, and technology skills will be appraised as part of this CTE class. In addition, Students will be expected to follow the new Garfield Way Common Expectations.

Following these guidelines and expectations as well as Garfield HS rules will be required to succeed on classwork assignments. Attendance is directly tied to success in our class and the workplace; it will also be required for full points on classwork and projects as well and to insure their timeliness.

Class Text, Resources and Required Supplies

We will not be using a paper textbook in this class. Instead, I will use the course website (www.garfieldcs.com) to link to readings, lecture summaries, videos and presentations.

Assignment descriptions will also be posted on the website. It will be your responsibility to make sure you either download materials ahead of time or have access to the Internet when you need them. Copies can also be printed from the classroom.

Please be sure to have writing instruments (pens and/or pencils) and a composition book or binder for the class every day to keep your notes and maintain a journal. If you intend to work on your projects outside of school, you will need a flash drive to transport digital files back and forth. You are highly encouraged to backup your work in case a copy become corrupted or lost. Periodically we will be using many different software tools in the course. All of them are installed on the computers in the lab. Most of the software is free and available for anyone to download and use on most any computer. So you can also work at home or anywhere you have full access to another computer.

Class Videos

We will be regularly watching online videos and tutorials, all of which have been pre-screened and viewable through our district supported Clean Video Search (<http://www.cleanvideosearch.com/>) - the most popular are periodic updates from “World Tech Update”. In addition, we typically watch the movie “WarGames” (<http://www.imdb.com/title/tt0086567/>) to discuss several computer topics like security, artificial intelligence, and networking. The movie is rated PG and contains some adult language. Most everything we watch is posted on our daily class web page; so students can view them again and share with friends.

Grading:

Over the course of the semester, you will complete several projects as well as shorter lab exercises. That’s where the learning happens, so these are weighed heavily. Each assignment will be graded according to the criteria listed in the assignment write-up. Paper exams are also an important opportunity for you to demonstrate learning. Points will be distributed between the different categories approximately as follows:

- 40% Daily Class Work: introductory worksheets, lab exercises, attendance, team collaboration, respect, leadership and participation in “Warm Up Exercises”
- 40% Projects: individual and group projects applying the knowledge and skills learned during class work
- 20% Tests and Quizzes: periodic exams that will cover essential content to ensure students are retaining taught concepts and can apply all skills

Final grade will be based on your weighted score following the [Seattle Public School District Grading Policy](#) (PDF).

Daily Class Work:

Class material will be delivered by lessons, demonstrations, group activities, discussions and videos as well as online research and readings. For each new topic there will typically be an introductory worksheet and computer lab exercises to allow students to practice new skills and ensure they fully understand the material. These exercises & worksheets will usually be checked during class to provide more immediate feedback and help guide you to completion. Due dates will be set for these exercises and points recorded for their completion.

In addition, most periods will begin with a “warm up” that is designed to get students thinking about computer science; these will be a variety of activities including introductory questions for a new subject, reflections on recent assignments, brain-teaser puzzles, thoughts about technology in the recent news, or an exercise highlighting a tricky area of the previous day’s lesson. Students will start working individually on the “warm up” as they enter the class, then after the bell and taking attendance, the class will discuss the warm up, sometimes collecting students’ responses for closer examination.

Our Corporate Classroom culture requires students to be respectful of others at all times, contribute in discussions, help each other collaboratively, attend class, and take on occasional leadership roles. A standard set of points may be given weekly reflecting student’s participation in warm up’s and adherence to the Corporate Classroom expectations. Bonus points will be given for outstanding examples supporting our classroom culture.

Projects

You will have several projects to complete during the semester, including a detailed final project on your career interests & technology. Each project's description, due date, and grading rubric will be presented and discussed in class as well as posted on the classroom website. It will be up to you to budget your time – I will give you opportunities to work in class but some may require outside work as well. I will make the lab available for use after school most days so you do not necessarily need your own computer. Most assignments will be turned in electronically through the website.

Exams

You will have pencil and paper quizzes and exams during each unit; the daily class work and projects will well prepare you for these exams. They will include reasoning about computational problems, remembering some terminology as well as short essay questions on topics covered. The semester exam will be comprehensive.

Late Work

- **Exercises, Worksheets:** Ample classroom & computer lab time will be provided to complete these activities during class – like a real job you are expected to be present to do your daily work and your “pay” are the points for the work completed. Unless you have excused absence, late work will not be accepted for these classroom assignments; you will receive points for only what you have completed. Excused absences will be accommodated by extending the due date accordingly, but students are expected to put in an extra effort for their completion so they are prepared for the corresponding Projects and Exams.
- **Projects:** Ample time will also be given to ensure students can complete projects, but some students may need additional time after class to complete larger projects. However if a student goes a week beyond the initial due date their work will receive a fraction of the grade, but students are encouraged to complete all assignments. If you are sick or have an excused absence, you must talk to me before the due date to make appropriate arrangements.

Getting Help

You may sometimes get stuck while working on an assignment for this class – please ask for help, we have additional resources! I will try to make myself available most days after school and you can also usually find me in the room during lunch and 5th period. I encourage you to make an appointment to make sure I'll be there. I will also strive to answer all e-mail within 24 hours.

Feedback

You have a great opportunity to shape the class into something you enjoy by providing lots of suggestions. You can always talk to me before/after class or send me an e-mail at embergquist@seattleschools.org