

Gujarat University
Choice Based Credit System (CBCS)
Syllabus for Statistics (UG)
First Year B. Sc.
Effective from June, 2011

S: 101

Statistical Method – I

Unit 1: Classification and Presentation of Data (9 L)

- Concept of Statistical Population, Sample, Types of data: Discrete, continuous, frequency and non grouped, nominal, ordinal, interval, ratio, time series data and cross sectional data, primary, Secondary, internal and external data
- Idea of a questionnaire, schedule, major sources including some government publication
- Construction of frequency table (One and Two factors), diagrammatic and graphical representation of ungrouped and grouped data, histogram, frequency curve, ogives, stem and leaf plot, box-plots.

Measures of Central tendency:

- Concept of central tendency
- Various measures of central tendency and their merits and demerits
- Properties and applications of central tendency
- Use of other partition values

Unit 2: Probability (9 L)

- Random process, random experiment, Trial, Sample point, Sample space, definitions of equally likely, mutually exclusive and exhaustive events, venn diagram
- Definition of probability, classical and relative frequency approach to probability, axiomatic approach to probability and its properties.

Unit 3: Economic Statistics (9 L)

- Concept of demand and supply, formulation of demand and supply functions, Market Equilibrium, Determination of demand and supply curves from time Series data,
- Elasticity of demand and supply and cost function, Revenue, Average revenue, Marginal Revenue and their relation with elasticity,
- Optimization of revenue for a given demand law, Use of elasticity in classification of goods, problem of monopoly.

Unit 4: Bivariate data and least square principle (9 L)

- Concept of Bivariate data, plotting of Bivariate data,
- Principle of least squares, fitting of linear, parabolic exponential (reducible to linear) curves

- Scatter diagram, product moments, coefficient of correlation and its properties, coefficient of determination, rank correlation,
- Concept of Regression, fitting of linear regression and related results

Reference books for S:101

1. Moore, S. David; McCabe, P. George
Introduction to the Practice of Statistics, 4th Edition
W. H. Freeman and Company
New York.
2. Agarwal, B. L.
Basic Statistics
New age International (P) Ltd., 1995
3. Mood, A. M., Greybill, F.A., Boes, D.C.
Introduction to the theory of Statistics
McGraw Hill
4. Bhat, B.R. Srivenkatramana, T. And Raomadhav, K.S.
Statistics: A beginner's Text, Vol. I
New age International (P) Ltd., 1996
5. Burton, G. Carrol, G. And Wall, S.
Quantitative methods for Business and Economics
Lengman, New York, 1999.
Ch. 1,2.
6. Lindsey, J. K.
An introduction to applied statistics – A modelling approach
2nd Ed. , 2003
Oxford University Press, ISBN – 978-0-19-852895-1
7. Cooke, Cramer and Clarke:
Basic Statistical Computing
Chapman and Hall
8. Morrison, D.F.
Applied Linear Statistical methods
Upper Saddle River, N.J.
Prentice Hall, 1983.
9. Dunn
Basic Statistics, A premier for the biomedical Sciences
2nd Ed., John Wiley and sons.
10. Hogg, R.V. and Craig, A.T.
In introduction to Mathematical Statistics
Amerind Publishing Co.
11. Tanur, J.M., Mosteller, F. Kruskal, W. H. Link, R.F., Pieters, R.S.,
Rising, G.R. (Special Editor: E. L. Lehman)
Statistics: A guide to the unknown.
Holden Day, San Francisco, 1989
12. Mendenhall, W.
Introduction to Probability and Statistics
9th Ed. North Scituate, Mass, Duxbury, 1994

S:102

Practical

Duration: 2 Hours per week

Part A: Manual Calculation

1. Presentation of Data:

- Frequency Table (Univariate and Bivariate data)
- Diagrams and Graphs:
Stem and Leaf curve, Pie chart, Bar Chart, Histogram, frequency curve, frequency polygon, cumulative frequency curves (Ogives)
- Interpretation of data

2. Measures of Central tendency:

- Arithmetic mean, Geometric mean, Harmonic mean, Weighted Arithmetic Mean, Combined Mean and combined variance.
- Median, mode and other partition values.

3. Fitting of linear and non linear curves reducible to linear form (two variable only)

4. Karl Pearson's coefficient of correlation, Spearman's coefficient of rank correlation,

5. Regression analysis: Lines of regression (linear case only) and other related problem.

6. Fitting of demand curve from time series data, calculation of price elasticity of demand.

Part B: Using Microsoft Excel

1. Introduction to MS Excel – functions and statistical Data analysis

2. Classification, tabulations and frequency tables

3. Bar diagram, dot diagram, Histogram, frequency curves, ogives, Stem and leaf plots, Box plots

4. Summary statistics

5. Two way tables and plots

6. Product moments, Karl Pearson and Spearman's Correlations

7. Curve fitting: Method of least squares: linear, parabolic, exponential and polynomials (Up to three variables)

8. Regression lines

9. Fitting of demand curve from time series data, calculation of price elasticity of demand.

S: 103
Basic Probability Theory – I

Unit 1: Measures of Dispersion: **(9 L)**

- Concept of variation (dispersion), absolute and relative measures, their merits and demerits, applications of these measures,
- Sample moments, skewness and kurtosis, measures based on skewness and kurtosis.

Unit 2: Conditional probability **(9 L)**

- Conditional probability, independence of events, pair wise and mutual independence, theorem on total probability, Bayes' theorem and its application
- Applications of probability in various fields: marketing, gambling, finance, life testing experiments, actuarial science

Unit 3: Time Series **(9 L)**

- Idea of time series, components of time series
- Measurement of trend by principle of least squares for mathematical curves (up to second degree) , moving average method,
- Calculation of seasonal variation and seasonal indices by Ratio to moving average and ratio to trend method.

Unit 4: Decision Analysis **(9 L)**

- Idea of uncertainty
- Decision under uncertainty, Principles (o criterions) for decision making – Laplace, Maximin, Minimax, Hurrwicz's
- Decision under risk – Expected Monetary Value (EMV) Criteria, Expected Opportunity Loss (EOL), Expected value of Perfect Information (EVPI).

Reference books for S:103

1. Feller, W.:
An Introduction to probability theory and its application, Vol. I
3rd ed.
John Wiley and sons, New York, 1968.
2. Freund, J.E.:
Introduction to Probability
Encino Calif, Dickenson Publishing Co. Inc. 1973.
3. Parzen, E.
Modern Probability theory and its applications
John Wiley and sons Inc., New York, 1960
4. Lindsey, J.K.
Introduction to Applied Statistics: A modelling approach
2nd Ed. (2003)
Oxford University Press
5. Lindley, D.V.
Making Decisions
2nd Ed. Wiley, London, 1985
6. Mandenhall, W. Introduction to Mathematical Statistics
8th Ed. Duxbury, 1991
7. Mendenhall, W. Wackerly, D. and Scheaffer, R.L.
Mathematical Statistics with applications
4th Ed. PWS – Kent, 1990, Boston
8. Hogg, R.V. and Craig, A. T.
Introduction to Mathematical Statistics
Amerind Publishing Co.
9. Mood, A. M., Greybill, F.A., Boes, D. C.
Introduction to the theory of Statistics
McGraw Hill
10. Rohatgi, V. K.
An Introduction to Probability theory and Statistics
John Wiley and Sons, 1967
11. Mukhopadhyay, P.
Mathematical Statistics
New Central Book Agency. Kolcutta, 1996
12. Hoel, P.G.
Introduction to Mathematical Statistics
Asia Publishing House
13. Meyer, P. L.
Introductory Probability and Statistical Applications
Addison Wesley, 1970
14. Goon, A.M., Gupta, M.K. and Dasgupta, B.
Fundamentals of Statistics, Vol. I., World press, Kolcutta,1991

S: 104

Practical

Duration: 2 Hours per week

Part A: Manual Calculation

1. Measurement of linear trend using least squares and method of moving average
2. Calculation of seasonal variation and seasonal indices by ratio to moving average
3. Calculation of seasonal variation and seasonal indices by ratio to trend method.
4. Solution of Decision problems using Maximin or Minimax, Maximax or Minimin, Laplace and Horwiz Criteria (Principles)
5. Solution of decision problems under risk – by Expected Monetary Criterion (EMV), Expected Opportunity Loss (EOL), Expected Value of Perfect Information

Part B: Using Microsoft Excel

1. Measurement of linear trend using least squares and method of moving average
2. Calculation of seasonal variation and seasonal indices by ratio to moving average
3. Calculation of seasonal variation and seasonal indices by ratio to trend method.
4. Solution of Decision problems using Maximin or Minimax, Maximax or Minimin, Laplace and Horwiz Criteria (Principles)
5. Solution of decision problems under risk – by Expected Monetary Criterion (EMV), Expected Opportunity Loss (EOL), Expected Value of Perfect Information

Note: 1. It is mandatory to have statistics laboratory, equipped with computers, MS office, Statcalc.

2. Students are required to perform practical using Data analysis pack and functions of MS Excel as well as they are required to attach print outs of work done.

3. The proposed batch size of statistics practical is 10 students per batch.