

Statistical Methods I

Semester I	Subject Code: BS11505	Lectures : 40
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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"> • Raw data, attributes and variables, discrete and continuous variables. • Presentation of data using exclusive frequency distribution and cumulative frequency distribution. (Construction of frequency distribution is not expected) • Graphical Presentation of frequency distribution - histogram, stem and leaf chart, less than and more than type ogive curves. • Numerical Problems 	(06)

Nitin Abhyankar

Nitin Abhyankar
20/1/15

Dr. Bhavana Deshpande

B. Deshpande
20/3/15

Anita Deshmukh

Anita Deshmukh
20/3/15

Suchi Smita Mohapatra

Suchi Smita Mohapatra
20/5/15

Anjali Kale

Anjali Kale
20/03/15

Amrita Basu

A. Basu 20/3/15



Unit 2: Measures of Central Tendency	No. of Lects.
<ul style="list-style-type: none"> Central Tendency: concept, illustrations, scope and limitations. Measures of central tendency - <ul style="list-style-type: none"> (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. (b) Median ; definition, computation of median for ungrouped and grouped data, graphical methods, merits and demerits. (c) Mode : definition, computation of mode for ungrouped and grouped data, graphical representation, merits and demerits. Partition Values: Quartiles, by formula and by graph, Box Plot. Numerical Problems. 	(08)

Unit 3: Measures of Dispersion	No. of Lects.
<ul style="list-style-type: none"> Dispersion : concept and utility Measures of dispersion <ul style="list-style-type: none"> (a) Range : definition, computations for ungrouped and grouped data, merits and Demerits. (b) Quartile deviation. (c) Variance and Standard Deviation : definition, computations for ungrouped and grouped data, combined variance for two groups, merits and demerits. Measures of dispersion for comparison - Coefficient of range, coefficient of quartile deviation, coefficient of variation (C.V.). Numerical Problems. 	(10)

Nitin Abhyankar

Nitin Abhyankar
20/3/15

Dr. Bhavana Deshpande

B. Deshpande
20/3/15

Anita Deshmukh

Anita Deshmukh
20/3/15

Suchi Smita Mohapatra

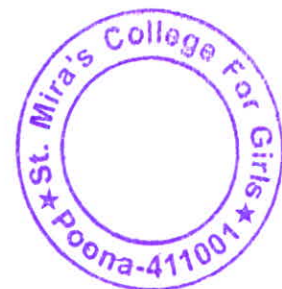
Suchi Smita Mohapatra
20/3/15

Anjali Kale

Anjali Kale
20/03/15

Amrita Basu

Amrita Basu 20/3/15



Unit 4: Moments , Measures of Skewness and Kurtosis	No. of Lects.
<ul style="list-style-type: none"> 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, β_1, γ_1 Kurtosis of a frequency distribution, measure of kurtosis (β_2, γ_2) based upon moments, type of kurtosis : leptokurtic, platykurtic and mesokurtic. Numerical problems. 	(08)

Unit 5: Correlation (for ungrouped data)	No. of Lects.
<ul style="list-style-type: none"> 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. 	(08)

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

Nitin Abhyankar

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20/3/15

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20/3/15

Suchi Smita Mohapatra

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20/3/15

Anjali Kale

Anjali Kale
20/3/15

Amrita Basu

Amrita Basu
20/3/15



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 6th 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, 4th 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

Nitin Abhyankar

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