

## Intro to Python (Part 1)

**Workshop Lead:** Benjamin Rudski

**Facilitator:** N/A

**Registration link:** <https://involvement.mcgill.ca/event/273420>

**Approximate duration:** 2 hours

**Prerequisites:**

- Basic computer science knowledge of data types and control structures.
- No prior programming experience is required, but knowing another language may help.
- To be able to participate in the exercises, participants must either:
  - Have a local installation of Python and Jupyter notebooks. Microsoft Visual Studio Code with the Python extension installed can also be used to run the Notebook.
  - Have a Google Account (to run in-browser as a Colab notebook)

**Summary: (2-3 sentences summarizing the workshop)**

In this 2-hour workshop, participants will be introduced to the basics of programming in Python. Students will journey from the basics of creating variables to writing code that can perform simple tasks. This workshop will teach participants how to write simple programs in Python and understand basic existing code.

**Learning Objectives: (List 3-5 learning objectives participants will learn upon completion of this workshop)**

1. Store data in variables and collections.
2. Perform basic operations on these data.
3. Use control flow and loops to write powerful code.

**Content:**

**1. Module 1 – Introduction to Python (10 minutes)**

- a. Welcome to Python
  - i. What is Python?
  - ii. Python Installations
  - iii. Tools for Using Python

## **2. Module 2 – Python Basics (45 minutes)**

- a. Foundations of Python - A Brief Overview of Types and Variables
  - i. Primitive Data Types (int, float, bool, string)
  - ii. Variables
  - iii. Collection Data Types (tuples, lists, dictionaries)
  - iv. Introduction to Functions (Function as a Machine)
- b. Numbers and Comparisons
  - i. Mathematical Operations
  - ii. Booleans
- c. Intro to Control Flow and Loops (if, while and for)
  - i. Control Flow: the if Statement
  - ii. while Loops
  - iii. Iteration with for Loops
- d. Exercise: Numbers and Loops for Unit Conversion

## **3. Module 3 – Strings and Collections: An Object Primer (45 minutes)**

- a. Introducing Objects
  - i. What is an Object?
- b. Introducing the String!
  - i. String Slicing
  - ii. String Methods (concatenation and string formatting, converting strings to numbers, find and replace)
- c. Introduction to Tuples, Lists and Dictionaries
  - i. Tuples and Tuple Unpacking
  - ii. Lists and List Methods (adding, removing, slicing)
  - iii. Dictionaries (Key-Value storage, accessing, adding, removing)
- d. Exercise: Working with Strings and Collections for DNA and Protein Processing

## **4. Module 4 – Where to go from here (10 minutes)**

- a. What to learn next? How?
- b. How to get help and how not to get help
  - i. Your code editor
  - ii. Documentation
  - iii. Books
  - iv. Tutorials
  - v. Stack Overflow (and pitfalls)
  - vi. ChatGPT (and pitfalls)
- c. Glimpse of other cool programming topics