

1. Duration of Courses and Other Details

This proposal is to start under mentioned six certificate courses for the time being.

- ❖ Introduction to Python Programming (IPP)
- ❖ Data Analysis using Python (DAPy)
- ❖ Data Science Using R (DSR)

The course is named as “Three Months Certificate Course in *specified subject*”.

Duration: These courses will be of 3 months duration starting from March/April 2018.
There will be 25 hours class from Monday to Friday (working days) this includes 8 Hours Theory, 12 Hours Practical and 5 Hours Self Practice.

Intake: Intake of students will be 30.

Fee Structure: The fee for each certificate course is INR 15000.00.

The university will provide certificate on completion of certificate course on its behalf. In case a certification from the proprietor is required, the candidate will submit fee to the concerned certifying issuing authority on his/her behalf and appear for that specific examination separately.

Entry Level: The candidate must have passed Bachelors degree in computer science/computer science engineering and information technology. The students graduated from other streams will have to pass bridge course of 3 months duration before joining these courses. The curriculum of the bridge course updates the enrolling students with mathematics and computing skills.

The candidate will be using his/her own laptop for practical sessions. The internet connectivity will be provided 24/7 in the Guru Kashi campus premises.

Introduction to Python Programming (IPP)

Introduction to Python: Python Installation and Working with Python Understanding Python variables Python basic Operators Understanding python blocks.

Data Types: Declaring and using Numeric data types: int, float, complex Using string data type and string operations Defining list and list slicing, Use of Tuple data type.

Program Flow Control: Conditional blocks using if, else and elif Simple for loops in python For loop using ranges, string, list and dictionaries Use of while loops in python Loop manipulation using pass, continue, break and else Programming using Python conditional and loops block.

Functions Modules and Packages: Organizing python codes using functions Organizing python projects into modules Importing own module as well as external modules Understanding Packages Powerful Lamda function in python Programming using functions, modules and external packages.

String List and Dictionary Manipulations: Building blocks of python programs Understanding string in build methods List manipulation using in build methods Dictionary manipulation Programming using string, list and dictionary in build functions.

File Operation: Reading config files in python Writing log files in python Understanding read functions, read(), readline() and readlines() Understanding write functions, write() and writelines()

Manipulating file pointer using seek Programming using file operations.

Data Analysis using Python (DAPy)

Introduction to Data Science: Common Python functionality and features for data scientists use, Common functionality and features of Jupyter Notebook.

Data Cleaning and Processing using python toolkit, Loading, saving files using pandas. How to read data into DataFrame structures, how to query these structures. Understanding of the python pandas library, Merge DataFrames, Generate summary tables, Group data into logical pieces and manipulate dates. Understanding of scales of data, issues with creating metrics for analysis.

Introduction to a variety of statistical techniques viz distributions, sampling and t-tests. Working on project starting with data cleaning activity and developing hypothesis. Testing knowledge of cleaning, merging, manipulating, and testing for significance of data.

Data Science Using R (DSR)

Introduction to Business Analytics, Types of Analytics, Data Science and its importance, Introduction to R, Installing R, Installing R Studio, R Packages, R Programming, if, for, while, repeat, break, next, switch, scan statements, Executing the commands in a File, Data Structure, Vector, Matrix, Array, Data frame, List, Factors, Functions, DPLYR & apply Function, Import Data File, DPLYR, Selection, Filter, Arrange, Mutate, Data Visualization in R, Bar chart, Dot plot, Scatter plot, Pie chart, Histogram and Box plot, Heat Maps.

Introduction to Statistics, Distance Measures, Euclidean space, Manhattan, Minkowski, Cosine similarity Mahalanobis distance, Pearson's correlation coefficient, Probability Distributions, Hypothesis Testing, T Test, Anova, Testing about population, Chi Square Test, F distribution and F ratio, Regression Analysis, Linear, Non-linear Regression Models,

Classification, Decision Tree, Logistic Regression, Bayesian, Support Vector Machines, Clustering, K-means Clustering, DBSCAN Clustering, Hierarchical Clustering, Association, Apriori Algorithm, Candidate Generation, Visualization on Associated Rules