

Python is a programming language that has become increasingly popular by virtue of its simplicity and capability. It is used extensively by MNCs such as Google, Yahoo, Amazon top in the areas of data mining and data processing.

The Dept. of Physics, SSSIHL conducted a workshop on **Python for Scientific Computing** on 30-31 March 2018 for Undergraduate Teachers at the Brindavan Campus. The workshop focused on **python for education and research**. Python as a tool for using plots, visualizations and simulations, and advanced functions such as molecular dynamics and quantum simulations will helps teacher and researchers alike.

The workshop was conducted by SSSIHL Alumni currently working in industry or pursuing research. They included:

Srinivas K, Associate Data Engineer, Capital One, Bangalore
Siva Sundar A, Design/Development Engineer, IBM
Mit Naik, candidate for Ph.D. Dept. of Physics, IISc, Bangalore
Guru Swaroop, Software Engineer, Applied Materials
Sai Shravan, Data Analyst, HSBC Data Processing, India
Adarsh Saraf, Software Engineer, Research, IBM
Vijeth B Vijayakumar, Data Analyst, HSBC
Amrit Kumar, Graduate Engineer – Verification, ARM

30 MARCH

The workshop was spearheaded by **Srinivas K**, who coherently introduced the **concept of programming and python as a computer language** during the first morning session. This included hands-on training on Canopy IDE for python for all the participants. Basic python topics such as printing, fundamental data types, user inputs and arithmetic operations were covered in this session. This was ably supported by a team of volunteers.

The afternoon session had two parallel sessions running, one for those who are new to programming and other for those who have some exposure to a programming language such as the C language.

The **session for the beginners** was led by **Srinivas K**, re-enforcing the basic concepts done in the morning session. An introduction to the **concept of loops, lists, tuples and dicts in python** was also given with emphasis on ‘thinking like a programmer’. The participants were made to code relevant examples.

The **session for those who had exposure to a programming language** was led by **Adarsh Saraf**. This session began with a quick **overview of the syntaxes of loops, lists, tuples and dicts and some advanced examples**. Basic file handling was also covered. Participants were made to code an example that involved counting and sorting the words of a large text file involving all the works of Shakespeare. Emphasis was laid on the fact that while python could achieve the same result in just a few lines of code, other programming languages, such as C, would probably require hundreds of lines of code.

31 MARCH

Following a brief review of the concepts covered in the previous day, the morning session began with **Pandas Module in python** led by **Vijeth B Vijayakumar**. Participants were made to **code a sample program** which was to read data from a CSV file titled ‘titanic’. This file contained the data of the passengers of the famous ship ‘titanic’. Data included details such as age, gender, class of travel, etc. Simply by processing the data of this file, one could obtain useful statistical conclusions, such as: The most number of people who were saved were the ones who held a first class ticket.

The afternoon session had two parallel sessions.

The teachers from the Departments of Chemistry & Biosciences had a **session on Pymol and Biopython**. This session was an introduction to advanced topics such as molecular modelling and genome sequencing, thus opening up the versatility of the programming language to the participants. This was led by Srinivas K.

The teachers from the Departments of Physics, Mathematics and Management & Commerce had a **session on the use of numpy, scipy and matplotlib modules in python**. The session initially focussed on basic plotting using common examples such as the sine wave and its harmonics. Subsequently, the participants moved on to have a feel of advanced topics such as the matrix manipulations, eigenvalue equations, Fast Fourier Transform (FFT) and Numerical Integration. This was led by Mit Naik.

The volunteers were very well prepared with the content of the workshop. Computers were pre-loaded with the relevant software (Canopy) and the necessary data. Tremendous effort and dedication from the volunteers ensured that they delivered the most important take-away of the workshop to the participants, i.e. the confidence to explore python further to suit their individual needs.

