# **Short Term Skill development course**

This course is targeted towards students, researchers and data science practitioners who are interested in starting or have already started their data science and software engineering journey with Python. In this short-term skill development course students will be able to understand the fundaments of working with Python. Additionally, students will get an opportunity to enhance their problem-solving skills that will assist them in becoming better software developers, researchers, and data scientists.

The skills learnt in this course can then be used to tackle various challenging problems that are faced while building software development solutions. We start this course by reviewing basis of programming such as variables, loops, methods, user defined data types, exceptions and object-oriented programming concepts. We then look at how to start working with data (csv and excel) in python and also look at data handling libraries such as numpy and pandas.

The databases can store a large number of records efficiently and also the searching and retrieving data is faster. The course also introduces to basics of designing the frontend in python and connecting it to a relational database and NoSQL database (Neo4j).

In the later part of this course, we use the concepts learnt in initial lectures to develop several projects. Our main goal while working on these projects is to take a top-down approach for software development. We start by looking at the system design of the project and observe how various entities of the project are logically linked to one another. In order to create the system design, we look at various architectural and design patterns such as Model-View-Controller (MVC), Model-View-ViewModel (MVVM), Model-View-Presenter (MVP) and Extract-Transform-Load (ETL). We create several project specific system designs which are used to develop the project in Python. We also follow the principles such as system design remodification and code refactoring for further modifying the solution. Along we look at various challenges that are faced in real life software development lifecycle. This assists in building robust data centric software that are readable, manageable, maintainable, scalable and efficient.