Computer Science A 2025-2026 Course Syllabus

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PCTI STEM Academy
Passaic County Vocational & Technical Schools
Credits: 12.5

Prerequisites: Computer Science Essentials, AP Computer Science Principles are required. It is recommended that students be proficient in English and algebra at the high school level before taking this course. Familiarity with functions and the concepts found in the uses of function notation are important prior knowledge.

Course Description

Computer Science A is a full year high school course that provides opportunities for students to develop an understanding of algorithms and data structures and is equivalent to a one-semester, introductory college course in computer science. Students will practice designing, developing, analyzing and documenting programs independently and collaboratively using the Java programming language. The course blends the College Board Computer Science A, Harvard's CS50x, and additional topics from the Oracle Certified Associate, Java SE 8 Programmer certification content.

All students taking this course will complete the AP Computer Science A Exam on Friday, May 15, 2026 at 12 PM. AP courses can help you stand out in the college application process and give you the opportunity to earn college credit while in high school.

Course Content

Unit 1: Using Objects and Methods

- 1.1 Introduction to Algorithms, Programming, and Compilers
- 1.2 Variables and Data Types
- 1.3 Expressions and Output
- 1.4 Assignment Statements and Input
- 1.5 Casting and Range of Variables
- 1.6 Compound Assignment Operators

- 1.7 Application Program Interface (API) and Libraries
- 1.8 Documentation with Comments
- 1.9 Method Signatures
- 1.10 Calling Class Methods
- 1.11 Math Class
- 1.12 Objects: Instances of Classes
- 1.13 Object Creation and Storage (Instantiation)
- 1.14 Calling Instance Methods
- 1.15 String Manipulation

Unit 2: Selection and Iteration

- 2.1 Algorithms with Selection and Repetition
- 2.2 Boolean Expressions
- 2.3 if Statements
- 2.4 Nested if Statements
- 2.5 Compound Boolean Expressions
- 2.6 Comparing Boolean Expressions
- 2.6E *Switch and Ternary Constructs*
- 2.7 while Loops
- 2.7E. *Do/While Loops*
- 2.8 for Loops
- 2.9 Implementing Selection and Iteration Algorithms
- 2.10 Implementing String Algorithms
- 2.11 Nested Iteration
- 2.12 Informal Run-Time Analysis

Unit 3: Class Creation

- 3.1 Abstraction and Program Design
- 3.2 Impact of Program Design
- 3.3 Anatomy of a Class
- 3.4 Constructors
- 3.5 Methods: How to Write Them
- 3.6 Methods: Passing and Returning References of an Object
- 3.7 Class Variables and Methods
- 3.8 Scope and Access
- 3.9 this Keyword

Unit 4: Data Collections

- 4.1 Ethical and Social Issues Around Data Collection

- 4.2 Introduction to Using Data Sets
- 4.3 Array Creation and Access
- 4.4 Array Traversals
- 4.5 Implementing Array Algorithms
- 4.6 Using Text Files *and Exceptions*
- 4.7 Wrapper Classes
- 4.8 ArrayList Methods
- 4.9 ArrayList Traversals
- 4.10 Implementing ArrayList Algorithms
- 4.11 2D Array Creation and Access
- 4.12 2D Array Traversals
- 4.13 Implementing 2D Array Algorithms
- 4.14 Searching Algorithms
- 4.15 Sorting Algorithms
- 4.16 Recursion
- 4.17 Recursive Searching and Sorting

Unit 5: Inheritance, Polymorphism, and Introduction to C

This unit covers topics that are not assessed on the AP CSA exam but are essential to an introductory course in computer science.

- 5.1 Iteration with Do/While (extension of 2.7)
- 5.2 Switch and Ternary Constructs (extension of 2.6)
- 5.3 Exceptions (extension of 4.6)
- 5.4 Superclasses and Subclasses
- 5.5 Subclass Constructors
- 5.6 Overriding Methods
- 5.7 Super Methods
- 5.8 Inheritance Hierarchies and Polymorphism
- 5.9 Abstract Classes and Interfaces
- 5.10 Introduction to the C Programming Language
- 5.11 Arrays in C
- 5.12 Algorithms in C
- 5.13 Memory: Pointers and Dynamic Allocation in C
- 5.14 Data Structures in C (Structs, Linked Lists, Stacks, Queues, Hash Tables, and Tries)

Unit 5E: Java Certification (Optional Self-Study)

The Java Certification unit is a supplementary set of activities that build on the content in AP CSA Units 1 through 4. The activities discuss additional topics that are included in Oracle Certified Associate certification. After completing AP CSA Units 1 through 4 and this unit, you

should be qualified to take the **Java SE 8 Programmer 1 Exam** and become an Oracle Certified Associate, Java SE 8 Programmer. (*Project Lead the Way PLTW AP Computer Science A course*)

- 5.1 Iteration with Do/While (*extends lesson 2.7*)
- 5.2 Switch and Ternary Constructs (*extends lesson 2.6*)
- 5.3 Formatting and StringBuilder
- 5.4 Calendar Data
- 5.5 Lambda Expressions
- 5.6 Exceptions (*extends lesson* 4.6*)*
- 5.7 Superclasses and Subclasses
- 5.8 Subclass Constructors
- 5.9 Overriding Methods
- 5.10 Super Methods
- 5.11 Inheritance Hierarchies and Polymorphism
- 5.12 Abstract Classes
- 5.13 Interfaces

Technical Skills and Content Proficiencies

Students are encouraged to develop computational thinking skills, professional skills, and problem-solving skills during this course.

Computational Thinking

Computational thinking practices are central to the study and practice of computer science. In this course you will develop and apply these practices on a regular basis:

- **Design Code**—Determine an appropriate program design and develop algorithms.
- **Develop Code**—Write and implement program code.
- **Analyze Code**—Determine the output or result of given program code or explain why code may not work as intended.
- **Document Code and Computing Systems**—Describe the behavior and conditions that produce the specified results in a program.
- **Use Computers Responsibly**—Understand the ethical and social implications of computer use.

Professional Practice and Communication

- Describe career paths within computing.
- Abide by professional standards when creating value for people and society.
- Collaborate when processing information to gain insight and knowledge.
- Apply project management strategies effectively as part of a team.
- Communicate ideas, processes, and products to optimize audience perception and understanding.

Problem-Solving

- Apply a creative development process.
- Acknowledge moments where persistence and the positive aspect of failure played an important role in gaining understanding about a problem.
- Engage stakeholders in a problem and use their perspectives to shape the course of your development.

Classroom Procedures and Guidelines

All students are expected to be consistently cooperative, responsible, attentive, and respectful.

Here are the most important guidelines to follow:

1. Each student must **be on time** and prepared for class.
2. Treat each person in this room with respect and dignity.
3. Follow all routines and procedures in the PCTVS Student and Parent Handbook.

Following guidelines will result in:

- Verbal acknowledgement
- A stress-free learning environment
- A pleasant and orderly classroom atmosphere

Not following guidelines will result in:

- **1st time**: Verbal reminder
- **2nd time**: Verbal reminder / Student teacher meeting in the hallway
- **3rd time**: Phone call or email home / Administrative referral
- **Severe disruption**: Immediate referral to an administrator

Additional guidelines are necessary for a safe and productive working environment. Below are guidelines for entering, moving, or leaving the classroom, grading, academic honesty, "Lunch Lecture", and more:

Entering the Classroom

Class begins when you walk through the door, not when the bell rings. Students should work on the "Do Now" until the lesson starts. The following procedures should be followed when entering the classroom.

- Follow all directions on the board.
- Remain in your assigned seat.
- Work quietly on Bell work/Do Now.
- Fill out your planner with homework.
- Sit quietly and wait for further direction.

When you are tardy:

- Enter quietly.
- Place any excuse or detention slips on the instructors' desk.
- Have a seat and take out your materials.

Moving around the classroom

- Ask permission.
- Do not ask during a classroom discussion unless it is an emergency.

Leaving the Classroom

- Keep bathroom visits to a minimum. Use the restroom before class or during lunch.
- Bathroom visits are prohibited during class's first and last 10 minutes.
- At the end of class make sure you submit your Exit Ticket and wait to be dismissed.
- Class Dismissal
    - The teacher dismisses you, not the bell.
    - Do not start packing up prior to the bell.
    - Wait until the teacher finishes and officially dismisses you with **"Have a nice day!"**

After an Excused Absence

1. Go to Canvas to find and complete and submit the assignment(s) you missed.
2. Submit an extension request if you are unable to complete the assignment on time.
3. Submit the late work and add a private comment to all Canvas assignments explaining why you were unable to complete the assignment on time.

Emergency & Safety Drill Guidelines

1. **Gather personal belongings** in the classroom or within your immediate area.
2. **Close** the **windows** and **doors** of the classroom and **turn off any light.**
3. **Always remain with your class.**
4. **Do not use any electronic communication device** until instructed otherwise.
5. **Listen to the instructions** given from the teacher or staff that in contact with the Command Center

Recitation "Lunch-Lecture" Session Guidelines

- Students are to remain quiet and work on schoolwork only.
- Tables and chairs will not be moved.

- There is no eating and drinking in the classrooms, Lecture Halls, or OLAs.

Grading Guidelines

Students must use the Code HS Integrated Development Environment (IDE) for all programming assignments unless otherwise specified in the assignment directions. No other programming environment is acceptable for use. Please refer to the Academic Honesty Guidelines below for more information.

All CTE courses at PCTVS follow the grading calculation shown below:

Semester	Weighting
Fall Term	25% of final grade
Winter Term	30% of final grade
Spring Term	35% of final grade
Final Exam	10% of final grade

CTE Courses and CTE Electives

Formative Assessments	
Homework/Classwork	5%
Quizzes	10%
Summative Assessments	
Exams	40%
Performance/Projects	45%

Each semester will have a minimum of two assignments in each category (Exams, Performance/Projects, Quizzes, and Homework/Classwork). Additional information about grading can be found in the PCTI STEM Academic Bill of Rights, including how and when to request a reassessment or extension. Forms for requesting reassessments or extensions are located on the Canvas homepage.

Academic Honesty Guidelines

AP CSA will give you opportunities to practice persistence and the positive aspect of failure which plays an important role in life. Collaboration is an essential part of learning in this course. However, there is a line between receiving help and submitting work that isn't yours. Read pages 52-55 of the PCTVS Student and Parent Handbook to understand what plagiarism/cheating is and the consequences of plagiarism. Read page 26 of the handbook to see the infraction chart including consequences of plagiarism.

While generative AI is already a powerful programming tool, you are here to learn to program yourself. You may not use AI-based software (e.g., ChatGPT, Claude, Copilot, Gemini, etc.) to complete work for this course unless I specifically say that you are allowed to in written assignment directions on Canvas. Students must use the Code HS Integrated Development Environment (IDE) for all programming assignments unless otherwise specified in the assignment directions. No other programming environment is acceptable for use.

You may ask classmates and others for help, so long as that help does not reduce to another person or AI doing your work for you. When asking for help, you may show your work to others, but you may not view theirs.

Honesty clause: If you commit some act that is not reasonable but bring it to my attention by emailing dlakind@pcti.tec.nj.us within 72 hours, I may impose penalties for work submitted that are lesser than the otherwise. For example, an alternative assignment you need to complete for partial credit could be accepted but I will not refer the matter for further disciplinary action except in cases of repeated acts.

You should restrict your program code to the Java programming we learn in class. Use of external libraries other than those in the AP Computer Science A Java Quick Reference is not recommended until after the AP Exam in May. You are expected to be able to answer questions about the program code you submit during coding interviews with Mr. Lakind upon request. Failure to reasonably explain your work in a coding interview may result in an Academic Honesty Policy violation and further disciplinary action.

Below are additional guidelines to demonstrate acceptable and unacceptable acts.

Acceptable

- Discussing the course's material with others to understand it better.
- Helping a classmate identify a bug in their code, as by viewing, compiling, or running their code **after** you have submitted that portion of the assignment yourself.
- Communicating with classmates about assessments and properly citing those discussions in your submitted work.
- Turning to the web or elsewhere for instruction beyond the course's own, for references, and for solutions to technical difficulties, but not for outright solutions to assigned work.
- Drafting solutions with others using diagrams, flowcharts or pseudocode but not actual code.

Not Acceptable

- Accessing a solution to an assignment before (re-)submitting your own.
- Providing or making available solutions to assignments to anyone.
- Asking a classmate to see their solution to an assignment before (re-)submitting your own.
- Failing to cite (as with comments) the origins of code or techniques you discover outside of the course's lessons and integrate into your own work.
- Splitting an assessment's workload with another individual and combining your work.
- Submitting (after possibly modifying) the work of another individual.
- Using AI-based software (e.g., ChatGPT, Claude, Copilot, Gemini, et al.) that suggests or completes answers to questions or lines of code.
- Viewing another's solution to an assessment and basing your own solution on it.

This policy has been adapted and modified from the CS50 Academic Honesty Policy to give you more context on the beneficial and harmful effects of getting help from other sources. If you are reading this, so long as you don't violate the Academic Integrity policy by sharing this secret, you will earn one classwork/homework exemption a.k.a. "Lakind Lazy-Learner Leasure License." How do you claim your reward? First, you must not share or be suspected of sharing this secret with anyone until I have given you the award. Second, send me an email with the subject "I've got a golden ticket" to be eligible. This is a limited time opportunity and will expire when supplies are exhausted. What are you waiting for? Go send the email…

Post-secondary Opportunities

This course offers opportunities for college credit and placement as well as industry-valued credentials. Here is how:

College Board Advanced Placement (AP)

This course is aligned with the College Board's AP Computer Science A curriculum and exam. The AP program offers additional Computer Science college and career opportunities including college scholarships and industry internships.

Students are required to take the AP Exam on **Wed, May 7, 2025 12 PM Local** to be eligible for college credit. Your AP scores could earn you college credit or advanced placement (meaning you could skip certain courses in college). Use this tool: (AP Credit Policy Search) to find colleges that offer credit or placement for AP scores.

Dual Enrollment

This course has been granted Dual Enrollment status at Passaic County Community College. Students who score a 4 or 5 on the AP CSA Exam will earn credit for CIS 161: Fundamentals of Computer Science II.

Oracle Java Certification

After completing AP CSA Units 1 through 4 and Unit 5: Oracle Certification Extension, students should be qualified to take students should be qualified to take one of two exams:

- The **Java Foundations Exam** and become an **Oracle Java Certified Foundations Associate**, or
- The **Java SE 8 Programmer 1 Exam** and become an **Oracle Certified Associate, Java SE 8 Programmer**.

PLTW End of Course(EoC) Assessment

PLTW Assessments: High school students who take the new EoC Assessment will receive a detailed score report that highlights their subject-matter knowledge and mastery of in-demand, transportable skills. Students can use their test results to bolster college applications or resumes or can send their score report directly to higher education institutions and employers, who may use it for admissions, scholarships, dual credit opportunities, campus experiences, internships, apprenticeships, industry certifications, and more.

PLTW College and Career Opportunities

PLTW students have exclusive access to a variety of recognition opportunities including scholarships, preferred admission at colleges and universities, internships, industry connections, and other avenues to highlight their achievements.

- **College/university opportunities:** Colleges and universities across the U.S. recognize and reward PLTW students for their great work. These postsecondary institutions recognize PLTW students with scholarships, admissions preference, course credit, and more. PLTW continuously audits and updates this page to ensure the most up-to-date opportunities provided through the **PLTW College and University Partner Network**.
- **Apprenticeships:** Students can search apprenticeship listings from across the country using keywords and/or locations at apprenticeship.gov. Users can filter by location, search radius, and skills, then sort the results by "most recent" or "most relevant" to find the right opportunities for you.
- **Student organizations:** PLTW partners with several student organizations to deepen and reinforce student learning through activities and events:
    - Career and Technical Student Organizations (CTSOs) – **SkillsUSA**, **HOSA-Future Health Professionals**, and **Technology Student Association (TSA)** – offer a variety of career-focused activities, leadership opportunities, and recognition in competitive events. We partner with these organizations to identify the competitions that correspond with PLTW lessons and activities.
    - Many PLTW students get involved in the **VEX Robotics Competition** and online challenges and take advantage of the **REC Foundation scholarships program**.

Learning Standards

NJ Student Learning Standards

8.1.12.CS.4: Develop guidelines that convey systematic troubleshooting strategies that others can use to identify and fix errors.

8.1.12.IC.1: Evaluate the ways computing impacts personal, ethical, social, economic, and cultural practices.

8.1.12.AP.1: Design algorithms to solve computational problems using a combination of original and existing algorithms.

8.1.12.AP.2: Create generalized computational solutions using collections instead of repeatedly using simple variables.

8.1.12.AP.3: Select and combine control structures for a specific application based upon performance and readability, and identify trade-offs to justify the choice.

8.1.12.AP.4: Design and iteratively develop computational artifacts for practical intent, personal expression, or to address a societal issue.

8.1.12.AP.5: Decompose problems into smaller components through systematic analysis, using constructs such as procedures, modules, and/or objects.

8.1.12.AP.6: Create artifacts by using procedures within a program, combinations of data and procedures, or independent but interrelated programs.
8.1.12.AP.7: Collaboratively design and develop programs and artifacts for broad audiences by incorporating feedback from users.

8.1.12.AP.8: Evaluate and refine computational artifacts to make them more usable and accessible.

8.1.12.AP.9: Collaboratively document and present design decisions in the development of complex programs.

9.2 - Career Readiness

• 9.2.12.CAP.2: Develop college and career readiness skills by participating in opportunities such as structured learning experiences, apprenticeships, and dual enrollment programs.
• 9.2.12.CAP.3: Investigate how continuing education contributes to one's career and personal growth

9.3– Career and Technical Education Career Cluster: (IT)

9.3.IT.1 Demonstrate effective professional communication skills and practices that enable positive customer relationships.
9.3.IT.2 Use product or service design processes and guidelines to produce a quality information technology (IT) product or service.
9.3.IT.3 Demonstrate the use of cross-functional teams in achieving IT project goals.
9.3.IT.4 Demonstrate positive cyber citizenry by applying industry accepted ethical practices and behaviors.
9.3.IT.9 Describe quality assurance practices and methods employed in producing and providing quality IT products and services.

9.3– Career and Technical Education Career Cluster: (IT-SUP)

9.3.IT-SUP.9 Employ technical writing and documentation skills in support of an information system.

9.3– Career and Technical Education Career Cluster: (IT-PRG)

9.3.IT-PRG.1 Analyze customer software needs and requirements.
9.3.IT-PRG.2 Demonstrate the use of industry standard strategies and project planning to meet customer specifications.
9.3.IT-PRG.3 Analyze system and software requirements to ensure maximum operating efficiency.
9.3.IT-PRG.4 Demonstrate the effective use of software development tools to develop software applications.
9.3.IT-PRG.5 Apply an appropriate software development process to design a software application.
9.3.IT-PRG.6 Program a computer application using the appropriate programming language.
9.3.IT-PRG.7 Demonstrate software testing procedures to ensure quality products.
9.3.IT-PRG.8 Perform quality assurance tasks as part of the software development cycle.
9.3.IT-PRG.9 Perform software maintenance and customer support functions.
9.3.IT-PRG.10 Design, create and maintain a database.

Life Literacies and Key Skills standards 9.4
With a growth mindset, failure is an important part of success.
9.4.12.CI.1: Demonstrate the ability to reflect, analyze, and use creative skills and ideas (e.g., 1.1.12prof.CR3a). Innovative ideas or innovation can lead to career opportunities.
• 9.4.12.CI.2: Identify career pathways that highlight personal talents, skills, and abilities (e.g., 1.4.12prof.CR2b, 2.2.12.LF.8).
• 9.4.12.CI.3: Investigate new challenges and opportunities for personal growth, advancement, and transition (e.g., 2.1.12.PGD.1).

Critical Thinking and Problem-solving Core Ideas Performance Expectations Collaboration with individuals with diverse experiences can aid in the problem-solving process, particularly for global issues where diverse solutions are needed.
• 9.4.12.CT.1: Identify problem-solving strategies used in the development of an innovative product or practice (e.g., 1.1.12acc.C1b, 2.2.12.PF.3).
• 9.4.12.CT.2: Explain the potential benefits of collaborating to enhance critical thinking and problem solving (e.g., 1.3E.12profCR3.a).
• 9.4.12.CT.3: Enlist input from a variety of stakeholders (e.g., community members, experts in the field) to design a service learning activity that addresses a local or global issue (e.g., environmental justice).
• 9.4.12.CT.4: Participate in online strategy and planning sessions for course-based, school-based, or other project and determine the strategies that contribute to effective outcomes.

International Science Technology Education (ISTE)

1. Empowered Learner. Students leverage technology to take an active role in choosing, achieving and demonstrating competency in their learning goals, informed by the learning sciences
2. Digital Citizen. Students recognize the rights, responsibilities and opportunities of living, learning and working in an interconnected digital world, and they act and model in ways that are safe, legal and ethical.
3. Knowledge Constructor. Students critically curate a variety of resources using digital tools to construct knowledge, produce creative artifacts and make meaningful learning experiences for themselves and others.
4. Innovative Designer. Students use a variety of technologies within a design process to identify and solve problems by creating new, useful or imaginative solutions.
5. Computational Thinker. Students develop and employ strategies for understanding and solving problems in ways that leverage the power of technological methods to develop and test solutions.
6. Creative Communicator. Students communicate clearly and express themselves creatively for a variety of purposes using the platforms, tools, styles, formats and digital media appropriate to their goals.
7. Global Collaborator. Students use digital tools to broaden their perspectives and enrich their learning by collaborating with others and working effectively in teams locally and globally.