# VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

## Syllabus of B.Sc. (Statistics) Semester III & Semester IV
## Syllabus effective from June 2015-2016

### S.Y. B.Sc. Semester -III

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## PAPER – 301
## Correlation, Regression and Association of Attributes

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Unit-1: **Linear Correlation Analysis:** (40%)

- Meaning, Definition, Types of correlation,
- Methods of studying correlation:

  (i) Scatter diagram method (with merits and limitations).

  (ii) Karl Pearson's product moment method (with merits and limitations), and

  (iii) Spearman's Rank Correlation method (with derivation, merits and limitations).
- Interpretation correlation coefficient,
- Properties,
- Problems of above topics.

Unit-2: **Linear Regression Analysis:** (40%)

- Meaning, Definition,
- Fitting regression lines by principle of least squares,
- Regression coefficients and their properties,
- Angle between two lines of regression and its interpretation,
- Coefficient Determination,
- Utility of study of regression,
- Difference between Regression analysis and Correlation analysis.
- Problems of above topics.

Unit-3: **Measures of Association of Attributes (for two attributes):** (20%)

- Idea of notations and terminology for classification of attributes,
- Contingency table,
- Types of association,
- Consistency of data,
- Methods of measures of association:

  (i) Proportion method, (ii) Method of Probability, (iii) Yule's Coefficient of association (with its characteristics), (iv) Coefficient of contingency,
- Comparison between measure of association and correlation.
- Problems of above topics.

**References:**

1 Mood, Graybill and Boes : Introduction to theory of Statistics.

2 Hogg and Craig : Introduction to mathematical Statistics.

3 Gupta and Kapoor : Fundamentals of mathematical statistics.

4 Stuart, G. and Ord, J.K. (1991): Advanced theory of Statistics, Vol. 2.

## PAPER – 302
## Numerical Analysis

Unit-1: **Finite Differences:** (20%)

- Concept of finite differences, Finite difference table, Definition of operators $\Delta$, $\nabla$, E, $\delta$, $\mu$, D; Relation among operators,
- Fundamental theorem of finite differences,
- Concept of Divided differences, Divided differences table.

Unit-2: **Interpolation:** (40%)

- Concept of interpolation, Assumptions, Uses,

- Interpolation for equal intervals:
  - Newton's forward difference interpolation formula,
  - Newton's backward difference interpolation formula,
- Interpolation for unequal intervals:
  - Newton's divided difference formula,
  - Lagrange's interpolation formula.

Unit-3: **Numerical Integration and Differentiation :** (40%)

- Concept of numerical integration,
- General Quadrature formula for equidistant ordinates,
- Trapezoidal rule, Simpson's one-third rule, Simpson's three-eighth rule,
- Concept of numerical Differentiation
- Differentiation based on Newton forward and Newton backward formula.

**References:**

1.S.S.Shastry: Numerical Analysis, Prentice Hall of India.

2.Gupta and Kapoor : Fundamentals of mathematical statistics.

3. H. Freeman: Finite difference for acturial sciences.

4. C.E. Froberg: Introduction to numerical analysis; Wesley.

## PAPER – 303

## Sampling Techniques

Unit:1 Terminology & Simple Random Sampling: (50%)

- Define terms: Population, Sample, Complete enumeration, Sampling, Sampling unit, Sampling frame, Sampling method, Parameter, Statistic, Estimate, Estimator,
- Advantages of sampling, Difference between population study and sample study, Limitations of sampling, Principles of sampling method, Sampling and non-sampling errors, Characteristics of an ideal sample, Random sampling,
- Simple random sampling (SRS):
  - Simple random sampling with replacement (SRSWR) and Simple random sampling without replacement (SRSWOR),
  - Method of Selection of sample and sample size
  - Estimation of population mean and population total
  - Idea of variance and standard error (without proof)
  - SRS of attributes ( proportions ):
    - Estimation of population proportion and total units,
  - Advantages and limitations.
  - Examples of above topics.

Unit:2 Stratified random sampling: (25%)

- Concept of stratified random sampling,
- Method of Selection of sample and sample size.
- Estimation of population mean
- Idea of variance and standard error (without proof)

- Advantages and limitations.

Unit:3 Systematic random sampling: (25%)

- Concept of systematic random sampling,
- Method of Selection of sample,
- Estimation of population mean,
- Idea of variance and standard error (without proof)
- Advantages and limitations.

➢ Comparison of simple random sampling, Stratified random sampling and systematic and for a given population.

**References:**

1. Cochran, W.G.: Sampling Techniques.
2. Murthy M.N.: Sampling Theory and Methods.
3. Des Raj: Sampling Theory.
4. Deming W.E.: Some Theory of Sampling.