

B.Sc. Part I Statistics (Introduced in the year 2024-25 as per NEP 2020)	
Semester I	
Descriptive Statistics I (2DSC03STA11)	
CO No.	At the end of the course students will be able to:
CO1	Know scope of Statistics and sampling methods
CO2	Compute descriptive statistics.
CO3	Compute moments, skewness, kurtosis and its interpretation
CO4	Apply an appropriate measure in given situations/data.
Elementary Probability Theory (2DSC03STA12)	
CO No.	At the end of the course students will be able to:
CO1	Distinguish between Deterministic and Non-deterministic experiments.
CO2	Understand the basic concepts of probability, conditional probability and independence of events.
CO3	Learn theorems on probabilities and compute probabilities.
CO4	Understand the concept of discrete random variable, probability distributions and mathematical expectation.
DSC Statistics Practical I (2DSC03STA19)	
CO No.	At the end of the course students will be able to:
CO1	Use various graphical and diagrammatic techniques and interpret.
CO2	Compute descriptive statistics.
CO3	Computation of Moments, Skewness, Kurtosis & its interpretation.
CO4	Computation of various probabilities.
Basic Statistics I (2OEC03MTS12)	
CO No.	At the end of the course students will be able to:
CO1	Prepare instruments for the data collection
CO2	Learn basic concepts of sample survey & different methods of sampling.
CO3	Visualize data diagrammatically.
CO4	Visualize data graphically
Semester II	
Descriptive Statistics II (2DSC03STA21)	
CO No.	At the end of the course students will be able to:
CO1	To compute correlation coefficient and its interpretation.
CO2	To compute regression coefficients and regression lines.
CO3	Analyze data pertaining to attributes and interpret the results.
CO4	Understand the need of vital statistics and concepts of mortality and fertility.

Discrete Probability Distributions (2DSC03STA22)	
CO No.	At the end of the course students will be able to:
CO1	Apply some univariate standard discrete probability distributions to different situations.
CO2	Obtain mathematical expectation of different distributions.
CO3	To learn relation between different discrete distributions.
CO4	Concept of bivariate random variable, probability distributions
DSC Statistics Practical II (2DSC03STA9)	
CO No.	At the end of the course students will be able to:
CO1	To compute correlation coefficient and its interpretation.
CO2	Analyze data pertaining to attributes and interpret the results.
CO3	Apply various discrete distributions
CO4	Compute mortality and fertility rates
DSC Statistics Practical II (3DSC03STA29)	
CO No.	At the end of the course students will be able to:
CO1	Compute correlation coefficient, regression coefficients.
CO2	Analyze data pertaining to attributes and interpret the results.
CO3	Apply various discrete distributions.
CO4	Compute mortality and fertility rates.
Basic Statistics I (2OEC03MTS12)	
CO No.	At the end of the course students will be able to:
CO1	Learn basic concepts in statistics.
CO2	Compute descriptive statistics.
CO3	Understand the concept of bivariate data.
CO4	Analyze data by using correlation and regression.

B.Sc. Part II Statistics (Introduced in the year 2024-25 as per NEP 2020)	
Semester III	
DSC V : Probability Distributions-I (DSC03STA31)	
CO No.	At the end of the course students will be able to:
CO1	Understand some discrete probability distributions and their applications in different fields.
CO2	Compute various statistical measures for continuous univariate and bivariate random variables.
CO3	Understand transformation of continuous univariate and bivariate random variable.
CO4	Compute various generating functions for continuous univariate and bivariate random variables
DSC-VI: Statistical Methods (DSC03STA32)	
CO No.	At the end of the course students will be able to:
CO1	Understand the concept of multiple linear regression and residual.
CO2	Understand the concept of multiple correlation and partial correlation.
CO3	Compute simple, weighted index numbers and cost of living index number.
CO4	Apply various methods to remove trend.
MIN-V: Predictive Modelling (MIN03STA31)	
CO No.	At the end of the course students will be able to:
CO1	Understand the concept of multiple linear regression, multiple & partial correlation & logistic regression.
CO2	Understand and apply multiple regression models & multiple & partial correlation in real life situations.
CO3	Understand concept of time series and its components.
CO4	Learn methods of determination of trend.
MIN-VI: Hypothesis Testing(MIN03STA32)	
CO No.	At the end of the course students will be able to:
CO1	Understand concept of testing of hypothesis.
CO2	Develop test procedures for testing of hypothesis
CO3	Apply large sample tests in real life examples
CO4	Implement appropriate small sample tests for real life testing of hypothesis problems.
DSC-PR-III: DSC Statistics Practical III(DSC03STA39)	
CO No.	At the end of the course students will be able to:
CO1	Compute probabilities of standard probability distributions, expected frequencies and test the goodness
CO2	Understand generation of random samples from standard probability distributions.
CO3	Understand the applications and sketch of various discrete and continuous distributions
CO4	Solve the real life problems based on Multiple Regression, Multiple & Partial Correlation, Index Number and Time Series
MIN-PR-III: MIN Statistics Practical III(MIN03STA39)	

CO No.	At the end of the course students will be able to:
CO1	Understand and apply multiple regression models, multiple & partial correlation & logistic regression in real life situations
CO2	Apply various methods of estimation of trend and seasonality.
CO3	Apply large sample tests in real life examples.
CO4	Implement appropriate small sample tests for real life testing of hypothesis problems.
VSC PR-II: Statistical Computing Using MS-Excel (VSC03STA39)	
CO No.	At the end of the course students will be able to:
CO1	Understand basic knowledge of MS-Excel.
CO2	Edit data using conditional formatting
CO3	Understand the use of functions & formulae on Excel spreadsheet & analyse the data using pivot table & pivot charts.
CO4	Understand the use of functions of Excel for fitting of discrete distributions.
Semester IV	
DSC-VII: Probability Distributions-II(DSC03STA41)	
CO No.	At the end of the course students will be able to:
CO1	Understand various continuous probability distributions.
CO2	Understand applications of various continuous probability distributions in different fields.
CO3	Compute descriptive statistics, moments, skewness, kurtosis, m. g. f. for continuous distributions
CO4	Understand the relation between various probability distributions.
DSC-VIII: Testing of Hypothesis & National Income (DSC03STA42)	
CO No.	At the end of the course students will be able to:
CO1	Understand the basic concepts of testing of hypothesis.
CO2	Distinguish between large and small sample tests.
CO3	Apply small and large sample tests in real life examples.
CO4	Understand the concept of National income.
MIN-VII: Applied Statistics(MIN03STA41)	
CO No.	At the end of the course students will be able to:
CO1	Compute simple and weighted Index numbers.
CO2	Understand the use of index number and concept of cost of living.
CO3	Understand meaning and purpose of statistical quality control.
CO4	Construct various types of control charts for quality control problems.
MIN-VIII: Sampling Techniques (MIN03STA42)	
CO No.	At the end of the course students will be able to:
CO1	Understand basic concepts of sample survey.
CO2	Understand and use probability sampling methods
CO3	Find appropriate sample size in various methods.

CO4	Apply various sampling methods to real life problems.
DSC-PR-IV: DSC Statistics Practical IV (DSC03STA49)	
CO No.	At the end of the course students will be able to:
CO1	Understand fitting of various continuous distributions.
CO2	Understand model sampling from various continuous distributions.
CO3	Apply large and small sample tests to real life problems.
CO4	Compute National income by using different methods
MIN-PR-IV: MIN Statistics Practical IV (MIN03STA49)	
CO No.	At the end of the course students will be able to:
CO1	Understand basic concepts of stochastic processes and their applications.
CO2	Construct various control charts for variables and attributes.
CO3	Understand basic concepts of sample survey.
CO4	Apply different methods of sampling in real life.
VSC PR-III: Introduction to R(VSC03STA49)	
CO No.	At the end of the course students will be able to:
CO1	Understand basics of R programming.
CO2	Know various built-in functions in R.
CO3	Evaluate various descriptive statistics measures using R.
CO4	Apply different parametric tests using R.

B.Com. Part I Statistics (Introduced in the year 2024-25 as per NEP 2020)	
Semester I	
Business Statistics - I (2SEC02STA11)	
CO No.	At the end of the course students will be able to:
CO1	Understand basic terms in sampling and different sampling methods.
CO2	Visualize data and compute descriptive statistics.
Semester II	
Business Statistics - II (SEC02STA21)	
CO No.	At the end of the course students will be able to:
CO1	Understand the concept of probability, probability distributions and its applications in real life.
CO2	Distinguish between process and product control, plot various control charts.

B.Com. Part II Statistics (Introduced in the year 2024-25 as per NEP 2020)	
Semester III	
Business Statistics - III (2SEC02STA31)	
CO No.	At the end of the course students will be able to:
CO1	Understand the concept of correlation and regression
CO2	Analyze bivariate data using correlation and Spearman's rank correlation.
CO3	Understand the concept of fitting of regression lines.
CO4	To solve real life problems using concept of correlation and regression.
Semester IV	
Business Statistics - IV (2SEC02STA41)	
CO No.	At the end of the course students will be able to:
CO1	Understand concept of time series and Index number
CO2	Measure trend, seasonal indices in time series
CO3	Compute simple and weighted index numbers.
CO4	Implement appropriate methods of construction of Index numbers to solve real life problems

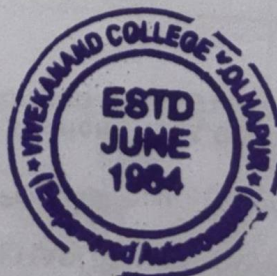
M.Sc. Part II Statistics (Introduced in the year 2024-25)	
Semester III	
STOCHASTIC PROCESSES (DSC17STA31)	
CO No.	At the end of the course students will be able to:
CO1	Classify general Stochastic Process.
CO2	Learn random walk model, gambler ruin problem and able to compute long run distribution of Markov chain.
CO3	Apply the Poisson process, birth and death process and various queuing systems in real life..
CO4	Employ branching processes to solve real life problems of stochastic nature
Statistical Learning And Data Mining (DSC17STA32)	
CO No.	At the end of the course students will be able to:
CO1	Understand and clean the big data sets.
CO2	Apply classification methods to real life problems in various fields.
CO3	Select and evaluate the models based on datasets using different modelling techniques.
CO4	Understand unsupervised learning and supervised learning techniques for univariate and multivariate data.
Python Programming (DSC17STA33)	
CO No.	At the end of the course students will be able to:
CO1	Understand Python programming basics, utilizing Python libraries.
CO2	Write a programme in python.
CO3	Understand use of functions and file handling in Python.
CO4	Analyse data using Python.
ECONOMETRICS (DSE17STA31)	
CO No.	At the end of the course students will be able to:
CO1	Understanding of simple and multiple linear regression, its assumptions, and the impact of violations of its assumptions.
CO2	Identify heteroscedasticity using Goldfield-Quandt and White test.
CO3	Distinguish different forms of simultaneous equations models by order and rank conditions.
CO4	Acquaint with causality, Granger causality, Granger test for causality and applications of estimation methods.
Generalized Linear Models (DSE17STA42)	

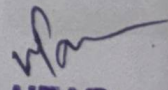
CO No.	At the end of the course students will be able to:
CO1	Understand and use the principles of statistical modelling.
CO2	Understand the general theory of GLM and apply GLM for the analysis related to data sets in various domains
CO3	Understand concept of Logistic regression and Poisson regression and its implementation in real life situation.
CO4	Understand concept of Generalized linear mixed models.
Semester IV	
Time Series Analysis (DSC17STA41)	
CO No.	At the end of the course students will be able to:
CO1	Remove trend and seasonality using different methods to convert the time series into stationary.
CO2	Understand time series, auto-covariance, auto-correlation their properties, various smoothing techniques.
CO3	Obtain Causality and inevitability, π -weights and ψ - weights, ACVF, ACF, PACF.
CO4	Understand estimation of ARIMA model, residual analysis and diagnostic checking, their forecasting.
Design And Analysis Of Experiments (DSC17STA42)	
CO No.	At the end of the course students will be able to:
CO1	Recognize the basic concepts of design of experiments.
CO2	Analyse different factorial and fractional experiments their interactions, graphical representation and confounding
CO3	Describe the concept of fractional factorial design.
CO4	Understand the concept of response surface and methods of fitting it.
Optimization Techniques (DSE17STA41)	
CO No.	At the end of the course students will be able to:
CO1	Understand basics and formulation of linear programming problems and appreciate their limitations; solve linear programming problems using graphical method.
CO2	Apply simplex method to solve real life problems
CO3	Solve artificial variable technique, duality theory, revised simplex method, sensitivity analysis
CO4	Understand the concept of Game theory and dynamic programming to solve their problems and understand their real-life applications
Statistical Quality Control (DSE17STA41)	
CO No.	At the end of the course students will be able to:
CO1	Understand concepts of control charts in quality improvement.
CO2	Construct modified control charts to monitor the process.
CO3	Analyse process capability using control charts.
CO4	Evaluate the quality of products using various acceptance sampling plans.
Survival Analysis (2DSE17STA43)	

CO No.	At the end of the course students will be able to:
CO1	Collect the life time data using different methods of censoring.
CO2	Apply the Cox regression model.
CO3	Understand concept of competing risk analysis and how to apply in real life situations.
CO4	Use regression methods for life time data.

M.Sc. Part II Applied Statistics (Introduced in the year 2024-25)	
Semester III	
STOCHASTIC PROCESSES (DSC18STA31)	
CO No.	At the end of the course students will be able to:
CO1	Classify general Stochastic Process.
CO2	Learn random walk model, gambler ruin problem and able to compute long run distribution of Markov chain.
CO3	Apply the Poisson process, birth and death process and various queuing systems in real life..
CO4	Employ branching processes to solve real life problems of stochastic nature
Statistical Learning And Data Mining (DSC18STA32)	
CO No.	At the end of the course students will be able to:
CO1	Understand and clean the big data sets.
CO2	Apply classification methods to real life problems in various fields.
CO3	Select and evaluate the models based on datasets using different modelling techniques.
CO4	Understand unsupervised learning and supervised learning techniques for univariate and multivariate data.
Python Programming (DSC18STA33)	
CO No.	At the end of the course students will be able to:
CO1	Understand Python programming basics, utilizing Python libraries.
CO2	Write a programme in python.
CO3	Understand use of functions and file handling in Python.
CO4	Analyse data using Python.
Biostatistics (DSE18STA31)	
CO No.	At the end of the course students will be able to:
CO1	Understand need and ethics of any clinical trial and how to conduct clinical trial of any medicine in different phases.
CO2	Apply various designs of clinical trials to the data.
CO3	Understand the designs of clinical trials and Epidemiological studies.
CO4	Analyze and report the clinical trials.
Statistical Quality Control (DSE18STA32)	
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CO1	Understand concepts of control charts in quality improvement.
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CO4	Evaluate the quality of products using various acceptance sampling plans.
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Time Series Analysis (DSC18STA41)	
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CO2	Apply simplex method to solve real life problems
CO3	Solve artificial variable technique, duality theory, revised simplex method, sensitivity analysis
CO4	Understand the concept of Game theory and dynamic programming to solve their problems and understand their real-life applications
Python for Data Science (DSE18STA42)	
CO No.	At the end of the course students will be able to:
CO1	Develop algorithmic solutions to data science related problems
CO2	Analyze the layers in the architecture of convolution neural networks.
CO3	Understand and master basic knowledge, theories and methods in computer vision
CO4	Comprehend the concepts of natural language processing, its applications and language modelling techniques




HEAD
 DEPARTMENT OF STATISTICS
 VIVEKANAND COLLEGE, KOLHAPUR
 (EMPOWERED AUTONOMOUS)