GNN COMPUTER SCIENCE PROGRAM
2024-2025

- Computer Science is **NOT** just about writing code!

- Believe it or not…Computer Science exists in just about every area of interest! Computer Science may be a wonderful area of exploration for you If you have an interest in some or all of the following:

  - Psychology

  - Art

  - Creative Writing

  - Security

  - Databases/Data Analysis

  - Math & Logic

  - Healthcare

  - Research

  - Finance/Stocks

  - Networking/Internet Infrastructure

- Computing jobs are among the highest starting salaries of any entry-level bachelor degree! (via USNews)

  - Computer Network Architect Median Salary: **$120,520**

  - Software Developer Median Salary: **$120,730**

  - Information Security Analyst Median Salary: **$102,600**

  - Database Administrator Median Salary: **$96,710**

  - IT Manager Median Salary: **$159,010**

- Computing jobs have very high satisfaction rates when compared to other jobs as they are interesting, intellectually challenging and creative!

- Exposing students to computer science education during their high school career gives them critical thinking skills needed for their success in the 21st century and for strengthening the workforce!

Technology is a rapidly advancing field that continues to grow at an exponential rate each and every day. North High is proud to offer several courses offered that help students become accustomed to the field of Computer Science and help them explore their creativity and thinking skills in a new and exciting way.

INTRODUCTION TO COMPUTER SCIENCE I – Fall Semester

Imagine you are on a job interview, and a member of the panel asks you the following:

You have 10 quarters flat on a table, where 8 of them are heads up, and 2 are tails up. You are blindfolded and unable to see the state (which side is up) of each coin. How can we divide the coins into 2 piles such that each pile contains an equal quantity of coins whose state are tails up?

While Computer Science is often associated with software development, the need for problem solving, logic, and communication skills has become critically important in today's society.

To that point, software has also become an integral part of education and society over the past decade. From word processing to cell phone applications, the demand for programmers grows each and every day. This course serves as a platform for students to take an introductory look at how software is developed, from both a logical/design point of view, as well as from a technical and practical point of view. Students will explore the beginning aspects of how to plan to write code while problem solving, read and write code, documentation, debugging, and working in teams to reach a common goal.

The course also allows students to discuss many ethical dilemnas found in the Computer Science world, and learn what types of careers and jobs are available and best suit their interests. Special attention is given to creative thinking, out of the box non-linear problem solving, and algorithm development. The course culminates in a final project where students will use everything they learned over the course of the semester to create an educational piece of software from scratch (Jeopardy, flashcards, etc.). This course can be taken for computer credit and satisfies the computer requirement for graduation.

1/2 unit of credit   **Prerequisite(s)**: Pre-algebra, no prior programming experience required!

INTRODUCTION TO COMPUTER SCIENCE II – Spring Semester

The concepts behind Computer Science help students to plan, think, process, and create. Being able to understand these overarching conceptual themes will unlock many different areas of Computer Science for exploration. The primary coding language in use today is Java, developed by Sun Microsystems. Java is the backbone of everything you see today, from applications to video games. In this course, we will study the beginning conceptual elements required to successfully understand and use Java. Students will be introduced to such concepts as object-oriented programming, algorithm development, and class hierarchies. Additionally, we will investigate mathematical topics such as working in other number systems such as binary and hexadecimal, logic proofs and circuit diagrams, as well as the math behind common encryption algorithms.

1/2 unit of credit   **Prerequisite(s)**: Completion of Computer Science I, Pre-Algebra

ADVANCED PLACEMENT COMPUTER SCIENCE PRINCIPLES – Full Year Course

(offered in 2024-2025)

In contrast to courses solely based on programming, AP Computer Science Principles is an alternative study of the computer science field that focuses on using and understanding technology and programming as a means to develop problem-solving techniques. The course does not focus on a particular programming language or have any programming prerequisites with the intent to make the course more welcoming to a broader student population. Special focus will be given to algorithm development, a detailed understanding of the inner workings of the Internet & data transfer, social and ethical implications of technology, and software engineering. We take a deep look at how human psychology factors into software development, how cybersecurity is quickly becoming the most important issue dealt with on a daily basis, and how to work with incredibly large data sets to analyze so we can draw inferences and make insights. It will also allow students to embrace their creative side with assignments and projects during the year that will factor into their AP Exam grade along with the traditional written exam taken in May. A summer assignment prior to the start of the class is required.

1 unit of credit   **Prerequisite(s)**: Completion of Algebra 1, course open to 10th-12th grades

ADVANCED PLACEMENT COMPUTER SCIENCE A – Full Year Course

(offered in 2025-2026)

Consider the following: to win a contest, you have 20 chances to guess a random number between 1 and 1 million. For each guess, you will be notified if your guess was correct, too high, or too low. Does an algorithm exist such that we can win the contest every time?

These are the types of complicated yet intriguing questions that will be answered in AP Computer Science. This course takes students deep into the infrastructure of the Java language, including memory efficiency, searching and sorting, data structures, and polymorphism. Students will work on challenging real-world lab activities that simulate classic Computer Science problems and mimic actual work environments which provide valuable insight and experience. In May, students will be required to take the AP Exam, which can qualify them for college credits. A summer assignment prior to the start of the class is required.

Students interested in this course should:

- Be familiar with mathematical notation and concepts through the Algebra 2 level and preferably beyond.
- Have formal experience in problem-solving/coding.
- Be able to structure and develop a given topic/problem solution in a logical manner.

Every student will be expected to devote time outside of the classroom setting to work on programming assignments.

1 unit of credit   **Prerequisite(s)**: Completion of Algebra 2, Introduction to Computer Science I and II, and a recommendation from the teacher. Exceptions require permission from the Department Chairperson.