Annual Teaching Plan

Academic Year: 2024-25 B.Sc. Part-I Semester I Department -Statistics

Subject - Statistics Course -DSC03STA11

DSC-I Descriptive Statistics I

Name of teacher – **Mulik M. A.**

Month July			**Module/ Unit**	**Sub Unit Planned**
Lectures 09	Practicals -	Total 09	Unit-1 Introduction to Statistics & Measures of Central Tendency	1.Definition and scope of Statistics 2.Qualitative data (Attributes): nominal and ordinal scale. Quantitative data (Variables 3.Concept of Central tendency 4.Arithmetic Mean (A.M)
Month August				
Lectures 09	Practicals 08	Total 17	Unit -1 Measures of Central Tendency	1.Geometric Mean (G.M) 2.Harmonic Mean (H.M.) 3.Median 4.Mode 5.Partition values Quartiles, Deciles and Percentiles, Box Plot. 6.Comparison between averages in accordance with requirements of good average. 7.Situations where one kind of average is preferable to others.
Month September				
Lectures 07	Practicals 16	Total 23	Unit-2 Measures of Dispersion	1.Concept of dispersion, Absolute and Relative measures of dispersion, 2.Range: Definition, Coefficient of range. 3.Quartile Deviation 4.Mean Deviation: 5.Mean Square Deviation (M.S.D.) 6.Variance and Standard Deviation 7.Coefficient of Variation 8.Moments
Month October				
Lectures 03	Practicals 08	Total 11	Unit-4 Theory of Attributes	1.Skewness: Concept of skewness of a frequency distribution, Types of skewness. Bowley's coefficient of skewness, Karl Pearson's coefficient of skewness, Measure of skewness based on moments. 2.Kurtosis: Concept of kurtosis of a frequency distribution, Types of kurtosis. Measure of kurtosis based on moments

M.A. Mulik

Name & Signature of Teacher

(Ms. M.A. Mulik)

VIVEKANAND COLLEGE KOLHAPUR ESTD JUNE 1964 (Empowered Autonomous)

Ms. V. C. Shinde

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DEPARTMENT OF STATISTICS

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Annual Teaching Plan

Academic year 2024-2025 Semester I Department -Statistics

Subject - Statistics Course Code -2DSC03STA12

Title - ELEMENTARY PROBABILITY THEORY

Name of teacher – Mrs. V. C. Shinde

Month: July			Module/Unit	Sub-units planned
Lectures 06	Practicals 08	Total 14	Unit-1 Probability	1. Deterministic and non-deterministic experiments 2. Definitions: Sample space, Event, Types of events 3. Algebra of events 4. Power set 5. Symbolic representation of given events and Illustrative examples.
Month: August				
Lectures 08	Practicals 16	Total 24	Unit-1 Probability	1. Apriori definition of probability, Probability model 2. Axiomatic definition of probability Illustrative examples 3. Definition of probability in terms of odd ratio 4. Some theorems on probability
Month: September				
Lectures 08	Practicals 16	Total 24	Unit-2 Independence of Event & Mathematical Expectation of discrete random variable (on finite sample space)	1. Definition of conditional probability, Multiplication theorem of probability 2. Baye's theorem, examples on conditional probability and Baye's theorem 3. Independence of two events, Pairwise and Mutual Independence for three events. Elementary examples. 4. Concept of Independence of two events. 5. Theorems on independence of events.
Month: October				
Lectures 09	Practicals 12	Total 21	Unit-3 Independence of Event & Mathematical Expectation of discrete random variable (on finite sample space)	1. Definition of discrete random variable, Probability mass function (p.m.f.) and cumulative distribution function (c.d.f.) 2. of a discrete random variable, Properties of c.d.f 3. Probability distribution of function of random variable, 4. Median and Mode of a univariate discrete probability distribution.

Name & signature of teacher

Mrs. V. C. Shinde

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Annual Teaching Plan

Academic year 2024 -2025 B.Sc. Semester II Department -Statistics

Subject - Statistics Course Code -2DSC03STA21 Title - Descriptive Statistics –II

DSC III: Descriptive Statistics –II

Name of teacher – Mulik M.A

Month- November- December			Module/Unit	Sub-units planned
Lectures 11	Practicals 16	Total 27	Unit-1 Correlation	1. Bivariate Random variable 2. Correlation, Types of correlation. 3. Scatter diagram, its utility. 4. Karl Pearson's coefficient of correlation 5. Spearman's rank correlation coefficient 6. Numerical examples
Month-January				
Lectures 8	Practicals 12	Total 20	Unit -2 Regression	1. Concept of regression 2. Equations of regression lines 3. Regression coefficients and its properties.
Month-February				
Lectures 07	Practicals 16	Total 23	Unit-3: Attributes	1. Meaning & Definition 2. Basic Terminology 3. Concept of consistency
Month- March				
Lectures 08	Practicals 12	Total 20	Unit-3 & 4: Attributes & Demography	1. Concept of Independence and Association of two attributes 2. Definition & meaning of Q and Y 3. Relation between Q & Y 4. Definition, meaning & need of vital statistics
Month – April-May				
Lectures 07	Practicals 16	Total 23	Unit-4 Demography	1. Mortality Rates 2. Fertility rate 3. Reproduction rate 4. Concept of life table

M.A. Mulik
Name & Signature of Teacher
Mr. M. A. Mulik

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Annual Teaching Plan

Academic year 2024-2025 Semester I Department -Statistics

Subject - Statistics Course Code -2DSC03STA22

Title – DISCRETE PROBABILITY DISTRIBUTIONS

Name of teacher - Mrs. V. C. Shinde

Month: November			Module/Unit	Sub-units planned
Lectures 04	Practicals 08	Total 12	Unit-1 Standard Discrete Probability Distributions	1. Idea of one point, two-point distributions and its mean and variance. 2. Discrete Uniform Distribution
Month: December			Module/Unit	Sub-units planned
Lectures 07	Practicals 16	Total 23	Unit-1 Standard Discrete Probability Distributions	1. Discrete Uniform Distribution, Bernoulli Distribution: p.m.f., mean and variance 2. Binomial Distribution 3. Hypergeometric distribution.
Month: January				
Lectures 10	Practicals 16	Total 26	Unit-1 Standard Discrete Probability Distributions	1. Poisson Distribution: Poisson distribution as a limiting case of Binomial distribution, examples. 2. Definition of bivariate discrete random variable (X, Y) on finite 3. Joint p.m.f., and c.d.f., Properties of c.d.f. (without proof).
Month: February				
Lectures 08	Practicals 16	Total 24	Unit-2 Bivariate Probability Distribution (Defined on finite sample space) & Mathematical Expectation (Bivariate random variable):	1. Computation of probabilities of events in bivariate probability 2. Concepts of marginal and conditional probability distributions, 3. Definition of expectation of functions of r.v. in bivariate distribution. 4. Theorems on expectations
Month: March-April				
Lectures 10	Practicals 16	Total 26	Unit-2 Bivariate Probability Distribution (Defined on finite sample space) & Mathematical Expectation (Bivariate random variable):	1. Expectation and variance of linear combination of two discrete r.v.s. 2. Definition of conditional mean, conditional variance, covariance and correlation coefficient, Cov (aX+bY, cX+dY) 3. Distinction between uncorrelated and independent variables. 4. Joint p.g.f, proof of the p.g.f. of sum of two independent r.v.as the product of their p.g.f.

Name & signature of teacher

Mrs. V.C Shinde

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Annual Teaching Plan

Academic year 2024 -2025 Semester I Department -Statistics

Subject - Statistics Course - 2OEC03MTS12 Title – Basic Statistics I

Name of teacher – Bhosale A. B.

Month			Module/Unit	Sub-units planned
Month-August				
Lectures	Practical 16	Total 16		statistics scopes ,primary secondary data qualitative quantitative data basic terms in statistics, cumulative frequencies
Month-September				
Lectures	Practical 16	Total 16		1.Formation of Frequency distribution 2.Diagrammatic representation (bar diagram, multiple, subdivided Bar, pie diagram, scatter diagram, box plot) 3.Graphical representation I (less than and greater than ogive curves) 4.Sampling (SRS and Stratified sampling)
Month- October-November				
Lectures	Practical 24	Total 24		1.Measures of central tendency: I, II 2.Diagrammatic & Graphical representation using MS- Excel 3.Measures of central tendency using MS-Excel

Name & Signature of Teacher

(Bhosale A.B.)

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Annual Teaching Plan

Academic year 2024 -2025 Semester II Department -Statistics

Subject - Statistics Course - 2OEC03MTS22 Title – Basic Statistics II

Name of teacher – Bhosale A. B.

Month- December			Module/Unit	Sub-units planned
Lectures	Practicals 12	Total 12		1.absolute and relative measures of dispersion concept and applications 2.Measure of Dispersion -I (ungrouped data)
Month-January				
Lectures	Practicals 16	Total 16		Measure of Dispersion -II (grouped data) Measure of Dispersion -III (C.V)
Month-February				
Lectures	Practicals 16	Total 16		1.correlation;definition,uses ,types 2.Methods of studying correlation 3.Correlation I (Karl Pearson) 4.Correlation II (Rank correlation)
Month- March				
Lectures	Practicals 20	Total 20		1.regression ;types , line of regressions, 2.regression coefficients 3.Regression I 4.Regression II
Month- April-May				
	Practicals 16	Total 16		1.Summary statistics using MS- Excel 2.Correlation and Regression using MS- Excel

Name & Signature of Teacher

(Bhosale, A.B.)

Mrs. V. C. Shinde

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Annual Teaching Plan

Academic year 2024 -2025 Semester III Department -Statistics

Subject - Statistics Course - DSC-V: DSC03STA31 Title –Probability Distributions I

Section I- Probability Distributions I

Name of teacher – Bhosale A. B.

Month-July			Module/Unit	Sub-units planned
Lectures 9	Practical 16	Total 25	Unit-1 Some Discrete Probability Distributions	**1.Geometric Distribution**: p.m.f, Mean and Variance, Additive property, Recurrence relation for probabilities, Memory less property, examples. **2.Negative Binomial Distribution**: p.m.f. with parameters (k, p), Geometric distribution is a particular case of Negative Binomial distribution, Mean, Variance, p.g. f., Additive property, Recurrence relation for successive probabilities, examples.
Month-August				
Lectures 10	Practical 16	Total 26	Unit-1 Some Discrete Probability Distributions	**1.Power series distribution:** p.m.f., Mean, Mode, Variance, Binomial, Poisson, Geometric and Negative Binomial distribution as particular cases of power series distribution. **2.Multinomial Distribution**: p.m.f., m.g.f,Marginal distribution, Mean, Variance, Covariance, Variance &Covariance matrix, Correlation coefficient, Additive property
Month-September				
Lectures 9	Practical 16	Total 25	Unit -2 Continuous Univariate Distributions	1.Definition of the continuous sample space, 2.Continuous random variable (r.v.), p.d.f., c.d.f. and its properties 3.Expectation of r.v., expectation of function of r.v., mean, median, mode, quartiles, variance, harmonic mean, raw and central moments, skewness and kurtosis. 4.Transformations of continuous univariate random variables
Month- October-November				
Lectures 10	Practical 20	Total 30	Unit-2 Continuous Bivariate Distributions	1.Definition of bivariate continuous random variable, p.d.f, c.d.f., 2.Expectation, conditional expectation. 3.Transformation of continuous bivariate random variables. Jacobin of transformation.

Name & Signature of Teacher

(Bhosale A. B.)

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Annual Teaching Plan

Academic year 2024-25 | B.Sc. Part-II | Semester III | Department -Statistics
Subject - Statistics | Course - DSC03STA32

Paper VI - Statistical Methods

Name of teacher – **Mulik M.A.**

Month-July			**Module/Unit**	**Sub-units planned**
Lectures 12	Practicals -	Total 12	Unit-1 Multiple linear Regression, Multiple and Partial Correlation (for trivariate data only)	1.Concept of multiple linear regression, plane of regression, Yule's notation, correlation matrix. 2.Fitting of regression plane by method of least squares, definition of partial regression coefficients and their interpretation. 3.Residual
Month-August				
Lectures 10	Practicals 16	Total 26	Unit-1 Multiple linear Regression, Multiple and Partial Correlation (for trivariate data only)	Multiple and Partial Correlation: 1.Concept of multiple correlations. 2.Definition of multiple correlation coefficient Ri.jk and its derivation 3.Properties of multiple correlation coefficient 4.Coefficient of multiple determination. 5.Concept of partial correlation, 6.properties of partial correlation coefficient and examples.
Month-September				
Lectures 08	Practicals 32	Total 40	**Unit-2 Index Number & Time Series**	1.Meaning and utility of index numbers, 2.Types of index numbers 3.Unweighted and weighted index numbers 4.Index numbers using; Laspeyre's, Paasche's and Fisher's formulae. 5.Properties of Fishers index number. 6.Tests of index numbers: unit test, time reversal test, factor reversal test. 7.Cost of living index number: definition 8. Shifting of base, splicing and purchasing power of money
Month- October				
Lectures 04	Practicals 16	Total 20	**Unit-2 Index Number & Time Series**	**Time Series:** 1.Meaning and need of time series analysis, components of time series. 2.Additive and Multiplicative model 3.Measurement of trend: (i) Moving averages method (ii) Progressive average method (iii) Least square method.

M.A. Mulik

Name & Signature of Teacher

(Ms. M. A. Mulik)

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Annual Teaching Plan

Academic year 2024 -2025 Semester IV Department -Statistics

Subject - Statistics Course - **DSC-VII: DSC03STA41** Title –Probability Distributions II

Section I- Probability Distributions II

Name of teacher – Bhosale A. B.

Month- December			Module/Unit	Sub-units planned
Lectures 6	Practicals 8	Total 14	Unit-1: Uniform, Normal, Exponential distribution	1.Uniform distribution 2.Exponential distribution
Month-January				
Lectures 10	Practicals 16	Total 26	Unit-1: Uniform, Normal, Exponential distribution	1.Normal distribution with parameters μ & σ^2. Standard normal distribution 2.Properties of Normal distribution 3.Numerical examples
Month-February				
Lectures 10	Practicals 16	Total 26	Unit-2: Gamma Distribution, Beta distributions and Exact Sampling Distributions	1. Gamma distribution 2.Beta distribution of 1st kind
Month- March				
Lectures 9	Practicals 16	Total 25	Unit-2: Gamma Distribution, Beta distributions and Exact Sampling Distributions	1. Beta distribution of 1st kind 2. Chi-Square distribution
Month- April-May				
8	Practicals 16	Total 24	Unit-2: Gamma Distribution, Beta distributions and Exact Sampling Distributions	3. Student's t- distribution 4. Snedecor's F distribution. 5. Inter relation between t, F and χ^2

Name & Signature of Teacher
(Bhosale A.B.)

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Mrs. V. C. Shinde

Annual Teaching Plan

Academic year 2024-2025 B.Sc. II Semester IV Department -Statistics

Subject - Statistics Course Code: DSC03STA42 Title –Testing of hypothesis & National Income

DSC-VIII: Testing of Hypothesis & National Income

Name of teacher – Mulik M.A

Month November -December			Module/Unit	Sub-units planned
Lectures 12	Practicals 20	Total 32	Unit-I Testing of Hypothesis I	1. Definitions: Population, sample, hypothesis and types of hypotheses, Simple & composite hypothesis One and two tailed tests. 2. Type I and type II errors, level of significance, p-value, Critical region, power of test. 3. Large sample tests: General procedure of testing 4. Large sample tests for: $\mu=\mu 0$ and $H_0: \mu 1 = \mu 2$
Month-January				
Lectures 8	Practicals 20	Total 28	Unit-2 Testing of Hypothesis I & II	1. $H_0: P_1 = P_2$, $H_0: \rho_1 = \rho_2$ 2. Exact/Small sample tests based on t distribution: $\mu=\mu 0$ and $H_0: \mu 1 = \mu 2$ 3. $H_0: \rho = \rho_0$
Month-February				
Lectures 8	Practicals 12	Total 20	Unit-2 Testing of Hypothesis II	1. Test based on chi-square distribution: $H0: \sigma^2 = \sigma 0^2$ 2. Test of goodness of fit 3. Test for independence of attributes
Month- March				
Lectures 10	Practicals 20	Total 30	Unit-2 & 3 Testing of Hypothesis II and National Income	1. F test for testing equality of two population variances $H0: \sigma 1^2 = \sigma 2^2$ 2. Definitions of national income by (a) Marshall, (b) Pigou and (c) Fisher. 3. Different concepts of national income
Month- April- May				
Lectures 12	Practicals 20	Total 32	Unit 3 : National Income	1. Methods of estimation of national income and the difficulties inmethods. (a) output method, (b) income method, (c) expenditure method. 2. Importance of national income.

M.A. Mulik
Name & Signature of Teacher

MJ · M.A · Mulik

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Annual Teaching Plan

Academic year 2024-2025 Semester III Department -Statistics

Subject - Statistics Title -Predictive Modelling Course -MIN03STA31

Name of teacher – Patil D.D.

Month-July			Module/Unit	Sub-units planned
Lectures 06	Practicals 16	Total 22	Unit-I Multiple Linear Regression (for trivariate data only)	1. Concept of multiple linear regression 2. plane of regression, Yule's notation, correlation matrix. 3. Fitting of regression plane by method of least squares
Month-August				
Lectures 08	Practicals 16	Total 24	Unit -I Multiple and Partial Correlation	1. Concept of multiple correlations. 2. Definition of multiple correlation coefficient Ri.jk 3. Coefficient of multiple determination $R^2_{i.jk}$. 4. Concept of partial correlation, Definition of partial correlation coefficient $r_{ij.k}$ & its properties.
			Unit-I Logistic Regression	1. Introduction to logistic regression 2. Difference between linear and 3. logistic regression, Logistic equation, Odds ratio in logistic regression.
Month-September				
Lectures 08	Practicals 16	Total 24	Unit-2 Introduction of Time Series Analysis:	1. Introduction to Time Series, Definition and uses of time series 2. Components of time series, Additive and Multiplicative model. 3. Methods of determination of trend
Month- October – November				
Lectures 17	Practicals 24	Total 41	Unit-2 Introduction of Time Series Analysis:	1. Moving Average, Progressive 2. Average, Least Square method. 3. Determination of seasonal variation: Simple average method. 4. Autoregressive Model AR(1), Moving Average Model MA(1)

Name & Signature of Teacher

(Mr. D. D. Patil)

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Annual Teaching Plan

Academic year 2024 -2025 Semester III Department -Statistics

Subject - Statistics Title –Hypothesis Testing Course Code-MIN03STA32

Name of teacher – Tangawade A. S.

Month-July			Module/Unit	Sub-units planned
Lectures 04	Practicals	Total 04	Unit-1 Large Sample Tests	1. Concept of normal distribution and its properties. 2. Sampling distribution of Statistic, hypothesis, Simple and composite hypothesis, Null and alternative hypothesis, One and two tailed tests, 3. Critical region, type I and type II errors, level of significance, p value, power of test.
Month-August				
Lectures 10	Practicals	Total 10	Unit-1 Large Sample Tests	4. General procedure of testing of hypothesis. 5. Test for means 6. Test for proportion 7. Testing population correlation coefficient
Month-September				
Lectures 08	Practicals	Total 08	Unit-2 Small Sample Tests	1. Definition of student's t variate, Sketch of student t distribution 2. t test for testing H_0: $\mu=\mu_0$, H_0: $\mu_1 = \mu_2$, paired t test.
Month- October-November				
Lectures 17	Practicals	Total 17	Unit-2 Small Sample Tests	3. Definition of Chi square variate, Sketch of chi square distribution. 4. Test for population variance 5. Test for goodness of fit. 6. Test for independent of attributes

Name & Signature of Teacher

Mr. A. S. Tangawade

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Annual Teaching Plan

Academic year 2024 -2025 Semester IV Department -Statistics

Subject - Statistics Title: Sampling Techniques Course : MIN03STA42

Name of teacher Patil D.D.

Month-December			Module/Unit	Sub-units planned
Lectures 08	Practicals 16	Total 24	Unit-1 Sampling Survey	1. Advantages and disadvantages of sampling methods 2. Principles of sampling survey, Principal steps in sample survey. 3. Designing a questionnaire, Characteristics of good Questionnaire.
Month-January				
Lectures 09	Practicals 12	Total 21	Unit-1 Sampling Survey	4. SRS: Simple random sampling from finite population of size N with replacement (SRSWR) and without replacement (SRSWOR) 5. In SRSWOR, the probability of a specified unit being selected in sample
Month-February				
Lectures 08	Practicals 16	Total 24	Unit-2.1 Methods of Sampling:	1. In SRSWOR, the probability of drawing a sample of size 'n' from a population of size N units is $1/(Nn)$ 2. In SRSWR, the probability of a specific unit included in the sample is $(1-1/N)/n$
Month- March				
Lectures 08	Practicals 16	Total 24	Unit-2.2 Stratified random sampling:	3. statement of unbiased estimator of population means and its variance under SRSWR & SRSWOR
Month- April-May				
Lectures 18	Practicals 24	Total 42	Unit-2 Non-Probability Sampling	4. Definition, Mean and Variance, sample size determination of ith 5. stratum under equal allocation, proportional allocation.

Name & Signature of Teacher
(Patil D.D)

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Annual Teaching Plan

Academic year 2024 -2025 Semester IV Department -Statistics

Subject - Statistics Course Title: Applied Statistics Course Code:MIN03STA41

Name of teacher – Tangawade A. S.

Month-December			Module/Unit	Sub-units planned
Lectures 08	Practicals	Total 08	Unit-1 Index Numbers	1. Meaning and utility of index numbers, problems in construction of index numbers. 2. Types of index numbers: price, quantity and value. 3. Unweighted and weighted index numbers
Month-January				
Lectures 09	Practicals	Total 09	Unit-1 Index Numbers	4. Index numbers using Laspeyre's, Paasche's and Fisher's formula. 5. Tests of index number 6. Cost of living index number 7. Shifting of base, splicing and purchasing power of money.
Month-February				
Lectures 08	Practicals	Total 08	Unit-2 Statistical Quality Control	1. Meaning and purpose of S.Q.C., 2. Process control, Product control, 3. Seven SPC tools, 4. Shewhart's control chart: construction &working, lack of control situation.
Month- March				
Lectures 08	Practicals	Total 08	Unit-2 Statistical Quality Control	5. Control charts for variables (Statement only): control chart for mean, 6. control chart for range, 7. construction and working of mean & range charts for unknown standards.
Month- April-May				
Lectures 18	Practicals	Total 18	Unit-2 Statistical Quality Control	8. Control charts for Attributes: Defects, defectives, fraction defective, 9. control chart for fraction defective (p-chart) for fixed sample size and unknown standards, construction and working, Control charts for number of defects (C-chart) for unknown standards, construction and working

Name & Signature of Teacher

Mr. A. S. Tangawade

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Annual Teaching Plan

Academic year 2024 -2025 Semester V Department -Statistics

Subject - Statistics Title –Probability Distributions

Paper No. IX Probability Distributions I

Name of teacher – Bhosale A. B.

Month-July			Module/Unit	Sub-units planned
Lectures 9	Practicals 15	Total 24	Unit-1 Univariate Continuous Probability Distributions	1. Laplace (Double Exponential) Distribution 2. Lognormal Distribution 3. Cauchy Distribution
Month-August				
Lectures 13	Practicals 20	Total 33	Unit -1 Univariate Continuous Probability Distributions	4. Weibull Distribution 5. Relation of Weibull distribution with gamma and exponential distribution, 6. Examples and problems.
			Unit-2 Univariate and Multivariate Probability Distributions	1. Logistic distribution 2. Pareto distribution 3. Power series distribution
Month-September				
Lectures 12	Practicals 20	Total 32	Unit-2 Univariate and Multivariate Probability Distributions	4. Multinomial distribution 5. Trinomial distribution as particular case of multinomial distribution.
			Unit-3 Truncated Distributions	1. Truncated distribution as conditional distribution,. 2. Truncated binomial distribution 3. Truncated Poisson distribution 4. Truncated normal distribution
Month- October-November				
Lectures 9	Practicals 15	Total 24	Unit-4 Bivariate Normal Distribution	1. P. d. f. of a bivariate normal distribution, 2. Marginal and conditional distributions 3. Conditional expectation and conditional variance

Name & Signature of Teacher

(Bhosale A. B.)

Mrs. V. C. Shinde

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Annual Teaching Plan

Academic year 2024 -2025 B.Sc. III Semester V

Department -Statistics

Subject - Statistics Title – Statistical Inference - I

Course Code - DSE 1004E2

Paper No. X Statistical Inference - I

Name of teacher – Makandar A. M.

Month-July			Module/Unit	Sub-units planned
Lectures 13	Practicals 20	Total 33	Unit-1 Point Estimation	1. Concept and definition of Point estimation 2. Definition of an estimator (statistic) & its S.E., 3. Properties of estimator 4. Unbiased estimators and results regarding unbiased estimators
Month-August				
Lectures 12	Practicals 20	Total 32	Unit-1 Point Estimation	5. Relative efficiency 6. Minimum Variance Unbiased Estimator and Uniformly Minimum Variance Unbiased Estimator 7. Consistency
			Unit-2 Likelihood and Sufficiency	1. Definition of likelihood function 2. Sufficiency 3. Pitman Koopman form and sufficient statistic
Month-September				
Lectures 12	Practicals 20	Total 32	Unit-2 Likelihood and Sufficiency	4. Fisher information function 5. Concept of minimal sufficient statistic 6. Illustrative examples.
			Unit-3 Cramer's Rao Inequality	1. Cramer Rao inequality. 2. Minimum Variance Bound Unbiased Estimator (MVBUE) of $\phi(\theta)$. 3. Some results related to MVBUE
Month- October- November				
Lectures 13	Practicals 20	Total 33	Unit-4 Method of Estimation	1. Method of maximum likelihood 2. Invariance property of MLE, relation between MLE and sufficient statistic. 3. Method of moments 4. Method of minimum chi-square

Name & Signature of Teacher

MS A.M. Makandar

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Annual Teaching Plan

Academic year 2024-2025 Semester V Department -Statistics

Subject - Statistics Title – Sampling Theory Course Code -DSE1004E3

Paper No. XI Sampling Theory

Name of teacher – Mrs. V. C. Shinde

Month-July			Module/Unit	Sub-units planned
Lectures 08	Practicals 04	Total 12	Unit-1 Basic Terminology, SRS and Stratified Sampling	1. Basic Terminology 2. Simple random sampling, SRSWR, SRSWOR 3. SRS for attributes 4. Determination of the sample size
Month-August				
Lectures 12	Practicals 20	Total 32	Unit-2	1. Stratified random sampling 2. Determination of the sample size under proportional and Neyman allocation 3. Comparison amongst SRSWOR, stratification with proportional optimum allocation.
Month-September				
Lectures 12	Practicals 20	Total 32	Unit-2 Other Sampling Methods	1. Systematic Sampling: Real life situations, technique of drawing a sample 2. Comparison of SRS, stratified and systematic sampling when population is in linear trend 3. Circular Systematic Sampling. 4. Cluster Sampling, Two Stage and Multi Stage Sampling, 5. Systematic sampling as a particular case of cluster sampling.
Month- October				
Lectures 13	Practicals 20	Total 33	Unit-4 Sampling Methods using Auxiliary variables	1. Ratio Method: Concept of auxiliary variable and its use in estimation 2. Situations where Ratio method is appropriate. 3. Relative efficiency of ratio estimators with that of SRSWOR 4. Regression Method, Relative efficiency of regression estimators over SRSWOR

Name & Signature of Teacher

Mrs. V.C Shinde

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DEPARTMENT OF STATISTICS

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Annual Teaching Plan

Academic year 2024-2025 Semester V Department -Statistics

Subject - Statistics Title – Operations Research Course Code: DSE1004E4

Name of teacher – Tangawade. A. S.

Month-July			Module/Unit	Sub-units planned
Lectures 8	Practicals 12	Total 20	Unit-1 Linear programming, TP and AP	1. Concept and formulation of problem as LPP 2. Some definitions
Month-August				
Lectures 12	Practicals 20	Total 32	Unit-1 Linear programming, TP and AP	3. Solution of L.P.P.: a) Graphical Method b) Simplex Method c) Big-M method d) Duality Theory Examples and problems
Month-September				
Lectures 12	Practicals 16	Total 28	Unit-1 Linear programming, TP and AP	4. Transportation problem (T.P.) IBFS by NWCR, LCM and VAM, MODI method of obtaining optimum solution 5. Assignment Problem (A.P.): Optimum solution by using Hungarian method. 6. Sequencing Problem
Month- October November				
Lectures 29	Practicals 28	Total 57	Unit-2 Decision Theory and Simulation Techniques	1. Basic concept and some definitions 2. Type of decision-making environments. 3. Decision making under uncertainty 4. Decision making under risk Meaning of simulation 5. Methods of generating random number 6. Techniques of generating and continuous distributions

Name & Signature of Teacher

Mr. A S Tangawade

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Annual Teaching Plan

Academic year 2024 -2025 Semester VI Department -Statistics

Subject - Statistics Title – Probability Distributions

Paper No. XIII: Probability Theory

Name of teacher – Bhosale A. B.

Month- November -December			Module/Unit	Sub-units planned
Lectures 13	Practicals 30	Total 43	Unit-1 Order Statistics	1. Order statistics: definition, derivation of distribution function and density function of the ith order statistic. 2. Derivation of joint p. d. f. of i -th and j-th order statistics
Month- January				
Lectures 14	Practicals 20	Total 34	Unit-1 Order Statistics	3. Distribution of the sample range and sample median when n is odd. 4. Examples and Problems.
			Unit-2 Convergence and Limit Theorem	1. Convergence: Definition and modes of convergence 2. WLLN i. i. d. random variables
Month- February				
Lectures 13	Practicals 20	Total 33	Unit-2 Convergence and Limit Theorem	3. Central Limit Theorem: Statement and proof 4. Simple examples based on Bernoulli, binomial, Poisson and chi-square distribution.
			Unit-3 Finite Markov Chains	1. Definition, examples and classification of stochastic process 2. Markov chain: Definition and examples of Markov chain, 3. Classification of states, simple problems.
Month- March				
Lectures 11	Practicals 25	Total 36	Unit-3 Finite Markov Chains	4. Stationary probability distribution, applications. 5. Continuous Markov chain: Pure birth process, Poisson process, birth and death process.
Month- April-May				
Lectures 11	Practicals 20	Total 31	Unit-4 Queuing Theory	1. Basic concepts in queuing theory 2. Distribution of arrival, inter arrival time, departure and service time. 3. Types of queuing models.

Name & Signature of Teacher

(Bhosale A.B.)

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Annual Teaching Plan

Academic year 2024 -2025 B.Sc. III Semester VI Department -Statistics

Subject - Statistics Title – Statistical Inference – II Course Code- DSE 1004F2

Paper No. XIV Statistical Inference II

Name of teacher – Makandar A. M.

Month- November-December			Module/Unit	Sub-units planned
Lectures 13	Practicals 20	Total 33	Unit-1 Interval Estimation	1. Notion of interval estimation and some definitions 2. Pivotal quantity and its use in obtaining confidence intervals and bounds. 3. Interval estimation for the different cases of normal distribution
Month-January				
Lectures 13	Practicals 20	Total 33	Unit-2 Parametric Test	1. Statistical hypothesis, problems of testing of hypothesis. 2. Most Powerful (MP) test. 3. Neyman - Pearson (NP) lemma 4. Likelihood Ratio Test
Month-February				
Lectures 12	Practicals 20	Total 32	Unit-3 Sequential Test	1. General theory of sequential analysis and its comparison with fixed sample procedure. 2. Wald's SPRT of strength (α, β) 3. Illustrations for standard distributions 4. Graphical and tabular procedure for carrying SPRT
Month- March				
Lectures 12	Practicals 20	Total 32	Unit-4 Non – Parametric Test	1. Notion of non-parametric statistical inference (test) and its comparison with parametric statistical inference. 2. Concept of distribution free statistic.
Month- April-May				
Lectures 13	Practicals 20	Total 33	Unit-4 Non – Parametric Test	3. Some non-parametric tests: Run test, Sign test, Wilcoxon's signed rank test, Mann-Whitney U –test, Median test, and Kolmogorov Smirnov test

Name & Signature of Teacher

M.S. A.M. Makandar

Mrs. V. C. Shinde

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Annual Teaching Plan

Academic year 2024 -2025 Semester VI Department -Statistics

Subject - Statistics Title – Design of Experiment Course Code -DSE1004F3

Paper No. XV Design of Experiment

Name of teacher – Mrs. V. C. Shinde

Month- November - December			Module/Unit	Sub-units planned
Lectures 16	Practicals 20	Total 113	Unit-1 Simple Design of Experiment	1. Basic terms in design of experiments, 2. Principles of design of experiments 3. Completely Randomized Design (CRD)
Month- January				
Lectures 13	Practicals 20	Total 82	Unit-2 Simple Design of Experiment	1. Randomized Block Design (RBD) 2. Latin Square Design (LSD) 3. Missing plot technique for RBD and LSD 4. Identification of real life situations where CRD, RBD and LSD are used.
Month- February				
Lectures 12	Practicals 20	Total 92	Unit-3 Efficiency of design, ANOCOVA and Factorial experiments	1. Efficiency of design 2. Analysis of Covariance (ANOCOVA) with one concomitant variable: Purpose of ANOCOVA 3. Practical situations 4. Estimation of parameters
Month- March-April				
Lectures 16	Practicals 24	Total 90	Unit-4 Factorial Experiment	1. Concept of factorial experiments 2. Definitions of main effects and interaction effects 3. ANOVA for 2^2 and 2^3 factorial experiments arranged in RBD. 4. Total confounding and Partial Confounding

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Annual Teaching Plan

Academic year 2024 -2025 Semester VI Department -Statistics

Subject - Statistics Title: Quality Management Course Code: DSE1004F4

Name of teacher – Tangawade. A. S.

Month- November: December			Module/Unit	Sub-units planned
Lectures 19	Practicals 16	Total 35	Unit-1 Process Control	1. Meaning and dimensions of quality 2. Seven magnificent tools of quality 3. Deming's PDCA cycle and its applications.
Month-January				
Lectures 13	Practicals 20	Total 33	Unit-1 Process Control	4. CUSUM chart, tabular form, 5. Moving average and exponentially weighted moving average charts.
Month-February				
Lectures 12	Practicals 16	Total 28	Unit-2 Product Control	1. Six-sigma methodology, 2. DMAIC cycle and case studies
Month- March				
Lectures 13	Practicals 16	Total 29	Unit-2 Product Control	3. Sampling Inspection plans for attribute inspection: Concept of AQL, LTPD
Month- April-May				
Lectures 25	Practicals 30	Total 55	Unit-2 Product Control	4. Consumer's risk, and producer's risk, AOQ, AOQL, OC, ASN and ATI. Single and double sampling plans

Name & Signature of Teacher

Mr. A.S. Tangawade

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Annual Teaching Plan

Academic year 2024 -2025 B. Com. Part – I(SEC) Semester I Department -Statistics

Subject - Statistics Title – Business Statistics I Course Code - SEC02STA11

Name of teacher – Kumbhar R.R

Month-July			Module/Unit	Sub-units planned
Lectures 16	Practicals ---	Total 16	Unit-1 Introduction to Statistics &Sampling Techniques	1. Meaning and scope of Statistics. 1. Basic terms 2. Diagrammatic Representation of Data 3. Graphical Representation of Data 4. Illustrative Examples
Month-August				
Lectures 12	Practicals ---	Total 12	Unit-1 Introduction to Statistics &Sampling Techniques	5. Definitions 6. Sample Survey 7. Methods of Sampling
Month-September				
Lectures 13	Practicals ---	Total 13	Unit-2 Measures of Central Tendency & Dispersion	1. Concept of central tendency, Mean, median and mode, 2. Partition values 3. Empirical relation 4. Examples 5. Merits and Demerits of Mean, Median and Mode.
			Unit-2 Measures of Central Tendency & Dispersion	6. Concept of Dispersion 7. Absolute and Relative measures of dispersion. 8. Range, Coefficient of Range, 9. Quartile Deviation (Q.D.), Coefficient of Q.D., M.D. about Mean, Coefficient of M.D. about mean 10. Numerical Examples.
Month- October-November				
Lectures 16	Practicals ---	Total 16	Unit-2 Measures of Central Tendency & Dispersion	11. Standard Deviation (S.D.) 12. Variance, Coefficient of Variation, (C.V.), 13. Combined S.D. for two groups. 14. Merits and Demerits of Range, Q.D., M.D. and S.D. 15. Numerical Examples.

Name & Signature of Teacher

Dr. R. R. kumbhar

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Annual Teaching Plan

Academic year 2024 -2025 B.Com. Part – I(SEC) Semester I Department -Statistics

Subject - Statistics Title – Business Statistics I Course Code - SEC02STA11

Name of teacher – Makandar A.M.

Month-July			Module/Unit	Sub-units planned
Lectures 16	Practicals BSc-II 16	Total 32	Unit-1 Introduction to Statistics &Sampling Techniques	1. Meaning and scope of Statistics. 2. Basic terms 3. Diagrammatic Representation of Data 4. Graphical Representation of Data 5. Illustrative Examples
Month-August				
Lectures 16	Practicals 20	Total 36	Unit-1 Introduction to Statistics &Sampling Techniques	6. Definitions 7. Sample Survey 8. Methods of Sampling
Month-September				
Lectures 10	Practicals 12	Total 22	Unit-2 Measures of Central Tendency & Dispersion	1. 1.Concept of central tendency, Mean, median and mode, 2. Partition values 3. Empirical relation 4. Examples 5. Merits and Demerits of Mean, Median and Mode.
			Unit-2 Measures of Central Tendency & Dispersion	6. Concept of Dispersion 7. Absolute and Relative measures of dispersion. 8. Range, Coefficient of Range, 9. Quartile Deviation (Q.D.), Coefficient of Q.D., M.D. about Mean, Coefficient of M.D. about mean 10. Numerical Examples.
Month- October-November				
Lectures 16	Practicals 16	Total 32	Unit-2 Measures of Central Tendency & Dispersion	11. Standard Deviation (S.D.) 12. Variance, Coefficient of Variation, (C.V.), 13. Combined S.D. for two groups. 14. Merits and Demerits of Range, Q.D., M.D. and S.D. 15. Numerical Examples.

Name & Signature of Teacher

M.S. A.M. Makandar

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Academic year 2024 -2025

B. Com. Part – I(SEC) Semester II Department -Statistics

Subject - Statistics Title – Business Statistics – II Course Code - SEC02STA21

Name of teacher – Kumbhar. R.R.

Month-December			Module/Unit	Sub-units planned
Lectures 15	Practicals	Total 15	Unit-1 Probability and Discrete Probability Distributions	1. Basic concepts in probability 2. Conditional probability. 3. Random variable, Probability mass function, cumulative distribution function 4. Expectation of r.v
Month-January				
Lectures 16	Practicals	Total 16	Unit-1 Probability and Discrete Probability Distributions	5. Binomial distribution: Properties and 6. examples 7. Poisson distribution: Properties and examples 8. Numerical examples.
Month-February				
Lectures 13	Practicals	Total 13	Unit-2 Statistical Quality Control (S.Q.C.):	1. Concept and need of S.Q.C. 2. Advantages of S.Q.C. 3. Chance and assignable causes, process control and product control.
Month- March				
Lectures 16	Practicals	Total 16	Unit-2 Statistical Quality Control (S.Q.C.):	4. Control chart and its construction. 5. Control charts for variable: Mean and range chart. 6. Control charts for attribute 7. Numerical examples.
Month- April-May				
Lectures 18	Practicals	Total 18	Unit-2 Statistical Quality Control (S.Q.C.):	8. Control charts for attribute 9. Numerical examples.

Name & Signature of Teacher

Dr. R.R. Kumbhar

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Annual Teaching Plan
Academic year 2024 -2025

B. Com. Part – I (SEC) Semester II Department -Statistics

Subject - Statistics Title – Business Statistics – II Course Code - SEC02STA21

Name of teacher – Makandar A.M

Month-December			Module/Unit	Sub-units planned
Lectures 17	Practicals BSc-II 16	Total 33	Unit-1 Probability and Discrete Probability Distributions	1. Basic concepts in probability 2. Conditional probability. 3. Random variable, Probability mass function, cumulative distribution function 4. Expectation of r. v
Month-January				
Lectures 16	Practicals 16	Total 32	Unit-1 Probability and Discrete Probability Distributions	5. Binomial distribution: Properties and 6. examples 7. Poisson distribution: Properties and examples 8. Numerical examples.
Month-February				
Lectures 16	Practicals 12	Total 28	Unit-2 Statistical Quality Control (S.Q.C.):	1. Concept and need of S.Q.C. 2. Advantages of S.Q.C.
Month- March				
Lectures 15	Practicals 16	Total 31	Unit-2 Statistical Quality Control (S.Q.C.):	3. Chance and assignable causes, process control and product control. 4. Control chart and its construction.
Month- April-May				
Lectures 16	Practicals 16	Total 32	Unit-2 Statistical Quality Control (S.Q.C.):	5. Control charts for variable: Mean and range chart. 6. Control charts for attribute 7. Numerical examples.

Name & Signature of Teacher

MS. A.M. Makandar

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Annual Teaching Plan

Academic year 2024 -25 B.Com. Part-II Semester III Department -Statistics

Subject - Statistics Course - SEC02STA31

Paper I: Business Statistics III

Name of teacher – **Ransubhe. P.V.**

Month-July			**Module/Unit**	**Sub-units planned**
Lectures 32	Practicals -	Total 32	Unit-1 Correlation	1.Concept and types of correlation. 2.Methods of studying correlation: Scatter diagram 3.Karl Pearson's correlation coefficient (r), computation of r for ungrouped data 4.Properties of correlation coefficient (r): (i) $-1 \leq r \leq 1$, interpretation of r = -1, r = 0, r = +1. (ii) Effect of change of origin and scale
Month-August				
Lectures 24	Practicals B.Sc. II 08	Total 32	Unit-1 Correlation	1.Spearman's rank correlation coefficient(R) 2.Computation of R (with and without tie). 3.Numerical problems.
Month-September				
Lectures 24	Practicals B.Sc. II 32	Total 56	Unit-2 Regression	1.Concept of regression. 2.Lines of regression 3.Fitting of lines of regression by least square method
Month- October				
Lectures 12	Practicals B.Sc. II 08	Total 20	Unit-2 Regression	1.Regression coefficients b_{xy} & b_{yx} 2.Properties of regression coefficients 3.Numerical problems.

Name & Signature of Teacher
(Ms. P.V. Ransubhe)

Ms. V. C. Shinde

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Annual Teaching Plan

Academic year 2024 -25 B.Com. Part-II Semester III Department -Statistics

Subject - Statistics Course - SEC02STA31

Paper I: Business Statistics III

Name of teacher – **Patil D. D.**

Month-September				
Lectures 08	Practicals -	Total 08	Unit-2 Regression	1.Concept of regression. 2.Lines of regression 3.Fitting of lines of regression by least square method
Month- October				
Lectures 08	Practicals -	Total 08	Unit-2 Regression	1.Regression coefficients b_{xy} & b_{yx} 2.Properties of regression coefficients 3.Numerical problems.

Name & Signature of Teacher

(Mr. O.D. Patil)

Mrs. V. C. Shinde

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Annual Teaching Plan

Academic year 2024-25 B.Com. Part-II Semester IV Department -Statistics

Subject - Statistics Course - SEC02STA41

Paper II: Business Statistics IV

Name of teacher – **Ransubhe P. V.**

Month- November -December			**Module/Unit**	**Sub-units planned**
Lectures 30	Practicals B.Sc. II 16	Total 46	Unit-1 Time Series	1.Definition and uses of time series, components of time series. 2.Additive and multiplicative models, 3.Methods of determination of trend: method of moving averages, method of progressive averages, method of least squares (only for straight line)
Month-January				
Lectures 24	Practicals B.Sc. II 16	Total 40	Unit-1 Time Series	1.Method of determination of seasonal variations: Simple average method 2.Numerical problems
Month-February				
Lectures 24	Practicals B.Sc. II 16	Total 40	Unit-2 Index Number	1.Need and meaning of index number. 2.Problems involved in construction of index number. 3.Price, quantity and value index number. 4.Simple (unweighted) index number
Month- March				
Lectures 24	Practicals B.Sc. II 16	Total 40	Unit-2 Index Number	1.Weighted index numbers: Laspeyre's, Paasche's and Fisher's index numbers. 2.Cost of living index number: Definition, construction by using family budget method and Expenditure method.
Month- April-May				
Lectures 24	Practicals B.Sc. I 16	Total 40	Unit-2 Index Number	1.Uses of index numbers 2.Numerical problems

Name & Signature of Teacher

(Ms. P. V. Ransubhe)

Ms. V. C. Shinde

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Annual Teaching Plan

Academic year 2024-25 B.Com. Part-II Semester IV Department -Statistics

Subject - Statistics Course - SEC02STA41

Paper II: Business Statistics IV

Name of teacher – **Patil D. D.**

Month- November -December			**Module/Unit**	**Sub-units planned**
Lectures 10	Practicals -	Total 10	Unit-1 Time Series	1.Definition and uses of time series, components of time series. 2.Additive and multiplicative models, 3.Methods of determination of trend: method of moving averages, method of progressive averages, method of least squares (only for straight line)
Month-January				
Lectures 08	Practicals -	Total 08	Unit-1 Time Series	1.Method of determination of seasonal variations: Simple average method 2.Numerical problems
Month-February				
Lectures 08	Practicals -	Total 08	Unit-2 Index Number	1.Need and meaning of index number. 2.Problems involved in construction of index number. 3.Price, quantity and value index number. 4.Simple (unweighted) index number
Month- March				
Lectures 08	Practicals -	Total 08	Unit-2 Index Number	1.Weighted index numbers: Laspeyre's, Paasche's and Fisher's index numbers. 2.Cost of living index number: Definition, construction by using family budget method and Expenditure method.
Month- April-May				
Lectures 12	Practicals -	Total 12	Unit-2 Index Number	1.Uses of index numbers 2.Numerical problems

Name & Signature of Teacher

(Mr. D. D. patil)

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Annual Teaching Plan

Academic year 2024-2025 Semester I Department -Statistics

Subject - Statistics Title - DISTRIBUTION THEORY Course Code - DSC17STA11
Name of teacher – Tangawade A. S.

Month-July			Module/Unit	Sub-units planned
Lectures 08	Practicals 16	Total 24	Unit-1 Random experiment	1. Review of Random experiment 2. Discrete random variables, continuous random variables. 3. Cumulative distribution function (CDF), properties of CDF.
Month-August				
Lectures 18	Practicals 16	Total 34	Unit -1 Random experiment	4. Computation of probabilities of events using CDF, quantiles 5. absolutely continuous and discrete distributions 6. Mixtures of probability distributions 7. Decomposition of mixture CDF into discrete and continuous CDFs 8. expectation and variance of mixture distributions.
			Unit-2 Transformation	1. Transformations of univariate random variables 2. probability integral transformation.
Month-September				
Lectures 16	Practicals 16	Total 32	Unit-2 Transformation	3. Concepts of location, scale and shape parameters of distributions with examples. 4. Symmetric distributions and their properties. 5. Moment inequalities
			Unit-3 Multivariate Normal Distribution	1. Random vectors, joint distributions, Independence, variance-covariance matrix, joint MGF. Conditional expectation and variances, 2. Transformations of bivariate random variables, Poisson distribution. 3. Convolutions, compound distributions.
Month- October-November				
Lectures 31	Practicals 24	Total 55	Unit-4 Sampling distributions	1. Sampling distributions of statistics from univariate normal random samples. 2. Distributions of linear and quadratic forms involving normal random variables 3. Fisher Cochran and related theorems. 4. Distribution of an order statistics.

Name & Signature of Teacher
Mr. A. S. Tangawade

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Annual Teaching Plan

Academic year 2024-2025 Semester I Department -Statistics

Subject - Statistics Course - DSC17STA12 Title - ESTIMATION THEORY

Paper No. II- ESTIMATION THEORY

Name of teacher – Bhosale A.B.

Month-July			Module/Unit	Sub-units planned
Lectures 12	Practicals 16	Total 28	Unit-1 Sufficiency, Completeness	1. Sufficiency principle, minimal sufficient statistic for exponential family, Pitman family. 2. Completeness, bounded completeness, ancillary statistics, Basu's theorem and applications.
Month-August				
Lectures 17	Practicals 16	Total 33	Unit-2 Point estimation, Rao- Blackwell theorem and Lehmann-Scheffe theorem	1. Problem of point estimation, 2. Unbiased estimators, minimum variance unbiased estimator, 3. Rao- Blackwell theorem and Lehmann-Scheffe theorem and their uses.
Month-September				
Lectures 16	Practicals 12	Total 28	Unit-2 MVUE, Cramer-Rao inequality, Chapman-Robinson bounds, Bhattacharya bounds	4. Necessary and sufficient condition for MVUE and their applications. 5. Fisher information and information matrix, Cramer- Rao inequality, Chapman-Robinson bounds, 6. Bhattacharya bounds, their applications.
			Unit-3 MLE, Method of moments, minimum Chi square. U-Statistics	1. Method of maximum likelihood (MLE) and small sample properties of MLE 2. Method of scoring and application to estimation in multinomial distribution. MLE in non-regular families. 3. Other methods of estimation: method of moments, minimum Chi square. U-Statistics
Month- October-November				
Lectures 17	Practicals 16	Total 33	Unit-4 Bayes estimation	1. The concept of prior distributions 2. posterior distribution 3. Bayes estimation under squared error and absolute error loss functions.

Name & Signature of Teacher

(Bhosale A.B.)

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Mrs. V. C. Shinde

Annual Teaching Plan

Academic year 2024-2025 | Semester I | Department -Statistics

Subject - Statistics | Title - STATISTICAL COMPUTING | Course Code - DSC17STA13

Name of teacher: Ms. Patil R. M.

Month-July			Module/Unit	Sub-units planned
Lectures 04	Practicals 08	Total 12	Unit-1 MSEXCEL	1. MSEXCEL: Introduction 2. Working with Multiple Worksheets and Workbooks.
Month-August				
Lectures 08	Practicals 08	Total 16	Unit-1 MSEXCEL	1. Built in mathematical and statistical functions for obtaining descriptive statistic, computing PMF/PDF, CDF and quantiles of the well-known distributions 2. Lookup functions 3. Excel add-ins: analysis tool pack, Pivot tables and charts.
Month-September				
Lectures 10	Practicals 12	Total 22	Unit-2 R-software	1. R-software: Introduction to R, data types and objects, operators 2. data input, data import and export, built in functions for descriptive statistics
Month- October-November				
Lectures 14	Practicals 16	Total 30	Unit-2 R-software	3. random sampling and computation of pdf, cdf and quantiles of well-known distribution. 4. built in functions

Name & Signature of Teacher

(Ms. R.M. Patil)

Mrs. V. C. Shinde

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Annual Teaching Plan

Academic year 2024-2025 | Semester I | Department -Statistics

Subject - Statistics | Title - Research Methodology | Course Code: MIN17STA11

Name of teacher – Pandhare R. S.

Month-July			Module/Unit	Sub-units planned
Lectures 06	Practicals 12	Total 18	Unit-1 Meaning of research	1. Meaning of research, objectives of research 2. Motivation in research, types of research, research approaches
Month-August				
Lectures 16	Practicals 24	Total 40	Unit -1 Meaning of research	3. Significance of research, research methods vs. methodology, research and Scientific method, research process 4. Criteria of good research, defining research problem, research design 5. Research Ethics, publication of research, Plagiarism
			Unit-2 Sampling techniques	1. Sampling techniques 2. Two phase sampling, ratio and regression method of estimation
Month-September				
Lectures 14	Practicals 24	Total 38	Unit-2 Sampling techniques	3. Probability proportional to size sampling 4. Non-sampling errors, Hansen–Horwitz and Demings model for the effect of call-backs 5. Warners model, MLE in Warners model
			Unit-3 Simulation	1. Concept and need of simulation, requisites of a good random number generator 2. Algorithms for generating random numbers 3. Acceptance-Rejection Technique
Month- October-November				
Lectures 24	Practicals 32	Total 56	Unit-4 Resampling methods	1. Resampling methods: Bootstrap methods, Jackknife method 2. Newton-Raphson method, bisection method, quadrature formula, trapezoidal rule and Simpson's rules for single integral.

PandhareRS

Name & Signature of Teacher

Pandhare R S.

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DEPARTMENT OF STATISTICS

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Annual Teaching Plan

Academic year 2024-2025 | Semester I | Department -Statistics

Subject - Statistics | Title: C Programming | Course Code- DSE18STA21

Name of teacher – Jadhav M. A.

Month- July			Module/Unit	Sub-units planned
Lectures 10	Practicals 12	Total 22	Unit-1	1. Overview of Computer programming 2. Algorithms 3. Flow charts 4. Fundamentals of C programming
Month- August				
Lectures 16	Practicals 20	Total 36	Unit -2	1. Control Structures 2. Structured programming 3. Examples
Month- September				
Lectures 18	Practicals 16	Total 34	Unit-3	1. Arrays 2. Pointers 3. Examples 4. Dynamic Memory Allocations using MALLOC, CALLOC and REALLOC.
Month- October- November				
Lectures 22	Practicals 24	Total 46	Unit-4	1. Structures and Union 2. Operations on file using C Library Functions

MAJadhav

Name & Signature of Teacher

M.A. Jadhav

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Annual Teaching Plan

Academic year 2023-2024 Semester I Department -Statistics

Subject - Statistics Title - Mathematical Statistics Course - DSE17STA11

Name of teacher – Patil A. A.

Month-July			Module/Unit	Sub-units planned
Lectures 12	Practicals	Total 12	Unit-1	1. Sequences of real numbers, Convergence, divergence, monotone 2. Limit points, Limit inferior and limit superior
Month-August				
Lectures 16	Practicals	Total 16	Unit -1	3. Subsequence and properties 4. Series of numbers, tests for convergence test for absolute convergence
			Unit-2	1. Real valued functions, continuous functions, Uniform continuity of functions and sequences of functions. 2. Riemann, Riemann-Steltjes Integrals and their common properties.
Month-September				
Lectures 18	Practicals	Total 18	Unit-2	3. Maxima, minima of functions of several variables. 4. Theorem on differentiation under integral sign and Leibnitz rule (statements only) with applications.
			Unit-3	1. Vectors, linear dependence and independence of vectors, example 2. Gram-Schmidt orthogonalization process, Orthonormal basis, Linear transformations, 3. Cayley-Hamilton theorem and its applications.
Month- October- November				
Lectures 20	Practicals	Total 20	Unit-4	1. Generalized inverse, Vector and Matrix differentiation, 2. Choleskey decomposition, real quadratic forms, reduction and classification. 3. Index and signature, extrema of a quadratic form

Name & Signature of Teacher

Patil A.A.

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Annual Teaching Plan

Academic year 2024-2025 Semester II Department -Statistics

Subject - Statistics Title - Linear Models and Regression Analysis Course Code: DSC17STA21

Name of teacher: Patil R. M.

Month- December			Module/Unit	Sub-units planned
Lectures 12	Practicals 16	Total 28	Unit-1	1. General linear model 2. Gauss Markov theorem, variances and Covariance of BLUEs, 3. Distribution of quadratic forms for normal variables
Month- January				
Lectures 12	Practicals 16	Total 28	Unit-2	1. Multiple regression model, least squares estimate, Properties of LSE, 2. Hypothesis testing 3. Model adequacy checking. 4. Transformations to correct model inadequacies
Month- February				
Lectures 14	Practicals 24	Total 38	Unit-3	1. Multicollinearity. 2. Autocorrelation 3. Parameter estimation using Cochrane-Orcutt method. 4. Variable Selection Procedures
Month- March				
Lectures 14	Practicals 16	Total 30	Unit-4	1. Robust Regression: breakdown and efficiency. 2. Asymptotic distribution of M-estimator.
Month- April-May				
Lectures 20	Practicals 20	Total 40	Unit-4	3. Nonlinear Regression Models: nonlinear least squares 4. Transformation to a linear model

Name & Signature of Teacher

(Ms. patil R.M)

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Annual Teaching Plan

Academic year 2023-2024 Semester II Department -Statistics

Subject - Statistics Course DSC17STA22 Title - THEORY OF TESTING OF HYPOTHESIS

Paper No. VII-THEORY OF TESTING OF HYPOTHESIS

Name of teacher – Bhosale A.B.

Month- November-December			Module/Unit	Sub-units planned
Lectures 17	Practicals 16	Total 33	Unit-1	1. Problem of testing of Hypothesis, Simple and composite hypotheses. 2. Randomized and non- randomized tests, most powerful test, Neyman-Pearson Lemma and its applications. 3. Determination of minimum sample size to achieve the desired strengths.
Month- January				
Lectures 18	Practicals 16	Total 34	Unit -1	4. Monotone likelihood ratio property, UMP test, power function of a test, existence of UMP. 5. Tests for one-sided alternatives. Concept of p-value.
			Unit-2	1. UMP tests for two sided alternatives examples, their existence and non- existence. 2. Generalized Neyman Pearson lemma, unbiased test.
Month- February				
Lectures 16	Practicals 12	Total 28	Unit-2	3. UMPU test and their existence in the case of exponential families (Statements of the theorems only). 4. Similar tests, test with Neyman structure.
			Unit-3	1. Problem of confidence intervals 2. UMA and UMAU confidence intervals.
Month- March				
Lectures 16	Practicals 16	Total 32	Unit-4	1. Likelihood ratio test and its application to standard distribution. 2. Goodness of fit tests based on Chi-square distribution 3. Spearman's Rank Correlation Test; Kendall's Rank Correlation Test; Kruskal-Wallis Test; Fridman's Two-way analysis of variance by ranks.
Month- April-May				
Lectures 17	Practicals 16	Total 33		4. Spearman's Rank Correlation Test; Kendall's Rank Correlation Test 5. Kruskal-Wallis Test; Fridman's Two-way analysis of variance by ranks.

Name & Signature of Teacher

(Bhosale A.B.)

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Annual Teaching Plan

Academic year 2024-2025 | Semester II | Department -Statistics

Subject - Statistics | Title: Multivariate Analysis | Course Code- DSC17STA23

Name of teacher – Pandhare R. S.

Month- December			Module/Unit	Sub-units planned
Lectures 08	Practicals 08	Total 16	Unit-1	1. Review of Multivariate Normal distribution 2. Hotelling's T^2 Statistic, and its null distribution. Applications of T^2 statistics 3. Mahalanobis' D^2 statistic
Month- January				
Lectures 10	Practicals 12	Total 22	Unit -1	4. Wishart matrix and its distribution 5. Properties of Wishart distribution, distribution of generalized variance.
Month- February				
Lectures 12	Practicals 12	Total 24	Unit-2	1. Discrimination and classification. Fisher's discriminant function and likelihood ratio procedure, minimum ECM rule 2. Rao's U statistics and its use in tests associated with discriminant function,
Month- March				
Lectures 10	Practicals 12	Total 22	Unit-2	3. Classification with three populations. 4. Cluster analysis
Month- April-May				
Lectures 10	Practicals 16	Total 26	Unit-2	5. Heirarchical methods: Single, Complete, average linkage method 6. Principal component analysis

Pandhare R.S

Name & Signature of Teacher

Pandhare R.S

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Annual Teaching Plan

Academic year 2023-2024 Semester II Department -Statistics

Subject - Statistics Title - PROBABILITY THEORY Course - DSE 17STA21

Name of teacher – Tangawade A. S.

Month- November-December			Module/Unit	Sub-units planned
Lectures 15	Practicals 16	Total 31	Unit-1	1. Classes of sets 2. Probability measure, Probability space.
Month- January				
Lectures 19	Practicals 16	Total 35	Unit -2	1. Measurable function, random variable, distribution function of a random variable, 2. simple randomvariable 3. Method of obtaining a random variable as a limit of sequence of simple random variables.
Month- February				
Lectures 16	Practicals 16	Total 32	Unit-2	4. Integration of a measurable function with respect to a measure, expectation of a random variable 5. independence. Characteristic function, simple properties. 6. Inversion theorem and uniqueness property (Statement only).
			Unit-3	1. Monotone convergence theorem 2. Fatous Lemma, Dominated Convergence theorem, Borel- Cantelli Lemma, and their applications. 3. Modes of convergence
Month- March				
Lectures 16	Practicals 16	Total 32	Unit-4	1. Borel- Cantelli Lemma, and their applications. 2. Modes of convergence
Month- April-May				
Lectures 30	Practicals 20	Total 50	Unit-4	3. Weak and Strong laws of large numbers 4. CLT

Name & Signature of Teacher

Mr. A. S. Tangawade

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Annual Teaching Plan

Academic year 2024-2025 | Semester II | Department -Statistics

Subject - Statistics | Title: DBMS | Course Code- DSE18STA21

Name of teacher – Jadhav M. A.

Month- December			Module/Unit	Sub-units planned
Lectures 12	Practicals 12	Total 24	Unit-1	1. Introduction to Databases and Data Models 2. Basic building blocks, business rules, 3. Data abstraction 4. Database users and administrators
Month- January				
Lectures 16	Practicals 24	Total 40	Unit -2	1. Introduction to Data Models and Normalization 2. Database design and ER Model 3. Relational Database design
Month- February				
Lectures 14	Practicals 16	Total 30	Unit-3	1. Introduction to SQL 2. Constraints 3. Views
Month- March				
Lectures 14	Practicals 20	Total 34	Unit-4	1. Operators in SQL 2. Functions 3. Clauses
Month- April-May				
Lectures 16	Practicals 08	Total 24	Unit-4	4. Join Transaction management 5. NoSQL

Jadhav

Name & Signature of Teacher

M. A. Jadhav

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Annual Teaching Plan

Academic year 2024-2025 | Semester III | Department -Statistics

Subject - Statistics | Title -: STOCHASTIC PROCESSES | Course Code: DSC17STA31

Name of teacher – Pandhare R.S.

Month- July			Module/Unit	Sub-units planned
Lectures 16	Practicals 36	Total 52	Unit-I	1. Definition of stochastic process 2. Examples of various stochastic processes 3. Definition of Markov chain 4. Examples of Markov chains, Formulation of Markov chain models, initial distribution 5. Chapman-Kolmogorov equations 6. Simulation of Markov Chain
Month- August				
Lectures 18	Practicals 32	Total 50	Unit -2	1. Classification of states 2. Random walk and gambler's ruin problem 3. Long-Run proportions and limiting probabilities 4. Stationary distribution
Month- September				
Lectures 17	Practicals 28	Total 45	Unit-3	1. Discrete state space continuous time Markov chain 2. Poisson process and related results 3. Birth and death processes and associated cases 4. Renewal and delayed renewal processes 5. Simulation of Poisson process and discrete state space Markov processes
Month- October-November				
Lectures 17	Practicals 32	Total 49	Unit-4	1. Galton-Watson Binaymi Branching process 2. Probability of ultimate extinction 3. Queuing model: M/M/1, M/M/1 with balking, M/M/c and M/G/1

Pandhare R.S.

Name & Signature of Teacher

Pandhare R.S.

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Annual Teaching Plan

Academic year 2024-2025 Semester III Department -Statistics

Subject - Statistics Title -: Statistical Learning and Data Mining Course Code: DSC17STA32

Name of teacher – Patil R. M.

Month- July			Module/Unit	Sub-units planned
Lectures 16	Practicals 12	Total 28	Unit-1	1. Data understanding and data cleaning 2. Supervised and unsupervised learning 3. Problem of classification 4. Classification techniques: k-nearest neighbor. decision tree, Naïve Bayesian, classification based on logistic regression, Bayesian belief Network
Month- August				
Lectures 16	Practicals 24	Total 40	Unit -2	1. Model evaluation and selection 2. Holdout Method and Random Subsampling 3. Bootstrap 4. Comparing Classifiers Based on Cost–Benefit and ROC Curves 5. Techniques to Improve Classification Accuracy
Month- September				
Lectures 16	Practicals 20	Total 36	Unit-3	1. ANN and SVM 2. McCulloch-Pitts AN model 3. ANN & regression models 4. Support vector regression 5. Linear programming support vector machine for classification and regression
Month- October-November				
Lectures 20	Practicals 28	Total 48	Unit-4	1. Unsupervised learning 2. CLARA, DENCLUE, DBSCAN 3. Market Basket Analysis: Association rules and prediction 4. Apriori Algorithm, data attributes, applications to electronic commerce

Name & Signature of Teacher

(Ms. Patil R.M)

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Annual Teaching Plan

Academic year 2024-2025 Semester III Department -Statistics

Subject - Statistics Title – Python Programming Course Code: DSC18STA33

Name of teacher: Patil R. M.

Month- July			Module/Unit	Sub-units planned
Lectures 06	Practicals 08	Total 14	Unit-1	1. Introduction to Python, History of Python, Introduction to Python Interpreter and program execution, Python Installation Process 2. Introduction to anaconda, python variable declaration, Keywords, Indents in Python 3. Python input/output operations. Types of Operators
Month- August				
Lectures 08	Practicals 12	Total 20	Unit-1	4. Built-in Data types: Arrays, String, List, Tuple, Set, Dictionary (characteristics and methods) 5. Conditional Statements & Loop Conditional Statements 6. Function in python 7. File Processing 8. some important file handling functions e.g open(), close(), read(), readline() etc.
Month-September				
Lectures 10	Practicals 12	Total 22	Unit-2	1. Modules: Concept of modularization, 2. Importance of modules in python, importing modules
Month- October				
Lectures 08	Practicals 12	Total 20	Unit-2	3. Built in modules. 4. Concept of library and its working, 5. Data storage, manipulation
Month- November-December				
Lectures 10	Practicals 12	Total 22	Unit-2	6. visualization and analysis using the libraries: Numpy, Pandas, Scipy, 7. statsmodels, Matplotlip, Seaborn, Regular Expressions (RegEx), Ski-kit learn.

Name & Signature of Teacher

(Ms. Patil R.M)

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Annual Teaching Plan

Academic year 2023-2024 Semester III Department -Statistics

Subject - Statistics Title -: Generalized Linear Models Course Code: DSE17STA32

Name of teacher – Pawar A. A.

Month-July			Module/Unit	Sub-units planned
Lectures 14	Practicals 12	Total 26	Unit-I	1. Generalized linear models 2. Quasi-likelihood estimation 3 Residual analysis, types of residuals: raw, Pearson, deviance, Anscombe, quantile; residual plots 4. Variable selection: AIC and BIC
Month- August				
Lectures 16	Practicals 16	Total 32	Unit -2	1. Logistic regression: logit, probit and clog model for dichotomous data 2. Linear time series models: Autoregressive, Moving Average, Autoregressive Moving Average models 3. ML estimation 4. Logistic regression for Nominal response: Baseline Category model and ordinal response: Proportional odds model
Month- September				
Lectures 14	Practicals 16	Total 30	Unit-3	1. Poisson regression 2. ML and Quasi-likelihood estimation of parameters 3. Power family of link functions 4. Over dispersion: Types, causes and remedies. Negative Binomial regression: NB-2 model.
Month- October-November				
Lectures 22	Practicals 32	Total 54	Unit-4	1. Generalized linear mixed models (GLMM) 2. Estimation by generalized estimating equations and conditional likelihood 3. Tests of hypothesis: LRT, asymptotic variance, Wald and score test

Pawar A A

Name & Signature of Teacher

Pawar Ajit A.

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Annual Teaching Plan

Academic year 2024-2025 M. Sc. II Semester III Department -Statistics

Subject -Applied Statistics Title - : STATISTICAL QUALITY CONTROL Course – DSE18STA32

Name of teacher – Patil D. D.

Month- July			Module/Unit	Sub-units planned
Lectures 17	Practicals 16	Total 33	Unit-1	1. Quality Improvement Tools 2. Shewhart Control charts 3. Performance measures of a control chart, X, R, S, S2, p, c and D charts, σ-control limits and probability control limits 4. Economic design of a control chart
Month- August				
Lectures 18	Practicals 16	Total 34	Unit -2	1. CUSUM and EWMA charts 2. SPRT chart, GLR Chart, charts for autocorrelated data, nonparametric control charts, Bayesian control charts. The change point model for process monitoring
Month- September				
Lectures 14	Practicals 16	Total 30	Unit-3	1. Process capability Analysis 2. process capability, process capability indices (Cp, Cpk, Cpm, Cpmk), point and interval estimation of Cp and Cpk 3. DIMAC process 4. Six Sigma Methodology
Month- October-November				
Lectures 16	Practicals 12	Total 28	Unit-4	1. Acceptance sampling plans for attributes 2. Single sampling plan,
Month- December				
Lectures 15	Practicals 16	Total 31	Unit-4	3. Double and multiple sampling plans, sequential sampling 4. Deming inspection criterion, Continuous sampling plans, skip-lot sampling plans.

Name & Signature of Teacher

(Mr. D. D. Patil)

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Annual Teaching Plan

Academic year 2024-2025 M. Sc. II Semester IV Department -Statistics

Subject - Statistics Course – DSE17pSTA41 Title -: TIME SERIES ANALYSIS

Name of teacher – Patil D.D.

Month-December			Module/Unit	Sub-units planned
Lectures 15	Practicals 16	Total 31	Unit-1	1. Exploratory time series analysis 2. Holt – Winter smoothing and forecasting 3. Auto - Covariance, Auto-correlation functions 4. Partial auto covariance function 5. First and second order Stationary time series
Month- January				
Lectures 19	Practicals 16	Total 35	Unit -2	1. Wold representation of linear stationary processes 2. linear time series models: Autoregressive, Moving Average, Autoregressive Moving Average models 3. Computation of ACVF, ACF and PACF for AR(1), AR(2), MA(1), MA(2), ARMA(1,1) process
Month- February				
Lectures 16	Practicals 12	Total 28	Unit-3	1. Estimation of ARMA models: Yule-Walker estimation for AR Processes 2. Maximum likelihood and least squares estimation 3. Minimum mean squared error forecasting
Month- March				
Lectures 16	Practicals 16	Total 32	Unit-3	1. Introduction to SARIMA models. 2. Spectral Representation of the ACVF, Spectral density of an ARMA process, its computation for simple models.
Month-April-May				
Lectures 20	Practicals 24	Total 44	Unit-4	1. Introduction to ARCH and GARCH models 2. Vector time-series models: Covariance and Correlation Matrix functions, 3. MA and AR representation of vector processes, Covariance matrix function of the vector AR(1) and MA(1) models.

Name & Signature of Teacher

(Mr. D. D. Patil)

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Annual Teaching Plan

Academic year 2023-2024 Semester IV Department -Statistics

Subject - Statistics Title -: Design and Analysis of Experiments Course Code: DSC17STA42

Name of teacher – Pawar A. A.

Month- December			Module/Unit	Sub-units planned
Lectures 12	Practicals 12	Total 24	Unit-I	1. Concept of design of experiments (DOE) 2. applications of DOE 3. Basic principles of DOE 4. one-way ANOVA, two-way ANOVA with and without interaction, two-way ANOVA with r observations per cell 5. Comparing pairs of treatment means
Month- January				
Lectures 15	Practicals 16	Total 31	Unit -2	1. Concepts of factorial designs 2. main effects, and interaction effects; The two-factor factorial design 3. The general factorial design; Analysis of replicated and unreplicated 2^k full factorial designs 4. Blocking and confounding in a 2^k factorial design 5. Construction and analysis of 2^{k-p} fractional factorial designs and their alias structures
Month- February				
Lectures 12	Practicals 16	Total 30	Unit-3	1. The 3^k full factorial design and its analysis using fixed effect model 2. Confounding in 3^k factorial designs; Construction and analysis of 3^{k-p} fractional
Month- March				
Lectures 10	Practicals 12	Total 28	Unit-3	3. factorial designs and their alias structures; 4. Factorials with mixed levels: factors at two and three levels, 5. factors at two and four levels; 6. Design optimality criteria.
Month- April-May			Unit-4	
Lectures 18	Practicals 20	Total 38		1. Response surface methodology 2. the method of steepest ascent, analysis of the response surface using first and second order model 3. multiple responses 4. designs for fitting response surfaces: simplex design, central composite design (CCD), spherical CCD 5. Box–Behnken design

Pawar A.A

Name & Signature of Teacher

Pawar Ajit A.

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Annual Teaching Plan

Academic year 2024-2025 | Semester IV | Department -Statistics

Subject - Statistics | Title: OPTIMIZATION TECHNIQUES | Course Code: DSE18STA41

Name of teacher – Pandhare R.S.

Month- December			Module/Unit	Sub-units planned
Lectures 10	Practicals 12	Total 22	Unit-I	1. Convex Sets and Functions 2. Linear programming problem (LPP) 3. Graphical method, Simplex method 4. Examples 5. Artificial variable technique: Two phase method, Big M method, degeneracy.
Month- January				
Lectures 16	Practicals 20	Total 36	Unit -2	1. Concept of Duality 2. Sensitivity Analysis
Month- February				
Lectures 15	Practicals 16	Total 31	Unit-3	1. Integer Linear Programming Problem (ILPP) 2. Branch and Bound method. 3. Quadratic programming: KuhnTucker conditions, methods due to Beale, Wolfe.
Month- March				
Lectures 16	Practicals 20	Total 36	Unit-4	1. Theory of games 2. Solution of 2 x 2 game by algebraic method, Graphical method, Reduction of the game problem as LPP
Month- April-May				
Lectures 20	Practicals 32	Total 52	Unit-4	3. Dynamic Programming: The Recursion Equation Approach, Computational Procedure, Characteristics of Dynamic Programming, Solution of L.P.P. by Dynamic Programming.

Pandhare RS

Name & Signature of Teacher

Pandhare R.S.

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Academic year 2024-2025 | Semester IV | Department -Statistics

Subject - Statistics | Title: Statistical Quality Control | Course Code: DSE17STA42

Name of teacher – Patil D. D.

Month- December			Module/Unit	Sub-units planned
Lectures 10	Lectures 12	Lectures 22	Unit-I	1. Quality Improvement Tools 2. Shewhart Control charts 3. Performance measures of a control chart, X, R, S, S2, p, c and D charts, σ-control limits and probability control limits 4. Economic design of a control chart
Month- January				
Lectures 14	Lectures 16	Lectures 30	Unit -2	1. CUSUM and EWMA charts 2. SPRT chart, GLR Chart, charts for autocorrelated data, nonparametric control charts, Bayesian control charts. The change point model for process monitoring
Month- February				
Lectures 16	Lectures 20	Lectures 36	Unit-3	1. Process capability Analysis 2. process capability, process capability indices (Cp, Cpk, Cpm, Cpmk), point and interval estimation of Cp and Cpk 3. DIMAC process 4. Six Sigma Methodology
Month- March				
Lectures 16	Lectures 16	Lectures 32	Unit-4	1. Acceptance sampling plans for attributes 2. Single sampling plan,
Month- April-May				
Lectures 18	Practicals 16	Total 34	Unit-4	3. Double and multiple sampling plans, sequential sampling 4. Deming inspection criterion, Continuous sampling plans, skip-lot sampling plans.

Name & Signature of Teacher

(Mr. Patil. D.D)

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Annual Teaching Plan

Academic year 2024-2025 | Semester IV | Department -Statistics

Subject - Statistics | Title – Python for Data Science | Course Code: DSE18STA42

Name of teacher: Patil R. M.

Month- December			Module/Unit	Sub-units planned
Lectures 10	Practicals 12	Total 22	Unit-1	1. Introduction to Data Science, Different Sectors in Data Science 2. Basic terminologies in Data Science. Overview of Data storage 3. Manipulation, visualization and analysis using the libraries
Month- January				
Lectures 14	Practicals 20	Total 34	Unit-2	1. Machine learning using scikit-learn library: Classification, Regression, and Clustering. 2. Introduction to deep learning, understanding different types of layers in sequential method: Dense, Convolutional Layers, Recurrent Layers, Normalization Layers. 3. Deep Neural Network
Month- February				
Lectures 12	Practicals 20	Total 32	Unit-3	1. Computer vision 2. Basic Operations on Images, Arithmetic Operations on Images 3. Image Preprocessing 4. Feature Detection and Description. 5. Image Detection and recognition examples
Month- March				
Lectures 16	Practicals 12	Total 28	Unit-4	1. Introduction to Natural Language Processing (NLP), Natural Language Toolkit (NLTK) in Python. 2. Data Preparation
Month- April-May				
Lectures 18	Practicals 20	Total 38	Unit-4	1. Feature Engineering: 2. Inverse Document Frequency, word embedding as features

Name & Signature of Teacher

(Ms. Patil R.M.)

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