

**TDC SYLLABUS FOR
STATISTICS
[PASS COURSE—ARTS / SCIENCE STREAM]**

**PASS COURSE
COURSE STRUCTURE**

Paper No.	Name of the Paper	Full marks	Pass marks	Lectures
STSP-101	Fundamental of Statistics, Measure of location and Dispersion Correlation and Regression, Probability Fundamentals, Conditional probability and Bayes, Theorem	35	12	60
STSP-201	Random variable, Mathematical Expectation, Probability Distribution Calculus of Finite differences. Numerical Integration	35	12	80
STSP-202	Practical	30	10	80
STSP-301	Sampling from distribution, Test of Significance, Large Sample Tests and Interval estimates. Pearsonian Chi-square test, Basic concepts of sample	35	12	80
STSP-401	Time Series, Index Number, Tests of Index Number, Sampling Technique-I, Sampling Technique-II	35	12	80
STSP-402	Practical	30	10	80
STSP-501	Fundamentals and Product Control, Process Control, Vital Statistics, Life Table & Official Statistics.	35	12	80
STST-601	Anova, Basic Design, Missing Plot Analysis, Factorial Design & Confounding.	35	12	80
STSP-602	Practical	30	10	80

STATISTICS
(PASS)
FIRST SEMESTER

STSP-101

**Fundamentals of Statistics, Measure of location and Dispersion,
Correlation and Regression, Probability Fundamentals,
Conditional probability and Bayes' Theorem**

Full Marks : 35

Pass Marks : 12

Unit-I: Fundamentals of Statistics

Marks: 7

Statistics: Origin, Scope and Limitations, Concepts of statistical population and sample from a population, parameter and statistics. Collection, classification, tabulation, diagrammatic and graphical representation of statistical data.

Unit-II: Measure of location and Dispersion

Marks: 7

Measure of location, dispersion, moments, absolute moments and factorial moments, Measure of skewness and kurtosis, use of Sheppard's correction for grouped data.

Unit-III: Correlation and Regression

Marks: 7

Method of least squares, Correlation and Linear regression, Rank correlation (Spearman's), multiple and partial correlations (for three variables only), Independence and association of attributes. Consistency of data, measures of association and contingency.

Unit-IV: Probability Fundamentals

Marks: 7

Definition of probability-Classical and relative frequency approaches to probability, Random experiment, trial, sample point and sample space, algebra of events, operation of events, discrete probability space.

Unit-V: Conditional probability and Bayes' Theorem

Marks: 7

Properties of probability based on axiomatic approach, conditional probability, independence of events, Bayes' theorem and its applications.

SECOND SEMESTER

STSP-201

**Random variable, Mathematical Expectation, Probability Distributions,
Calculus of Finite differences, Numerical Integration**

Full Marks : 35

Pass Marks : 12

Unit-I: Random variable

Marks: 7

Definition of a discrete random variable, p.m.f. and c.d.f. Idea of continuous random variable, p.d.f.

Unit-II: Mathematical Expectation

Marks: 7

Mathematical Expectation of a random variable, theorems on the expectation of the sum and product of random variables. Moment generating function (definition and properties).

Unit-III: Probability Distributions

Marks: 7

Standard univariate distributions

Discrete: Uniform, binomial, Poisson and hypergeometric distribution.

Continuous: Uniform, normal, Chebyshev's inequality and applications, Weak law of large numbers, central limit theorem, de-Moivre's theorem (definition only)

Unit-IV: Calculus of Finite differences

Marks: 7

Basic concepts: Δ and E operators, finite difference, interpolation formulae, Newton's forward, backward, divided difference, Lagrange's interpolation.

Unit-V: Numerical Integration

Marks: 7

Trapezoidal rule, Simpson's 1/3rd rule, 3/8th rule, root of a polynomial equation, solution of simple problems by Newton-Raphson method (one-variable only).

STSP-202

Practical based on paper no STSP-101 and STSP-201

Full Marks : 30

Pass Marks : 10

Practical Notebook

Marks: 5

Viva-voce

Marks: 5

Experiment

Marks: 20

THIRD SEMESTER
STSP-301
Statistical Methods

Full Marks : 35
Pass Marks : 12

Marks: 7

Unit-I: Sampling from distributions

Definition of a random sample, Statistical Concepts of sampling distribution and standard error, Deviation of the sampling distribution of the mean of a random sample drawn from normal population, standard errors of sample mean, sample variance and sample proportion.

Marks: 7

Unit-II: Test of Significance

Null and alternative hypothesis, level of significance, Type-I and Type-II errors, Statement of chi-square, t and F statistics with applications, Testing for the mean and variance of univariate normal distribution. Testing of equality of two variances of two univariate normal distributions and related confidence intervals. Testing of the significance of sample correlation coefficient.

Marks : 7

Unit-III: Large Sample Tests and Interval estimates

Use of central limit theorem for testing and interval estimation of a single mean and a single proportion and difference of two means and two proportions.

Marks: 7

Unit-IV: Pearsonian chi-square test

Pearsonian chi-square test for goodness of fit and for homogeneity of a number of distribution, Contingency table and test of impedance of attributes in a Contingency table.

Marks: 7

Unit-V: Basic concepts of sample

Concepts of population and sample, need for sampling, census survey and sample survey, Principles of sample survey, basic concepts in sampling, organizational aspects of sample survey, sampling selection and sample size.

FOURTH SEMESTER
STSP-401

Applied Statistics-I

Full Marks : 35
Pass Marks : 12

Marks: 7

Unit-I: Time Series

Definition, uses of time series, its components, additive and multiplicative models, idea of trend and its determination, construction of seasonal indices.

Marks: 7

Unit-II: Index Number

Definition of index number and applications, problems involved in the construction of index

numbers, use of averages, simple aggregate and weighted average methods, fixed and chain based methods, Laspeyres's, Paasche's, Fisher's and Marshall-Edgeworth's index numbers.

Unit-III: Tests of Index Number

Marks: 7

Test of index numbers (only Time Reversal Test and Factor Reversal Test), Limitations of index numbers, cost of living index number and index number of industrial production.

Unit-IV: Sampling Technique-I

Marks: 7

Definition of sample and sample size, simple random sampling with and without replacement, stratified sampling, systematic sampling.

Unit-V: Sampling Technique-II

Marks: 7

Concepts of cluster sampling, multistage and multiphase sampling, P.P.S. Sampling, double sampling, Pilot survey.

STSP-402

Practical based on STSP-301 and STSP-401

Full Marks : 30

Pass Marks : 10

Practical Notebook

Marks: 5

Viva-voce

Marks: 5

Experiment

Marks: 20

FIFTH SEMESTER

STSP-501

Applied Statistics-II

Full Marks : 35

Pass Marks : 12

Unit-I: SQC Fundamentals and Product Control

Marks : 7

Concepts of quality, inspection and control, advantages of statistical quality control, control charts-their statistical basis, control charts for attributes and variables X, R, P and C-charts.

Unit-II: Process Control

Marks : 7

Acceptance sampling by attributes, single and double sampling inspection plans, concepts of producer's risk, consumer's risk, AQL, AOQL, OC and ASN curves.

Unit-III: Vital Statistics

Marks : 7

Concepts of rates and ratios of vital events, sources of vital statistics, death and birth rates, standardized death rates, gross and net reproduction rates.

Unit-IV: Life Table Marks : 7
Life table, concepts of complete life and abridged life table, construction and uses of life table.

Unit-V: Official Statistics Marks : 7
Present official system in India, methods of collection of official statistics, their reliability and limitations, national statistical commission, central statistical organization, NSSO, some socio-economic and health indicators as per last census figures for India with reference to Assam.

SIXTH SEMESTER

STSP-601

Design and Experiment

Full Marks : 35

Pass Marks : 12

Marks : 7

Unit-I: ANOVA

Analysis of variance-definitions, assumptions, linear models-Analysis of variance for one-way and two-way classification (with one observation per cell).

Unit-II: Basic Design

Need for design of experiments, fundamental principles of design and experiments, basic designs-CRD, RBD, LSD and their analysis.

Marks : 7

Unit-III: Missing Plot Analysis

Missing plot techniques, orthogonality of classification in two ways data, advantages of orthogonality relations, simple illustrations.

Marks : 7

Unit-IV: Factorial Design

Factorial Designs-2ⁿ design, illustrations.

Marks : 7

Unit-V: Confounding

Main effects and interactions-complete confounding and partial confounding in 2ⁿ design.

Marks : 7

STSP-602

Practical based on STSP-501 and STSP-601

Full Marks : 30

Pass Marks : 10

Practical Notebook

Marks: 5

Viva-voce

Marks: 5

Experiment

Marks: 20