Computational Thinking using Python

Course Objectives
This course will enable participants to:

- Understand basic concepts of computational thinking
- Introduction to python programming
- Able to write single line statements of code
- Perform fundamental data analytics

Who Should Attend
This course is designed for learners with no experience in programming or coding, and would like to experience and learn how to code at foundation level.

This course is also a pre-requisite for learner who would like to learn how to use Python for data analytics work.

Pre-requisites
No technical / coding / programming background needed

Course Duration
2 Days / 14 Hours

Course Outline
1. **What is Computational thinking?**
   - Logical Problem Solving
   - Decomposition
   - Pattern Recognition
   - Abstraction
   - Algorithm

2. **What is and why use Python?**
   - Introducing Programming and programming languages
   - Introducing Flowcharts
   - Source code
   - Structure your coding using flowchart

3. **Introducing Python**
   - Explain Variables, Constants, Data Types, Data Structures
   - Explain Assignment statements and program structures
   - Explain Control Flow such as Decision Structures, Loop Structures etc
     - While
     - For
   - Explain Functions
     - Reuse coding using Functions
   - Explain Exception handling
Learning Outcomes for Day 1

1. Understand basic concepts of computational thinking
2. Introduction to software development and programming
3. Able to write single line statements of code

Day 1
Data Analytics: Programming fundamentals

1.1 What is Computational thinking?
1.2 Introduction to general software development
1.3 Introducing Algorithms
1.4 Introducing Flowcharts
1.5 Introduction to programming and programming languages
1.6 Introducing Python

- Variables, Constants, Data Types, Data Structures
- Assignment statements
- Using printf()
- Get inputs from screen and display
- Expressions and comments
- Conditionals operators, syntax, assignment – Arithmetic operators, bitwise operators, comparison operators, Boolean operators and operator precedence
Learning Outcomes for Day 2

1. Introduction to problem solving using programming
2. Able to write basic command lines for execution of desired output
3. Able to write scripts to perform simple data analytics
4. Hands-on practices to complete

Day 2

2.1 Structured data types - dictionary, tuples, arrays, sets, lists, mixed structures
2.2 Strings – formatting, splitting, joining, methods
2.3 Loops – while, for, switch, if else, additional controls
2.4 Functions – definitions, arguments, return values, parameter parsing, generators, decorators
2.5 Built-in functions – numeric, string, container
2.6 File I/O operations – read, write, path directories
2.7 Modules and database – types of files such as flat files, text files, excel
2.8 Exception handling – errors
Data Visualisation using Python

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Course Outline

Learning Outcomes for Day 1
Data Analytics: Visualisation fundamentals

- Introduction to Statistics, Regression etc
- Explain Libraries/Packages
- Describe Programming Best Practices and its Importance
- Cleaning and preparation of data
- Work on testing and debugging codes
- Presentation of data
- Demonstrate some best practices
- Hands-on Practices
  - Formulate Mathematics problems
  - Interpret survey results for dynamic business environment
  - Decision making for HR on employee analytics
  - Trending information on price and volume for stock market