



Course Content

Course Description:

Programming is becoming increasingly essential for biologists of all types. This course is written with examples and exercises that use biological problems. Python has many features and this course will address those features that are most important to a biologist such as DNA and protein sequences.

Deliver Method:

This course is delivered through a mix of instructor-led training (ILT) and hands-on labs.

Topics:

Introduction:

- Setting up your environment
- Editing and running Python programs

Printing and Manipulating Text

- Why are we so interested in working with text?
- Printing a message to the screen
- Quotes are important
- Use Comments to annotate your codes
- Error messages and debugging
- Printing special characters
- Storing strings in variables
- Tools for manipulating strings

Reading and writing files

- Why are we so interested in working with files?
- Reading text from a file
- Files, contents and filenames
- Dealing with newlines
- Missing files
- Writing text to files
- Closing files
- Paths and folders

Lists and Loops

- Why do we need lists and loops?
- Creating lists and retrieving elements
- Working with list elements
- Writing a loop
- Indentation errors
- Using a string as a list
- Splitting a string as a list
- Splitting a string to make a list
- Iterating over lines in a file
- Looping with ranges

Writing our own functions

- Why do we want to write our own functions?
- Defining a function
- Calling and improving our function
- Encapsulation with functions
- Functions don't always have to take an argument
- Functions don't always have to return a value
- Functions can be called with named arguments
- Function arguments can have defaults
- Testing functions



Python for Biologist

Course ID #: 1411-906-00-W

Hours: 21

Conditional tests

- Programs need to make decisions
- Conditions, True and False
- If statements
- Else statements
- While loops
- Building up complex conditions
- Writing true/false functions

Regular expressions

- The importance of patterns in biology
- Modules in Python
- Raw strings
- Searching for a pattern in a string
- More ways to use patterns

Dictionaries

- Storing paired data
- Creating a dictionary
- Iterating over a dictionary

Files, programs and user input

- File contents and manipulation
- Basic file manipulation
- Running external programs
- Running a program
- Capturing program output
- User input makes our programs more flexible
- Interactive user input
- Command line arguments