Ahmednagar Jilha Maratha Vidya Prasarak Samaj's

New Arts, Commerce, and Science College Ahmednagar (Autonomous)

(Affiliated to Savitribai Phule Pune University, Pune)

National Education Policy (NEP)
Choice Based Credit System (CBCS)

Programme Framework and Syllabus for

Skill Enhancement Courses: Statistics
कौशल्य वृद्धी अभ्यासक्रम: संख्याशास्त्र

Implemented from

Academic Year 2024-25

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Introduction of Skill Enhancement Courses: Statistics

The Statistics SEC introduces students to the quantitative aspects of research. Courses in the SEC programme will improve knowledge and working understanding of basic statistical techniques and methods in many areas including agriculture, business, education, finance, insurance sector, and different branches of computer science.

Statistics is the science of collecting, presenting, analysing and interpreting data and communicating these findings to the society. Statistics will help in assessing public opinions through surveys to forecasting business trends. Statistics plays vital role in clinical research. There is huge scope in present as well as in future across countless industries, the government and academia for people who can provide this essential skill set.

Statistics is the science of making inferences and decisions under uncertainty. It is increasingly relevant in the modern world due to the widespread availability of and access to unprecedented amounts of data and computational resources. Unlike classical Statistics, the need to process and manage massive amounts of data has become a key feature of modern Statistics.

The undergraduate SEC subject in Statistics focuses on providing students with a working knowledge base in Statistics, probability, and computation tools along with an ability to perform data analysis which is helpful in life science and IT sector.

2. Programme Outcomes (POs)

Students enrolled in the program complete a curriculum that exposes and trains them in a full range of essential skill sets and abilities. They will achieve the following objectives.

1. Student will achieve the skill of understanding the data.
2. Student will be able to develop the data collection methods.
3. Student will have skill to write a story using data visualization.
4. Student will understand the interdisciplinary approach to correlate the statistical concepts with concepts in other subjects.
5. Student will be made aware of history of Statistics and hence of its past, present and future role as part of our culture.
6. Students will demonstrate conceptual domain knowledge of the Statistics in an integrated manner.
7. Student will play the key role in management for effective functioning.

Skill Enhancement Courses: Framework and Course Distribution: Subject: Statistics

Sr. No.	Year	Semester	Level	Course Type	Course Code	Title	Credits
1.	I	II	5.0	SEC-01	SEC-ST01P	Introduction To R	02
2.	II	III	5.5	SEC-02	SEC-ST 02P	Introduction To Tableau	02
3.	II	IV	6.0	SEC-03	SEC-ST 03P	Introduction To C	02
						Total	06

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Skill Enhancement Courses: Statistics

Title of the Course: Introduction to R								
Year: I				**Semester: II**				
Course Type	Course Code	Credit Distribution		Credits	Allotted Hours	Allotted Marks		
		Theory	Practical			CIE	ESE	Total
SEC-01	SEC-ST 01P	00	02	02	60	15	35	50

Learning Objectives:

1. Student learn different imputation tools in R.
2. They able to discriminate between hardware and software.
3. They understand the different data visualization using R.
4. Student learns how to compute descriptive Statistics using R.
5. The overall logical thinking as a base of data science will be improved.

Course Outcomes (Cos)

1. Student will have sufficient computational skill through R- programming software.
2. Student will understand the difference in data visualization using R.
3. Student will understand the difference in output of analysis using R.
4. The overall logical thinking as a base of data science will be improved.
5. Student will have skill of result interpretation.

Detailed Syllabus:

Unit-I		**Introduction to R and imputation methods**
		Computer hardware, computer software, Differences Between Hardware and Software, History of R language, Why R Language, features of R Programming Language, advantages of R Programming Language.
		R Preliminaries: Assignment operator, Vector bases of R, functions in R, acceptable object names in R. Methods of Data input: c function, sequence function and sequence operator, scan function, rep function, data.frame function, matrix function, class function, importing data from excel, resident data sets. Data accessing or Indexing: Accessing data from data frame, subset and transform, List
Unit-II		**Graphical and Diagrammatic Representation of Data using R**

		Diagrams: Simple bar diagram, Subdivided bar diagram, Multiple bar diagram, Pie diagram, stem and leaf diagram.
		Graphs: Boxplot, spike plot,histogram for both equal and unequal class intervals, frequency polygon, ogive curves, empirical distribution function, Saving the diagram and graphs using R
Unit-III		**Basic Statistics using R**
		Use of R commands to compute measures of Central Tendency, dispersion, skewness and kurtosis Computations of following measures for all types of data. a) Central tendency mean, mode, median, quartiles, deciles, percentiles, geometric mean and harmonic mean. b) Dispersion: variance, standard deviation, coefficient of variation,mean deviation. c) Skewness: Bowley's coefficient and Karl Pearson's coefficient of skewness.
Unit- IV		**Probability Distribution and Its application using R**
		Plotting of p.m.f. and c.d.f. of Bernoulli, Binomial, Hypergeometric, Geometric distribution, Poisson distribution and its applications.
		Plotting of p.d.f. and c.d.f. of Uniform distribution, Exponential, Normal distribution and its applications.

List of Practical:

Sr. No.	**Title of the Practical**	No. of Practical's
1	Data Input Methods	2
2	Diagrammatic and Graphical Representation	2
3	Measures of Central Tendency	2
4	Measures of Dispersion	2
5	Measures of Skewness and Kurtosis	2
6	Plotting of probability mass function, cumulative distribution function.	2

Suggested Readings/Material:

1. Crawley, M.J. (2006). Statistics – An introduction using R. John Wiley London.
2. Purohit, S.G., Deshmukh, S.R. and Gore, S.D., (2015). Statistics using R. Alpha Science International.
3. Verzani, J., (2018). Using R for introductory Statistics. CRC press.
4. Schumacker, R.E., (2014). Learning Statistics using R. Sage Publications.