

## Statistical Methods I

Semester I

Subject Code: BS11505

Lectures : 40

## Objectives:

The syllabus aims in equipping students with -

- Ability to prepare for postgraduate work or study in various fields of Statistics.
- Developing attitudes which aim to make them responsible members of the society.
- The methodology of designing research tools and interpretation and analysis of results and report writing.
- Application orientation of logic and objectivity in solution of problems of development and growth.
- Ability to offer research and consultancy services to advance societal development
- Sustainability in emerging process of digital technology and confront the challenges of modern technology and information system.

Unit 1: Data condensation and Graphical methods	No. of Lects.
<ul style="list-style-type: none"> <li>Raw data, attributes and variables, discrete and continuous variables.</li> <li>Presentation of data using exclusive frequency distribution and cumulative frequency distribution. (Construction of frequency distribution is not expected)</li> <li>Graphical Presentation of frequency distribution - histogram, stem and leaf chart, less than and more than type ogive curves.</li> <li>Numerical Problems</li> </ul>	(06)

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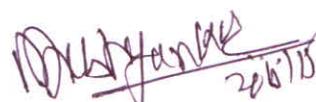
**Unit 2: Measures of Central Tendency**

	No. of Lects.
<ul style="list-style-type: none"> <li>• Central Tendency: concept, illustrations, scope and limitations.</li> <li>• Measures of central tendency -           <ul style="list-style-type: none"> <li>(a) Arithmetic Mean (A. M.) : definition, formula for computations of A. M. for ungrouped and grouped, data combined mean, weighted mean, merits and demerits of A. M., Trimmed mean.</li> <li>(b) Median ; definition, computation of median for ungrouped and grouped data, graphical methods, merits and demerits.</li> <li>(c) Mode : definition, computation of mode for ungrouped and grouped data, graphical representation, merits and demerits.</li> </ul> </li> <li>• Partition Values: Quartiles, by formula and by graph, Box Plot.</li> <li>• Numerical Problems.</li> </ul>	(08)

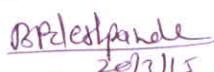
**Unit 3: Measures of Dispersion**

	No. of Lects.
<ul style="list-style-type: none"> <li>• Dispersion : concept and utility</li> <li>• Measures of dispersion           <ul style="list-style-type: none"> <li>(a) Range : definition, computations for ungrouped and grouped data, merits and Demerits.</li> <li>(b) Quartile deviation.</li> <li>(c) Variance and Standard Deviation : definition, computations for ungrouped and grouped data, combined variance for two groups, merits and demerits.</li> </ul> </li> <li>• Measures of dispersion for comparison - Coefficient of range, coefficient of quartile deviation, coefficient of variation (C.V.).</li> <li>• Numerical Problems.</li> </ul>	(10)

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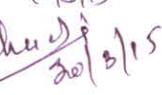
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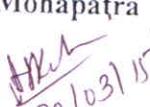
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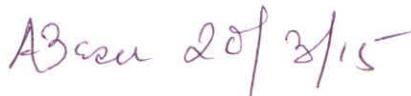
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## Unit 4: Moments , Measures of Skeweness and Kurtosis

No. of Lects.

- Raw and Central Moments: definition, computations for ungrouped and grouped data (only up to first four moments).
- Relation between raw and central moments up to fourth order.
- Concept of symmetric frequency distribution, skewness, positive and negative skewness.
- Measures of skewness - Pearson's measure, Bowley's measure,  $\beta_1, \gamma_1$
- Kurtosis of a frequency distribution, measure of kurtosis ( $\beta_2, \gamma_2$ ) based upon moments, type of kurtosis : leptokurtic, platykurtic and mesokurtic.
- Numerical problems.

## Unit 5: Correlation (for ungrouped data)

No. of Lects.

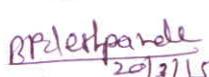
- Bivariate data ; scatter diagram
- Correlation, positive correlation, negative correlation, zero correlation
- Karl Pearson's coefficient of correlation ( $r$ ), limits of  $r$  ( $-1 \leq r \leq 1$ ), interpretation of  $r$ , coefficient of determination ( $r^2$ ) and interpretation as strength of relation
- Karl Pearson's coefficient of correlation between ranks
- Numerical problems.

Note : Theorems are to be studied without proof (wherever applicable)

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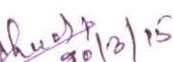
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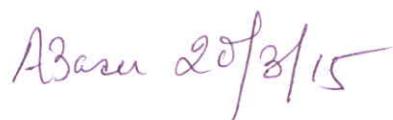
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### Recommended Text Books:

- Gupta S. C. and Kapoor V. K. 1987. Fundamentals of Applied Statistics (3rd Edition) S. Chand and Sons, New Delhi.
- Kulkarni M.B., Ghatpande S.B., Gore S.D. 1999, Common Statistical Tests Satyajeet Prakashan, Pune
- Kulkarni M.B., Ghatpande S.B. 2007, Introduction to Discrete Probability and Probability Distributions SIPF Academy
- Sarma K.V.S. 2001 Statistics Made Simple. Do it Yourself on P.C. Prentice Hall

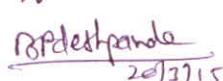
### Recommended References:

- Medhi J. 1992, Statistical Methods (An Introductory Text), New Age International
- Freund J.E. 2005, Modern Elementary Statistics Pearson Publication
- Trivedi K.S. 2001, Probability, Statistics, Design of Experiments and Queuing Theory with Applications of Computer Science Prentice Hall of India, New Delhi 9
- Ross S. M. 2006, A First Course In Probability 6<sup>th</sup> Edition Pearson publication
- Law A. M. and Kelton W. D. 2007, Simulation Modelling and Analysis Tata McGraw Hill
- Box G. E. P. and Jenkins G. M. 2008, Time Series Analysis, 4<sup>th</sup> edition Wiley
- Brockwell P. J. and Davis R. A. 2006, Time Series Methods Springer
- Snedecor G. W. Cochran W. G. 1989, Statistical Methods John Wiley & sons

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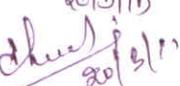
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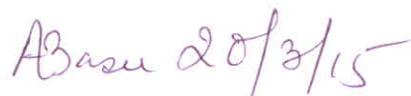
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