SYLLABUS OF 6 SEMESTER DEGREE COURSE IN

STATISTICS
(ELECTIVE AND HONOURS)

Note:

1. Students with Mathematics as compulsory subject at plus two level will be eligible for admission to Statistics Honours Course.

2. Minimum eligibility marks (as prescribed by NEHU in other subjects) of Mathematics at plus two level must be considered for admission to Statistics Honours Course.

3. Statistics Honours students must opt for Mathematics as one of the pass subjects.

Course structure for Statistics (Hons) and Elective

Semester	Paper No.	Name of the Paper	Marks
1	STEH – 1(TH)	Descriptive Statistics, Numerical Analysis & Probability (Theory)	75
1	STEH – 1(PR)	Descriptive Statistics, Bivariate Data and Numerical Analysis (Practical)	25
2	STEH- 2(TH)	Probability Distribution & Statistical Inference (Theory)	75
2	STEH- 2(PR)	Probability Distribution & Statistical Inference(Practical)	25
3	STEH – 3(TH)	Categorical Data, Survey Sampling & Design of Experiments (Theory)	75
3	STEH – 3(PR)	Categorical Data, Survey Sampling & Design of Experiments (Practical)	25
4	STEH – 4(TH)	Applied Statistics (Theory)	75
4	STEH – 4(PR)	Applied Statistics (Practical)	25
5	STH – 51(TH)	Mathematical Methods and Distribution Theory (Theory)	75
5	STH – 51(PR)	Mathematical Methods and Distribution Theory (Practical)	25
5	STH – 52(TH)	Linear Models, Regression and Operations Research, Design of Experiments (Theory)	75
5	STH – 52 (PR)	Regression and Operations Research, Design of Experiments (Practical)	25
6	STH – 61(TH)	Statistical Inference (Theory)	75
6	STH – 61(PR)	Statistical Inference (Practical)	25
6	STH - 62(TH)	Survey Sampling and Nonparametric Inference (Theory)	75
6	STH – 62 (PR)	Survey Sampling and Nonparametric Inference (Practical)	25
		Total	800

STEH - Elective & Honours

STH - Honours

Note:

1. All theory examinations will be of 75 marks and 3 hours duration and all practical examinations will be of 25 marks and 3 hours duration.

2. For theory papers 2 questions to be set from each Unit and 1 question to be attempted from each Unit.

3. For practical papers 2 questions to be set from each Unit and 1 question to be attempted from each Unit.

   3 questions
Practical Record
   Viva-voce

4. All Practicals in 5th and 6th semester will be done using Excel Worksheet (Without using Data Analysis Tool Pack)

1ST SEMESTER (ELECTIVE AND HONOURS)

STEH – 1 (TH)

Descriptive Statistics, Numerical Analysis and Probability.(Theory)

Marks: 75
Lectures: 75

Unit-I: Types of data: concept of a statistical population and a sample from a population , Classification (Cross and hierarchical) and Tabulation of data. Frequency and non-frequency data; discrete and continuous data; qualitative and quantitative data ;primary data; secondary data.

Presentation of Data: diagrammatical and graphical representation of ungrouped and grouped data; frequency distribution, cumulative frequency distributions and their graphical representation, histogram, frequency polygon and ogives.

Descriptive measures of data: univariate data - concepts and properties of central tendency, (Mean- AM, GM, HM Median, Mode) or location(Quantiles), dispersion and relative dispersion, skewness and kurtosis and their measures including those based on quantiles and moments , Sheppard's correction for moments for grouped data (without derivation).

Lectures : 15

Unit-II: Bivariate and Trivariate Data: Scatter diagram, product moment correlation coefficient and its properties. Regression, principle of least squares, fitting of linear regression and related results, fitting of curvilinear Regression, Multiple regression involving two independent variables – Multiple and partial correlation coefficients (fitting of second degree polynomial). Intraclass correlation coefficient.

Lectures : 15

Unit-III: Finite difference: definition, operators Δ & E, their properties, difference table, methods of interpolation, Newton's Forward & Backward and Lagrange's methods of interpolation. Newton's Divided differences.

Numerical integration, the general quadrature formula Trapezoidal rule, Simpson's one-third and three-eighth formula.

Lectures : 15

Unit IV: Definition of probability: classical, axiomatic and relative frequency approaches. Random experiments - trial, sample points and sample spaces, definition of events, operation on events, mutually exclusive independent and exhaustive events. Discrete sample space and its properties. Conditional probability and independence of events, addition and multiplication theorems with proof, Bayes' theorem and its applications.

Lectures : 15

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Unit V: Random variables: definition of discrete and continuous random variable and their properties, probability mass function. probability density function; Distribution function and its properties. Mathematical expectation of a random variable and its properties; moments, measures of location, dispersion, skewness and kurtosis. generating functions – mgf, cgf, pgf and uses. Joint, marginal, conditional pmf and pdf. Conditional expectation and variance. Independence of Random Variables. **Lectures : 15**

Text Books :

Hogg R.V. and Tanis E.A. (2003)	:	Probability and Statistical Inference, Pearson Education, New Delhi
Saxena, H.C.(1998)	:	Calculus of Finite Difference, S.Chand & Co.
Goon A.M., Gupta, M.K. and Dasgupta, B(1999)	:	Fundamental of Statistics, Vol-I, World Press Kolkata.
Goon A.M., Gupta, M.K. and Dasgupta, B (2003)	:	Basic Statistics, World Press, Kolkata
Mood, A.M. Graybill, F.A. Boes, D.C. (1974)	:	Introduction to the Theory of Statistics Tata-Mc-Graw Hill.
Ross, S. M (2003)	:	A first Course in Probability, 6th Edn. Pearson and Education, New Delhi
Hogg, R. V., Craig, A. T. (2002)	:	Introduction to Mathematical Statistics, 5th Edn. Pearson Education, New Delhi

References:

Bhatt, B.R. Srivenkataramana, T and Rao Madhava K.S. (1997)	:	Statistics : A Beginner's Text Vol-II New Age International (P) Ltd.
Croxton, F.E. Cowden D.J. and Kelin, S. (1973)	:	Applied General Statistics, Prentice Hall of India
Gupta S. C. and Kapoor V. K (2000)	:	Fundamental of Mathematical Statistics. S.Chand & Co., New Delhi.
Medhi, J. (1992)	:	Statistical Methods, New Age Publication.
Sastry, S.S. (1999)	:	Introductory Methods of Numerical Analysis, Prentice Hall, India.

Scarborough, J. B.(1955)   :   Numerical Mathematical Analysis Oxford and IBH Publishing

Bhattacharyya, G. K., Johnson, R.A. (1977)   :   Statistical Concepts and Methods, Wiley Series, New York

Hogg, R.V. and Tanis, E.A. (2003) :   Probability and Statistical Inference, Pearson Education, New Delhi

1ST SEMESTER (ELECTIVE AND HONOURS)

STEH – 1 (PR)

Descriptive Statistics and Numerical Analysis.(Practical)

Unit-I:
1. Drawing of line, bar, multiple bar, divided bar and pie diagrams.
2. Drawing of histogram, frequency polygon, frequency curve, ogives.
3. Computation of measures of central tendency.
4. Computation of measures of dispersion.
5. Computation of moments (upto order 4)
6. Application of Sheppard's correction to moments.
7. Computation of coefficients of skewness and kurtosis.

Unit-II:
8. Calculation of correlation and regression coefficients (ungrouped and grouped data)
9. Fitting of straight line, parabola by least square method.
10. Spearman's rank correlation.
11. Fitting of curvilinear_linear regression by linearizing transformation.
13. Computation of multiple and partial correlation coefficients.
14. Computation of multiple regression.
15. Fitting of second degree polynomial.

Unit-III:
16. Interpolation by Newton's Forward and Backward interpolation formulae.
17. Interpolation by Lagrange's formulae.
18. Interpolation by Divide difference formulae.
19. Numerical Integration using Trapezoidal, Simpson's 1/3 rd and 3/8th formulae.

References:

Hogg, R.V. and Tanis, E.A. (2003) : Probability and Statistical Inference, Pearson Education, New Delhi.

Bhattacharyya, G. K. and Johnson, R.A. (1977) : Statistical Concepts and Methods, Wiley Series, New York

Bhatt, B.R. Srivenkataramana, T and Rao Madhava K.S. (1997) : Statistics : A Beginner's Text Vol-II New Age International (P) Ltd.

Goon A.M., Gupta, M.K. and Dasgupta, B(1999) : Fundamental of Statistics, Vol-I, World Press Kolkata.

Goon A.M., Gupta, M.K. and Dasgupta, B (2003) : Basic Statistics, World Press, Kolkata

Gupta, S.C and. Kapoor, V.K (2000) : Fundamentals of Mathematical Statistics, S. Chand and Co.

Scarborough, J. B, (1955) : Numerical Mathematical Analysis Oxford and IBH Publishing