TRIBHUVAN UNIVERSITY

INSTITUTE OF SCIENCE AND TECHNOLOGY

SCHOOL OF MATHEMATICAL SCIENCES

Bachelor in Mathematical Sciences (B.Math.Sc.)

Course of Study

Code No.: MSST 151 *Full Mark*: 75
Paper: **Statistics and Data Analysis II** *Pass Mark*: 30
Nature: Theory *Credit*: 3

Course Description:

This course begins with Applications of integration, Techniques of integration, Parametric Equations and Polar Coordinates, and is followed by a comprehensive treatment of Infinite sequence and series.

Learning Objectives:

The main objective of the course is to familiarize students with continued basic Statistics and methods of data analysis techniques including correlation and regression.

Mode of Delivery:

The course will be taught by lecture (48 hrs), and problem solving and class discussion (24 hrs). The use of spread sheet software for problem solving will be encouraged.

Contents:

Unit 1 Data Modeling **20 hrs**

Correlation analysis: correlation and it's types (bivariate data and frequency distribution, correlation between two variables, positive correlation, negative correlation, zero correlation, perfect correlation) scatter covariance between two variables, Karl Pearson's coefficient of Correlation of ranked data: Spearman rank correlation and Kendall rank correlation.

Regression analysis: Regression and it's types, simple and multiple regression linear and curvilinear; total and partial, difference between correlation and regression, lines of regression, fitting of lines of regression by the method of least squares, interpretation of slope and intercept, concept of linearity, simple and multiple linear regression models, fitting a simple/multiple linear regression models to a data set and interpret the output, uses majors of model fit to select an appropriate set of explanatory variables .

Unit 2 Analysis of Categorical Data **8hrs**

Class frequencies, relation between class frequencies, consistence of data, condition for consistency of data, independence and association of attributes, Yule's method and coefficient of contingency, Yule's coefficient of colligation, Pearson's coefficient of contingency and their interpretation.

Unit 3 Index Numbers **15 hrs**

Index numbers kinds of index numbers: price index, value index, quantity index, cost of living index, construction of index numbers, methods of computing price index, simple and weighted index numbers: Laspeyre's, Passche's and Fisher's index numbers, time and factor reversal test, cost of living index number, purchasing power of money, real wages, base shifting, inflation and deflation: chain indices and splicing two index numbers.

Unit 4 Analysis of Time Series

Time series, components of time series. Measurement of trend: Semi-average, moving average. Method of least squares: measurement of seasonal variation: Method of simple average and Ratio to Moving average ,application of time series .

Unit 5 Introduction to Probability **10 hrs**

Concepts in probability: deterministic and random experiments; Definitions of terms: trial and event, outcome, sample space, equally likely, mutually exclusive, exhaustive and favorable cases, sure and impossible events, independent and dependent events; Definitions of probability: mathematical (classical), statistical (relative frequency) and subjective with their merits and demerits; Combinatorial analysis and combinatorial probability examples, algebra of events and probability; Properties of probability and basic theorems: Additive and multiplicative theorems, Boole's inequality; Axiomatic definition of probability, conditional probability, pair-wise and mutual independence, Bayes theorem, prior and posterior probabilities

References

1. Gupta, S. C. &Kapoor, V. K. *Fundamentals of Mathematical Statistics*, Sultan Chand & Sons, New Delhi India, 2001.
2. Kapoor, J. N. &Saxena, H. C. *Mathematical Statistics*, S. Chand & Company Ltd., New Delhi, India, 2001.
3. Gupta, S. C. & Kapoor V. K. *Fundamentals of Applied Statistics,* Sultan Chand and Sons, India, 1994.
4. Bajracharya P.M. et.all , A text book of statistics second edition, sukunda books publication, Kathmandu Nepal.

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