

PCAP Certification Prep Syllabus

High School (33 Contact Hours)

Course Overview and Goals

This course prepares students for the Python Institute's PCAP - Certified Associate in Python Programming exam (PCAP-31-03). Students work through modules and packages, exceptions, strings, object-oriented programming, and functional tools and file input and output, covering every objective on the exam syllabus. Each topic is practiced through autograded coding exercises and debugging challenges, and the course ends with three full-length practice exams. Upon completion, students will be able to read, write, and debug intermediate Python programs and be ready to sit for the PCAP certification exam.

Learning Environment

The course utilizes a blended classroom approach. The content is fully web-based, with students writing and running code in the browser. Teachers utilize tools and resources provided by CodeHS to leverage time in the classroom and give focused 1-on-1 attention to students. Each module of the course is broken down into lessons. Lessons may be composed of short video tutorials, interactive learning pages, explorations, simulations, free-response prompts, coding exercises, and quizzes. Each module ends with a comprehensive quiz that assesses students' mastery of that module's material.

Programming Environment

Students write and run Python programs in the browser using the CodeHS editor.

Technology Requirements

All activities and exercises in this course are completed in the CodeHS editor. No 3rd party sites or tools are required.

Prerequisites

This course is designed for students who already know Python fundamentals at the PCEP level. It follows CodeHS PCEP Certification Prep, and students who have completed Introduction to Python Programming are also prepared. Students should be comfortable with variables, conditionals, loops, functions, lists, and basic exception handling. A supplemental PCEP Refresher module is available for students who need a review.

More Information

Browse the content of this course at <https://codehs.com/course/29187/explore>

Course Breakdown

Module 1: Welcome to PCAP Prep (1 day / 1 hour)

Students learn how the PCAP-31-03 exam is structured and create a personal study plan.

Browse the full content of this module at <https://codehs.com/course/29187/explore/module/43152>

Objectives / Topics Covered	• PCAP exam format • Exam objectives • Study planning
Example Assignments / Labs	• Your PCAP Study Plan ◦ Students review the five exam sections and write a study plan that targets their weakest areas.

Module 2: Modules and Packages (1 week / 5 hours)

Students import and explore modules, use the math, random, and platform modules, and build their own modules and packages.

Browse the full content of this module at <https://codehs.com/course/29187/explore/module/43153>

Objectives / Topics Covered	• Import variants • math and random • platform module • User-defined packages
Example Assignments / Labs	• Pick the Right Import ◦ Students choose the correct import form for code that uses math, random, platform, and sys. • Party Planner Math ◦ Students use math and random functions to solve party-planning problems. • Build a System Report ◦ Students write a function that reports system details using the platform module. • Package a Utilities Library ◦ Students build a module with <code>__all__</code> and a <code>__name__</code> guard, then import it from another file.

Module 3: Advanced Exceptions (1 week / 4 hours)

Students handle errors using Python's exception hierarchy, raise and assert their own errors, and define custom exception classes.

Browse the full content of this module at <https://codehs.com/course/29187/explore/module/43154>

Objectives / Topics Covered	• Exception hierarchy • raise and assert • Custom exceptions
Example Assignments / Labs	• Order the Handlers ◦ Students order except clauses from specific to general and add a finally block. • Validate with raise and assert ◦ Students validate input by raising TypeError and ValueError and using assert. • Bank Account Exceptions ◦ Students define an exception hierarchy and raise a custom error when a withdrawal is too large.

Module 4: Advanced Strings (1 week / 3 hours)

Students learn how characters are represented and manipulate strings with indexing, slicing, operators, and built-in methods.

Browse the full content of this module at <https://codehs.com/course/29187/explore/module/43155>

Objectives / Topics Covered	• Character encodings • String operations • String methods
Example Assignments / Labs	• Caesar Shift ◦ Students use ord(), chr(), and the modulo operator to encode and decode a message. • Slice Puzzles ◦ Students solve string challenges using only slicing and the in operator. • Clean the Roster ◦ Students split, strip, sort, and join a messy roster string into a clean list of names.

Module 5: Advanced OOP (1.5 weeks / 6 hours)

Students build and inspect classes, use instance and class variables, and design class hierarchies with inheritance and polymorphism.

Browse the full content of this module at <https://codehs.com/course/29187/explore/module/43156>

Objectives / Topics Covered	• Instance and class variables • Name mangling • Introspection • Multiple inheritance • Polymorphism
Example Assignments / Labs	• Pet Registry ◦ Students use a class variable to count instances and see how an instance attribute shadows it. • Protect the Balance ◦ Students store a balance as a private attribute and expose it through methods. • Multiple Inheritance Mixer ◦ Students combine two parent classes and predict which method runs based on the MRO. • Payroll Polymorphism ◦ Students write subclasses that override <code>pay()</code> or <code>__str__()</code> so one print call behaves differently for each employee.

Module 6: Functional Tools and File I/O (1.5 weeks / 6 hours)

Students write concise code with comprehensions, lambdas, and closures, and read and write text and binary files.

Browse the full content of this module at <https://codehs.com/course/29187/explore/module/43157>

Objectives / Topics Covered	• List comprehensions • Lambdas, map, filter • Closures • Generators • File I/O
Example Assignments / Labs	• Rewrite as a Comprehension ◦ Students replace four for loops with list comprehensions. • Transform the Scores ◦ Students curve, filter, and label test scores using <code>map()</code>, <code>filter()</code>, and lambdas. • Build a Greeter Factory ◦ Students write a function that returns customized greeting functions. • Summarize a Log File ◦ Students read a log file, count each message type, and write a report file.

Module 7: Practice Exams (1.5 weeks / 8 hours)

Students review exam-day strategies and take three full-length, timed practice exams that follow the PCAP-31-03 blueprint.

Browse the full content of this module at <https://codehs.com/course/29187/explore/module/43158>

Objectives / Topics Covered	• Exam strategy • Timed practice exams
Example Assignments / Labs	• PCAP Practice Exams 1-3 ◦ Students complete three 40-question, 65-minute practice exams that match the exam's section weighting, then review their results.

Supplemental Module: PCEP Refresher (as needed / 4 hours)

Students review the PCEP-level skills the course builds on. Teachers can assign individual lessons to students who need a refresher.

Browse the full content of this module at <https://codehs.com/course/29187/explore/module/43372>

Objectives / Topics Covered	• Functions • Classes • Exceptions • File basics • Comprehensions
Example Assignments / Labs	• Function Gym ◦ Students write three small functions that each return a value. • Safe Divider ◦ Students handle division by zero and invalid input with try and except. • Word Counter ◦ Students count the lines and words in a file and write a summary file.