VGURU TECH ACADEMY

Python Programming

Course Syllabus

Level: Beginner

Part 1: Course Description

This course introduces young learners to Python programming, focusing on basic concepts like simple commands, variables, loops, and data types. Through interactive storytelling and creative graphics, students will engage in fun activities, learning to write simple Python programs and develop basic problem-solving skills. The course culminates in a small project, allowing students to showcase their newfound abilities.

Part 2: Student Learning Outcomes & Objectives

Student Learning Outcomes

- Understand basic programming concepts
- Write simple Python programs
- Develop logical thinking and problem-solving skills

Course Objectives

To introduce young learners to the world of programming through Python, focusing on fundamental concepts and fun activities to spark interest in coding.

Part 3: Topic Outline

Prerequisites

- Basic computer skills
- Ability to read and follow simple instructions

➔ Session 1: Introduction to Python
  - ◆ What is Programming?
  - ◆ Introduction to Python

➔ Session 2: Playing with Python
  - ◆ Basic Python commands
  - ◆ Interactive storytelling

➔ Session 3: Variables and Data Types
  - ◆ Understanding variables
  - ◆ Data types: Strings and Numbers

➔ Session 4: Fun with Loops
  - ◆ Introduction to loops
  - ◆ Creating repetitive patterns

➔ Session 5: Conditional Statements
  - ◆ If-else statements
  - ◆ Simple decision-making games

➔ Session 6: Creative Graphics
  - ◆ Drawing with Turtle Graphics
  - ◆ Basic shapes and colors

➔ Session 7: Introduction to Functions
  - ◆ What are functions?
  - ◆ Creating and using simple functions

➔ Session 8: Project Work
  - ◆ Building a small interactive game/story
  - ◆ Review and showcase projects

Level: Intermediate

Part 1: Course Description

Designed for students with basic Python knowledge, this course delves into more complex concepts such as advanced data types, nested loops, and functions. It emphasizes enhancing problem-solving and debugging skills through practical applications like file handling and data manipulation. The course concludes with a collaborative project, where students apply their skills to develop a small application.

Part 2: Student Learning Outcomes & Objectives

Student Learning Outcomes

- Write more complex Python programs
- Understand and use data structures
- Develop debugging and problem-solving skills

Course Objectives

- To build upon the foundational knowledge of Python, introducing more complex concepts and encouraging creative problem-solving

Part 3: Topic Outline

Prerequisites

- Completion of beginner-level or basic understanding of Python
- Ability to write and understand simple Python code

➔ Session 1: Deep Dive into Data Types
  - ◆ Lists and Tuples
  - ◆ Manipulating data structures

➔ Session 2: Advanced Loops and Conditional Statements
  - ◆ Nested loops
  - ◆ Complex conditions

➔ Session 3: Fun with Strings
  - ◆ String manipulation
  - ◆ Creating word games

➔ Session 4: Exploring Dictionaries
  - ◆ Introduction to dictionaries
  - ◆ Real-world applications

➔ Session 5: Intermediate Functions
  - ◆ Parameters and return values
  - ◆ Modular programming

➔ Session 6: Error Handling
  - ◆ Understanding errors
  - ◆ Basic exception handling

➔ Session 7: File Handling
  - ◆ Reading from and writing to files
  - ◆ Data persistence

➔ Session 8: Intermediate Project
  - ◆ Developing a small application
  - ◆ Collaborative coding and review

Level: Advanced

Part 1: Course Description

Aimed at students with a solid Python foundation, this advanced course covers sophisticated topics like object-oriented programming, advanced functions, and Python libraries. Students will explore data visualization, web scraping, and GUI programming, applying these skills in real-world scenarios. The course culminates in a capstone project, where students develop and present a comprehensive application, demonstrating their in-depth understanding of Python.

Part 2: Student Learning Outcomes & Objectives

Student Learning Outcomes

- Master advanced Python concepts
- Develop complex programs and algorithms
- Gain an understanding of real-world applications of Python

Course Objectives

- To refine and expand Python skills, focusing on advanced topics and real-world applications, preparing students for more sophisticated programming challenges.

Part 3: Topic Outline

Prerequisites

- Completion of Intermediate Level or strong understanding of Python basics
- Familiarity with complex data types and control structures

- ➔ Session 1: Advanced Data Structures
  - ◆ Sets and Frozen sets
  - ◆ Advanced list comprehensions
- ➔ Session 2: Object-Oriented Programming
  - ◆ Classes and Objects
  - ◆ Inheritance and Polymorphism
- ➔ Session 3: Advanced Functions
  - ◆ Lambda functions
  - ◆ Decorators and Generators
- ➔ Session 4: Working with Libraries
  - ◆ Introduction to Python libraries
  - ◆ Using libraries like NumPy and Pandas
- ➔ Session 5: Data Visualization
  - ◆ Graphing with Matplotlib
  - ◆ Basic data analysis
- ➔ Session 6: Web Scraping and Automation
  - ◆ Introduction to web scraping
  - ◆ Automating simple tasks
- ➔ Session 7: Introduction to GUI Programming
  - ◆ Building basic GUI applications
  - ◆ Event-driven programming
- ➔ Session 8: Capstone Project
  - ◆ Developing a comprehensive application
  - ◆ Presentation and peer review