Hindi Vidya Prachar Samiti's

Ramniranjan Jhunjhunwala College

of Arts, Science & Commerce

(Empowered Autonomous College)

Affiliated to

UNIVERSITY OF MUMBAI

Syllabus of Statistics VSC for the T. Y. B.Sc. Semester VI (under NEP)

Program: B.Sc. STATISTICS

Program Code: RJSUSTA

(REVISED in 2025-2026 in alignment with the NEP2020 facilitating the inter-and multidisciplinary learning and multiple entry and exit of the students)

(CBCS 2025-2026)

Preamble

The National Education Policy 2020 aims at imparting skill-based learning and caters to the multiple entry and exit facility for the students thus empowering them to acquire knowledge at their pace. In the three-year UG program, the student has two exit options. Students also have the option of choosing the Honors program of four years study in a given discipline and later converting it to a five-year integrated PG degree program. As an undergraduate student, he/she learns the core subject (Major), subject complementing the core subject (Minor), a course from another discipline (OEC or GEC), Vocational and Skill Enhancement course from the Major (VSEC). The remaining verticals under NEP 2020 are IKS (Indian Knowledge System), AEC (Ability Enhancement Course), VEC (Value Enhancement Course) and with progressive three years of UG, student also completes at different levels OJT (On Job Training), FP (Field Projects), CEP (Community Engagement Program), RP (Research Project) which helps him/her in understanding their roots, application of the knowledge for the benefit of self and the society. Vertical CC (Co-curricular activities and activities related to yoga and human well-being) helps in preparing youth with good character and interpersonal relationships.

T.Y.B.Sc. Semester VI Statistics VSC Syllabus

Credit Structure for B Sc Semester VI as per NEP 2020 Implemented

from the academic year 2025-2026
Course Code: RJVSCSTAP

Semester VI
Level 5.5 Major Statistics

Courses	Credits	Total Credits	Course Code
Discipline Specific Core -I Distribution Theory and Stochastic Processes	4	12	RJDSCSTA361
Discipline Specific Core -II Testing of Hypothesis	4		RJDSCSTA362
Discipline Specific Core -III Practical on DSC-I and DSC-II	4		Practicals related to DSC I and II RJDSCSTAP361
Discipline Specific Elective-I Elements of Actuarial Science	4	4	RJDSESTA361
Discipline Specific Elective-II Introduction to Six Sigma			RJDSESTA362
Vocational Skill Course (VSC) Foundations of Python Programming	2	2	RJVSCSTAP361
On Job Training (OJT)	4	4	RJOJTSTA361
Total Credits	22	22	

*As per University Grid

Credit Structure for VSC Statistics Semester VI as per NEP 2020 Implemented from the academic year 2025-2026.

Vertical	Course	Nomenclature	Topics	Credits
VSC (2 Credits)	Paper Code : RJVSCSTAP361	Foundations of Python Programing	Introduction to Python Programming Numpy, Pandas and Data Exploration	02

SEMESTER	:	VI (Vocational Skill Course)
TITLE OF THE SUBJECT/COURSE	:	**Foundations of Python Programing**
COURSE CODE	:	**RJVSCSTAP361**
CREDITS	:	02
DURATION	:	60 LECTURES

LEARNING OBJECTIVES	
1.	To enable students to write, debug, and understand Python programs using fundamental programming constructs.
2.	To develop problem-solving skills through the application of Python in real-world scenarios and logical thinking.

COURSE OUTCOME NUMBER	On completing the course, the student will be able to:	PSO Addressed	BLOOMS LEVEL
CO1	Demonstrate understanding of Python basics, apply them to write simple programs, and analyze code for errors.	2,3,4,5	BT level II, III and IV understand, apply and analyze
CO2	apply knowledge of data structures, create programs using lists, tuples, dictionaries, and sets, and evaluate their effectiveness.	3,4	BT level III and IV apply and analyze
CO3	Design and implement python solutions, analyze problems, and remember key concepts to develop effective solutions.	3,4,5	BT level I, III and IV remember ,apply and analyze
CO4	explain object-oriented programming concepts, apply them in Python, and understand the underlying principles.	2, 3,4,5	BT level I, II and III remember, understand and apply

Semester VI	
Foundations of Python Programming	**Paper Code: RJVSCSTAP361**
Practicals based on VSC	

1. Basic Python Operations and Functions

- Programming Languages, its features, Introduction to IDLE Interpreter, its basic syntax, built-in Number types, Expression, Operators, Built-in function Type, Operator Precedence.
- Detail of Statements: Expression, Assert, Assignment, Augmented, del, Import.
- Python Input/Output with print() and input() function, Function, Defining and Calling function, Function Call.
- Compound Data Type: Strings, Updating Strings, Tuples, Accessing Values in Tuples, Updating Tuples, Delete Tuple elements, Lists, Accessing Values in Lists, Updating Lists, Delete List elements.
- Built-in function: Min, Max, and Sum.
- Function: Advantage, Types, Return Statement, Passing Values by Reference and by Value, Function Arguments, Recursive Function, Scope of Variable, Range function.

2. Conditional Statements, Loops, and Lists

- Conditional Statement: If, If-else, if-then-else, Nested If.
- Looping: For loop, For loop with else, While loop, Nested loop.
- Control Statement: Break, Continue, Pass Statement.·
- Dictionary: Dictionaries, Accessing values in Dictionary, Updating Dictionary, Delete elements from Dictionary.
- Anonymous Function, List Comprehensions, Directory Methods in Python.

3. Dictionaries, Anonymous Functions, and List Comprehension

- Dictionary: Dictionaries, Accessing values in Dictionary, Updating Dictionary, Delete elements from Dictionary.
- Anonymous Function, List Comprehensions, Directory Methods in Python.

4. NumPy Arrays and Operations

- Numpy arrays: Creating arrays creating n-dimensional arrays using np.array and array operations (indexing and slicing, transpose, mathematical operations).

5. Pandas DataFrames and Text Data

• Pandas dataframes: Creating series and dataframes and Operations on series and dataframes. • Reading and writing data: From and to Excel and CSV files. • Text data operations: len, upper, lower, slice, replace, contains.
6. Plotting and Descriptive Statistics • Frequency Tables. • Plotting: using "matplotlib" (Histograms, Box plots, Scatter plot, Bar plot, Line plot) • Descriptive Statistics: mean, median, mode, min, max, quantile, std, var, skewness, kurtosis, correlation.

References:

1. Problem solving and Python programming- E. Balgurusamy, TataMcGrawHill.
2. How to think like a computer scientist learning with Python by Allen Downey.
3. Fundamentals of Python First programs 2nd edition - Kenneth A Lambert, Cengage Learning India.
4. Doing Math with Python - Amit Saha, No starch ptress.

Scheme of Examinations

1. One Semester End (Practical) Examination of 50 marks. Duration: 1. hours.
2. Minimum marks for passing Exam are 40 %.
3. HOD's decision, in consultation with the Principal, shall remain final and abiding to all.

Evaluation and Assessment

(Based on the centralized guidelines given by EC under NEP2020)

Practical examination : **50 marks**

Duration : 2 hours

Question no.	Max Marks
1	40 (with internal option)
Journal	05
Viva	05
Total	50

Key to set effective Question paper

Question	KNOWLEDGE	UNDERSTANDING	APPLICATION and ANALYSIS	TOTAL MARKS- Per question
1	02	03	05	**10**
2	03	02	05	**10**
3	02	03	05	**10**
4	03	02	05	**10**
-TOTAL- Per objective	10	10	20	**40**
% WEIGHTAGE	25%	25%	50%	**100%**

Mapping of the course to Local/ Regional/National/International relevance

Class	Course Name	Course Code	Local relevance	Regional relevance	National relevance	International relevance

T Y B Sc Statistics Major	Foundations of Python Programing	RJVSCSTAP361	To use Python for addressing local needs in areas like business, education, and community development.	To develop Python programming skills for solving region-specific challenges in sectors like agriculture, education, health, and local businesses.	To support national growth by applying Python in sectors like digital governance, industry, and innovation.	To leverage Python for global challenges in areas like technology, data analysis, and sustainable development.

Mapping of the course to Employability/ Entrepreneurship/Skill development

Class	**Course Name**	**Course Code**	**Topic focussing on Employability/ Entrepreneurship /skill development**	**Employability/Entrepreneurship/Skill development**	**Specific activity**
T Y B Sc Statistics Major	Foundations of Python Programing	RJVSCSTAP361	All topics	Data Analysis and Interpretation.	Conducting statistical analysis using Python software

Integration of Cross cutting Issues

Class	Course Name	Course Code	Cross Cutting Issues
T Y B Sc Statistics Major	Foundations of Python Programing	RJVSCSTAP361	Professional Ethics, Social accountability UNSDG 4, 8, 9 NEP2020 Interdisciplinary