

# KENNEDY-KING COLLEGE

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### Python Fundamentals

#### Instructor Information

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#### Course Information

Semester and Year	Spring 2026
Title	Python Fundamentals
Subject, Category Number, and Section	CE IT 1015
Class Number	67383
Length of Course	8 Weeks / 48 Hours
Form of Course Delivery	Remote Live (Zoom)
Class Meetings Days and Times	Dates: 1/13/2026 - 3/5/2026 Tuesday 6 p.m. – 9 p.m. (3 Hours) Thursday 6 p.m. – 9 p.m. (3 Hours)
Building and Room Number	KK-Zoom

#### Catalog Description:

Welcome to Python Fundamentals - an 8-week comprehensive boot camp designed for students interested in transitioning to machine learning and data science programs.

New to programming? This intensive workshop focuses on fundamental programming concepts and Python essentials that you need before advancing to specialized fields like machine learning. The course provides a solid foundation in both Python programming and professional version control with Git/GitHub.

Python is an extremely popular, general-purpose, versatile coding language with a shallow learning curve, meaning you can accomplish significant tasks with the fundamentals you'll learn in this eight-week program.

#### Course Objectives:

This 8-week boot camp covers:

- Python fundamentals: variables, data types, operators
- String manipulation and formatting
- Data structures: lists and dictionaries
- Control flow: conditionals and loops
- Functions and code organization
- File input/output operations
- Error handling and debugging
- Git and GitHub for version control
- Professional coding practices
- Problem-solving with logic

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- Preparation for advanced topics (ML, data science, web development)

### Student Learning Outcomes:

**Understanding fundamental programming concepts:** Students will develop a solid understanding of programming fundamentals including variables, data types, operators, control structures (loops and conditionals), functions, and best practices for code organization.

**Write and execute Python programs:** Students will be able to write clean, functional Python code to solve problems and execute programs successfully. They will understand Python syntax, structure, and professional coding standards.

**Apply problem-solving skills:** Students will develop computational thinking and problem-solving skills by breaking down complex problems into manageable components and designing solutions using Python. These skills transfer to any advanced programming domain.

**Professional version control:** Students will master Git and GitHub workflows for tracking changes, collaborating on projects, and managing code professionally - essential skills for any tech career.

### DETAILED SESSION BREAKDOWN (8 Sessions)

#### SESSION 1: Python Basics & Git Setup (Week 1 - Tuesday)

##### Python Topics:

- Introduction to Python and why it matters
- Setting up your development environment
- Variables and data types (int, float, str, bool)
- Basic operators (arithmetic, comparison, assignment)
- The print() function and output formatting
- Comments and code documentation
- Writing your first Python programs

##### Git Topics:

- Introduction to version control
- Installing and configuring Git
- Creating your first repository
- Basic Git workflow: add, commit, push
- Understanding Git terminology
- Best practices for commit messages

##### Workshop Activities:

- Create about\_me.py program
- Build a simple calculator
- Initialize first Git repository
- Make first commits and push to GitHub

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### SESSION 2: Strings & Git Workflows (Week 1 - Thursday)

#### Python Topics:

- String creation and manipulation
- String indexing (positive and negative)
- String slicing with [start:end:step]
- Essential string methods
- F-string formatting for modern Python
- String concatenation and repetition
- Working with multi-line strings

#### Git Topics:

- Understanding branches
- Creating and switching between branches
- Branch naming conventions
- Merging branches
- When and why to use branches
- Basic branching workflows

#### Workshop Activities:

- String manipulation exercises
- Text formatting programs
- Create feature branches
- Practice branch workflows

### SESSION 3: Lists & Collaborative Git (Week 2 - Tuesday)

#### Python Topics:

- Understanding lists (ordered, mutable collections)
- Creating and accessing lists
- List indexing and slicing
- Essential list methods
- List operations (sum, min, max, len)
- List comprehensions
- Nested lists (2D structures)
- Statistical operations on lists

#### Git Topics:

- Fork vs Clone explained
- Forking repositories on GitHub
- Creating pull requests
- Code review process
- Keeping forks updated
- Collaboration best practices

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### Workshop Activities:

- Temperature data analyzer
- Shopping list manager
- Data transformation exercises
- Fork repository and create pull request

### SESSION 4: Loops & Iteration (Week 2 - Thursday)

#### Python Topics:

- For loops and iteration basics
- The range() function
- Looping through lists
- While loops and termination conditions
- Break and continue statements
- enumerate() for index + value
- zip() for pairing lists
- Nested loops and accumulator patterns

#### Git Topics:

- Feature branch workflow
- Branch-per-feature strategy
- Working with multiple branches
- Organizing work with branches
- When to merge branches

#### Workshop Activities:

- Training simulator (epoch loops)
- Batch data processor
- Feature normalizer
- Multi-branch Git practice

### SESSION 5: Conditionals & Decision Making (Week 3 - Tuesday)

#### Python Topics:

- If/elif/else statements
- Comparison operators
- Boolean operators (and, or, not)
- Combining conditions
- Nested conditionals
- Membership testing with "in"
- Practical decision-making patterns

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### Git Topics:

- Understanding merge conflicts
- Reading conflict markers
- Resolving conflicts step-by-step
- Creating .gitignore files
- What to ignore in Python projects
- Preventing conflicts

### Workshop Activities:

- Grade calculator
- Number analyzer
- Simple login system
- Create and resolve conflicts intentionally

## SESSION 6: Dictionaries & Data Organization (Week 3 - Thursday)

### Python Topics:

- Understanding key-value pairs
- Creating and accessing dictionaries
- Adding and modifying dictionary data
- Dictionary methods
- Looping through dictionaries
- Nested dictionaries
- When to use dict vs list

### Git Topics:

- Git tags for milestones
- Creating annotated tags
- Semantic versioning (v1.0, v2.0)
- Pushing tags to GitHub
- Using tags for releases
- Managing versions

### Workshop Activities:

- Student gradebook system
- Contact manager
- Inventory tracker
- Tag your projects with versions

## SESSION 7: File Operations & Documentation (Week 4 - Tuesday)

### Python Topics:

- Reading from text files

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- Writing to files (w, a modes)
- Understanding file modes
- Context managers (with statement)
- Working with CSV files
- Error handling for files
- File paths and navigation

### Git Topics:

- Why documentation matters
- Writing clear README files
- Markdown basics
- Documenting your code
- Professional documentation standards

### Workshop Activities:

- To-do list with file storage
- Simple journal application
- CSV data processor
- Write README for your projects

## SESSION 8: Functions & Course Review (Week 4 - Thursday)

### Python Topics:

- Defining and calling functions
- Parameters and arguments
- Return values
- Default parameters
- Variable scope (local vs global)
- Building utility libraries
- Code organization with functions

### Git Topics:

- Complete Python skills review
- Git workflow review
- Best practices summary
- Where to go next
- Resources for continued learning

### Workshop Activities:

- String utilities library
- Math helper functions
- Build complete utility module
- Final comprehensive assessment

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### Prerequisites:

No prior programming experience required. This course is designed for complete beginners who are interested in learning Python and preparing for advanced topics like machine learning.

### Required Text(s) and Material(s):

All course materials provided (PowerPoint lectures, Jupyter notebooks, exercises)

No textbook purchase required

### Supplemental Learning Material(s):

- Python.org - Official Python documentation
- Real Python ([realpython.com](http://realpython.com))
- Google's Python Class ([developers.google.com/edu/python/](http://developers.google.com/edu/python/))
- Git documentation ([git-scm.com](http://git-scm.com))
- GitHub Learning Lab

### Audience:

Students interested in Machine Learning programs, Data Science careers, Software development, and building a programming foundation.

### Grading System:

The course consists of 8 session quizzes, hands-on coding exercises, final assessment, and portfolio of completed projects.

Certificate of Excellence - Awarded for earning 70% or higher

### Methods of Instruction:

Live lectures, live coding sessions, interactive workshops, pair programming, code reviews, and individual practice.

### Methods of Evaluation:

Weekly quizzes, coding exercises evaluated for correctness and quality, portfolio of projects, and final comprehensive assessment.

### Grading Scale:

Pass/Fail

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## **CITY COLLEGES OF CHICAGO** College Policies and Resources

### **Student Code of Conduct:**

Please access documents at [ccc.edu/menu/Pages/Policies.aspx](http://ccc.edu/menu/Pages/Policies.aspx).

### **Academic Integrity and Dishonesty:**

Please access documents at [ccc.edu/menu/Pages/Policies.aspx](http://ccc.edu/menu/Pages/Policies.aspx).

### **Federal and State Statutes and Mandates Americans with Disabilities Act (ADA):**

For more go to ([www.dol.gov/oasam/regs/statutes/sec504.htm](http://www.dol.gov/oasam/regs/statutes/sec504.htm)) or call (773) 602-5278.

### **Federal Family Educational Rights and Privacy Act (FERPA):**

For more information go to [www.ed.gov/policy/gen/guid/fpcos/ferpa/index.html](http://www.ed.gov/policy/gen/guid/fpcos/ferpa/index.html).

### **Resources for Student Success:**

To learn more about services available visit:

<http://www.ccc.edu/colleges/kennedy/Pages/Current-Students.aspx>.