

**Vikram University, Ujjain**

**Board of studies in Computer science (Faculty of Engineering Science)**

**SYLLABUS of**

**Certificate Course in Python for Analytics**

**Exclusively for University Teaching Department (ICS,VUU)**

**Certificate Course in Python for Analytics**

**PROGRAMME of UTD (ICS,VUU)**

**(Effective from Academic Session 2020-21)**

## **Certificate Course in Python for Analytics**

### **Objective of the Course**

Certificate in Python for Analytics is a unique 90 days programme offered by Institute of Computer Science, Vikram University, Ujjain is an excellent blend of knowledge and practice in the field of Python Programming and its industrial applications. The program is targeted for creating qualified Python Professionals. The programme also equipped with strong analytical and programming prospects.

**Duration of the Course (in days):**90 days

**Minimum Eligibility Criteria and pre-requisites, if any:** 10+2 pass with knowledge of basics of Computers

### **COURSE STRUCTURE**

#### **Certificate Course in Python for Analytics**

<b>Paper code</b>	<b>Title of Paper</b>	<b>Theory External Marks</b>	<b>Min. Pass marks</b>	<b>Internal Marks</b>	<b>Min. Pass marks</b>	<b>Total</b>
<b>CPA-101</b>	<b>Introduction to Data Analytics</b>	<b>75</b>	<b>27</b>	<b>25</b>	<b>09</b>	<b>100</b>
<b>CPA- 102</b>	<b>Python for Analytics</b>	<b>75</b>	<b>27</b>	<b>25</b>	<b>09</b>	<b>100</b>
<b>CPA-103</b>	<b>Internship/Industrial Training/Project Work</b>	<b><u>150</u></b>	<b><u>54</u></b>	<b>50</b>	<b>28</b>	<b>200</b>
	<b>Total</b>	<b><u>300</u></b>		<b>100</b>		<b>400</b>

## **CPA 101 - Introduction to Data Analytics**

### **UNIT 1**

Descriptive Statistics: Introduction to the Course. Descriptive Statistics, Probability Distribution. Inferential Statistics through Hypothesis test. Regression

### **UNIT 2**

Machine Learning: Differentiate Algorithmic and model based framework. Regression : Ordinary Least Square, K- Nearest Neighbours Regression and classification.

### **UNIT 3**

Supervised Learning with Regression and Classification techniques -1 Bias-Variance Dichotomy Model Validation Approaches Logistic Regression Linear Discriminant Analysis Quadratic Discriminant Analysis Regression and Classification Trees Support Vector Machines

### **UNIT 4**

Unsupervised Learning and Challenges for Big Data Analytics Clustering Associative Rule Mining Challenges for big data analytics

### **UNIT 5**

Prescriptive analytics Creating data for analytics through designed experiments Creating data for analytics through Active learning Creating data for analytics through Reinforcement learning

Text:

1. R. Panneerselvam, “Research Methodologies,” PHI.
2. C.R. Kothari: Research methodology, Methods and Techniques, New Age Publication.
3. S .N.Sivanandam ,S.N.Deepa, “Introduction to Neural Networks using MATLAB 6.0“, TATA McGraw- Hill publications
4. William Stallings, "Cryptography and Network security", Third Edition, Pearson Ed.

## **CPA 102 - Python for Analytics**

### **UNIT I:**

Introduction to Python: Python versus Java, Python Interpreter and its Environment, Python installation, Python basics: variables, operators, Strings, Conditional and Control Statements, loops; Data structures: lists and dictionaries; functions: global functions, local functions, lambda functions and methods.

### **UNIT II:**

**Object Oriented Programming Concepts:** Class, object, constructor, destructor and inheritance; Modules & Packages, File Input and Output, catching exceptions to deal with bad data, Multithreading, Database Connectivity.

### **UNIT III:**

Creating Arrays, Arrays Operations, Multidimensional Arrays Arrays transformation, Array Concatenation, Array Math Operations, Multidimensional Array and its Operations, Vector and Matrix.

### **UNIT IV**

**Visualization:** Visualization with matplotlib, Figures and subplots, Labelling and arranging figures, Outputting graphics.

### **UNIT V:**

Manipulating data from CSV, Excel, HDF5, and SQL databases, Data analysis and modelling with Pandas, Time-series analysis with Pandas, Using Pandas, the Python data analysis library, Series and Data Frames, Grouping, aggregating and applying, Merging and joining.

### **Text Books:**

1. McKinney Wes, "Python for Data Analysis: Data Wrangling with Pandas, NumPy, and IPython", O'Reilly Media, 2012.
2. Hauck Trent, "Instant Data Intensive Apps with Pandas How-To", Packt Publishing Ltd, 2013.
3. Beazley David M. "Advanced Python Programming", Pearson Education, 2009.
4. Chun Wesley, Core Python Programming, 3rd Edition, Prentice Hall Professional, 2012.
5. Telles Matt "Python Power!: The Comprehensive Guide", Cengage Learning, 2008.