DEPARTMENT OF STATISTICS: GARGAON COLLEGE

Programme Specific Outcome of Statistics

After completion of the Three year B. Sc. with Major in Statistics in Semester System under Dibrugarh University, the students will be able to-

1. **STSM-101: Descriptive Statistics:** Develop knowledge of the various aspects of tools of Descriptive Statistics.
2. **STSM-201: Mathematics for Statistics-1:** Gain background knowledge of essential Mathematics for Statistics.
3. **STSM-202: Practical based on STSM-101**: Gain experience of handling real world data by applying various statistical tools and techniques to draw conclusions based on descriptive statistics.
4. **STSM-301: Probability and Distribution-1:** Get basic concept of Probability and Distributions.
5. **STSM-302: Numerical Methods:** Gain training on different aspects of numerical methods in finite difference, numerical differentiation, integration and solution of equations.
6. **STSM-401: Probability and Distributions-II:** Get basic knowledge of different discrete and continuous probability distributions, sampling distributions and convergence in probability and distributions.
7. **STSM-402: Mathematics for Statistics-II:** get basic background knowledge of essential Mathematics for Statistics such as matrices, differentiability of functions, Improper integrals etc.

8. **STSM-403: Practical (based on paper STSM-302, STSM-401, Unit 2 of STSM-402):** Get hands on experience of using various statistical techniques based on theories of STSM-302, STSM-401, Unit 2 of STSM-402.
9. **STSM-501: Estimation:** Learn methods and properties of point and interval estimation.
10. **STSM-502: Testing of Hypothesis:** Learn basic knowledge of parametric as well as non parametric techniques of test of hypotheses.
11. **STSM-503: Sample Survey:** Introduce themselves to the concepts and methodology of sample survey including SRS, Stratified RS, Systematic and Cluster sampling.

12. **STSM-504: Practical:** Get practical training in identification, formulation and solution of practical problems of data analysis and inference using Statistical Methods.

13. **STSM-601: Design of Experiments:** Get the basic concepts and methodology of analysis of variance and design of experiments.

14. **STSM-602: Applied Statistics:** Learn the basic concepts and methodology of Time Series Analysis, Index Numbers, Mathematical Economics and Econometrics, Demography, Statistical Quality Control and Educational Statistics.

15. **STSM-603: Practical:** Get practical training in identification, formulation and solution of practical problems of data analysis and interference using statistical methods.

16. **STSM-604: Project Work:** Cope with real problems (may involve field work or not) of theoretical and/or of realistic nature. Also they learn to be more proficient in writing as well as oral communication skills and learn to work in diverse environments.

COURSE SPECIFIC OUTCOME OF STATISTICS AS MAJOR IN 3- YEAR B.Sc. COURSE

1. COURSE CODE: STSM-101: Descriptive Statistics:

After completion of the course of Major in Statistics in Semester System under Dibrugarh University, the students will be able to-

CO1: Contents subject matter with brief history of Statistics, its definition and limitations, the art of learning from data, the methods for presenting and describing set of data in various measurement scales as well as textual, tabular and graphical presentation of data.

CO2: highlights the developments of measures (the statistic) that are used to summarize a data set.

CO3: Concepts of bivariate and multivariate data, correlation and regression.

CO4: Covers the concepts of analyzing categorical data, consistency of data, independence and association of attributes.

2. COURSE CODE: STSM-201: Mathematics for Statistics-1:

After completion of the course of Major in Statistics in Semester System under Dibrugarh University, the students will be able to-

CO1: highlights the concepts of mathematical analysis as a means of studying functions in the context of real numbers (i.e. real analysis), set, sequence , convergence and divergence of sequence, comparison tests etc.

CO2: imparts the knowledge of concepts of differentiation of one function w.r.t. another function, differentiation of implicit functions, increasing and decreasing functions, Maxima and Minima, successive and partial differentiation etc.

CO3: clarifies the concepts of definite integral, properties and applications, double and triple integrals, Jacobians and applications in statistics.

3. COURSE CODE: STSM-202: Practical based on STSM-101:

Students learn to analyze data by applying various statistical tools and techniques and draw conclusions based on descriptive statistics.

4. COURSE CODE: STSM-301: Probability and Distribution-I:

After completion of the course of Major in Statistics in Semester System under Dibrugarh University, the students will be able to-

CO1: learns the basic concept of elementary probability theory and the possibility of randomness in any realistic model of a real world phenomenon.

CO2: study of probability by introduction of random variables- discrete as well as continuous along with cumulative distribution function, moment generating function, cumulant generating function, probability generating function etc.

CO3: by studying the course students learn about bivariate distribution of discrete and continuous type, joint density function, marginal and conditional probability distributions, expectations, covariance and correlation and regression.

5. <u>COURSE CODE: STSM-302: Numerical Methods:</u>

After completion of the course of Major in Statistics in Semester System under Dibrugarh University, the students will be able to-

CO1: learn what finite difference- is backward and forward, backward and forward operators, differences of polynomial etc.

CO2: students learn various techniques of interpolation for equal and unequal intervals, their derivations and applications with the help of simple problems.

CO3: Various techniques of numerical differentiation, numerical integration and different methods of solution of Algebraic and Transcendental equations.

6. <u>COURSE CODE: STSM-401: Probability and Distribution II:</u>

After completion of the course of Major in Statistics in Semester System under Dibrugarh University, the students will be able to-

CO1: gains knowledge of concept, definition and derivation of few discrete probability distributions- recurrence relations for probability, moments, PGF, MGF, CGF, CF etc.

CO2: it contents continuous probability distributions of Uniform, Normal, Lognormal, Exponential, Gamma, Beta etc, calculation of probability using CDF, bivarite Normal Distribution- MGF, marginal and conditional using MGF.

CO3: explains the concept of sampling distributions-chi square, t, F etc and concept of order statistics.

CO4: highlights on convergence in probability and distributions, Chebyshev Inequality, CLT, De Moivre- Laplace theorem, Lindeberg-Levy theorem etc.

7. <u>COURSE CODE: STSM-402: Mathematics for Statistics II:</u>

After completion of the course of Major in Statistics in Semester System under Dibrugarh University, the students will be able to-

CO1: deals with vector space over real field, linear dependence and independence of vectors ctc.

CO2: covers theory of matrices.

CO3: it covers basic knowledge of differentiability of functions derivative, Rolle's Theorem, Mean Value theorem etc.

CO4: Definition of Riemann integral, Improper integral, Beta & Gamma integrals, their properties and applications in statistics.

8. **COURSE CODE: STSM-403: Practical based on STSM-302, STSM-401 and STSM-402:**

Students learn to analyze data by using various methods of interpolation, numerical integration, to solve algebraic equation by Newton Raphson Method etc along with fitting of probability distributions, classification of quadratic forms by using Eigen values.

9. **COURSE CODE: STSM-501: Estimation:**

After completion of the course of Major in Statistics in Semester System under Dibrugarh University, the students will be able to-

CO1: Highlights on Point Estimation, its properties, characteristics, Cramer Rao Inequality, data reduction, statement and applications of Factorization Theorem and Rao Blackwell Theorem.

CO2: Explains various methods of estimation with illustrative examples.

CO3: Concepts of Interval Estimation, confidence interval and confidence coefficient etc.

10. **COURSE CODE: STSM-502: Testing of Hypothesis:**

After completion of the course of Major in Statistics in Semester System under Dibrugarh University, the students will be able to-

CO1: Concepts of simple and composite Hypothesis, types of Error, Critical Region, Power of a test, Neyman Pearson Lemma, UMP Test, Likelihood Ratio Test etc.

CO2: Test of Significance- large sample test, Chi Square, T and F tests etc.

CO3: Concept of various Non Parametric test.

11. <u>**COURSE CODE: STSM-503: Sample Survey:**</u>

After completion of the course of Major in Statistics in Semester System under Dibrugarh University, the students will be able to-

CO1: Introduces the concepts of population and sample, details of census and sample surveys, probability and non probability sampling, ideas of NSSO, CSO, SRS and population census of India.

CO2: Outlines the features of simple random sampling, properties and estimates of the parameters, Ratio and Regression Estimates in SRS.

CO3: Details of Stratified Random Sampling, properties of the estimates, their variances, different types of allocation of sample size in each stratum, Relative precision etc.

CO4: Gives the concepts and methodology of Systematic sampling, variance of the estimated mean, Cluster sampling and relative precision of systematic, stratified random and simple random sampling.

12. <u>**COURSE CODE: STSM-504: Practical:**</u>

This course imparts practical training in identification, formulation and solution of problems of data analysis based on Large Sample Theory, testing of hypothesis, non parametric tests, goodness of fit tests, analysis of various random sampling-SRS, Stratified and Systematic etc.

13. <u>**COURSE CODE: STSM-601: Design of Experiments:**</u>

After completion of the course of Major in Statistics in Semester System under Dibrugarh University, the students will be able to-

CO1: Provides basic concepts of linear estimation, Gauss Markov linear models, Gauss Markov Theorem, Analysis of Variance and Analysis of Covariance- one way and two way classification of data.

CO2: Deals with Principles of Design of Experiment, CRD, RBD, LSD, Their assumptions, model hypothesis, estimation of parameters and statistical analysis, Missing Plot Techniques.

CO3: Gives details of factorial experiments 2^2, 2^3, 2^4 experiments, total and partial confounding, split plot technique.

14. <u>COURSE CODE: STSM-602: Applied Statistics:</u>

After completion of the course of Major in Statistics in Semester System under Dibrugarh University, the students will be able to-

CO1: Deals with Time Series Analysis- components and models, resolving the components of time series with various methods.
CO2: Imparts the basics of Index Number- their definitions, construction, tests for Index Numbers, Inflation and Deflation and uses of Index Numbers.
CO3: Discusses about Mathematical Economics and Econometrics, theory and analysis of consumer behavior, demand and elasticity of demand, utility function and income distribution, CLRM upto three variables and its matrix form, OLS estimates of CLRM.
CO4: Deals with demographic data of India, vital rates, ratio and proportion, Measures of mortality, fertility etc.
CO5: Deals with Statistical Quality Control- process and product control, control charts for variables and attributes, Acceptance sampling for variables and attributes.
CO6: Discusses about Educational Statistics- Scaling Procedure, Reliability, Methods of estimating Test Reliability, Validity etc.

15. <u>COURSE CODE: STSM-603: Practical:</u>

This course imparts practical training in identification, formulation and solution of problems of data analysis based on ANOVA, Design of Experiments, Time Series Analysis, Index Number, Demand Analysis, Demography, SQC and Educational Statistics etc.

16. <u>COURSE CODE: STSM-604: Project Work:</u>

With Project Work, a student will learn to do field work to cope with real problems, learn to prepare appropriate questionnaire, collecting data, entering data in computer- either in EXCEL or in SPSS, analyzing data and learn to draw valid interpretation along with preparing a Dissertation as well as ready for Power Point Presentation of the Project Report before the experts as fulfillment of syllabus.