

SARDAR PATEL UNIVERSITY
THIRD SEMESTER
(EFFECTIVE FROM JUNE, 2019)
SUBJECT: STATISTICS
COURSE CODE: US03CSTA21
(DESCRIPTIVE STATISTICS)

Course credit: 4

No. of lectures per week: 4

All units carry equal Weightage

Weightage: Internal – 30%, External – 70%

Objectives:

The main objective of this course is to acquaint students with some basic concepts in Statistics. They will be introduced to some elementary statistical methods of analysis of data. At the end of this course students are expected to be able to analyze the data.

- 1. To tabulate statistical information given in descriptive form,**
- 2. To use graphical techniques and interpret,**
- 3. To compute various measures of central tendency, dispersion, skewness,**
- 4. To analyze data pertaining to attributes and to interpret the results,**
- 5. To apply statistics in the various fields.**

Unit - I Analysis of Quantitative data - I

- **Types of data**
 - **Quantitative data : Discrete and Continuous**
 - **Qualitative data : Nominal and Ordinal**
- **Measures of central tendency**
 - **Mean, Median, Mode**
 - **Geometric mean**
 - **Harmonic mean**
 - **Weighted mean**
 - **Combined mean**
 - **Merits & demerits**
 - **Properties (with proof)**
 - **Examples**

Unit - II Analysis of Quantitative data - II

- **Partition values and their graphical representation**
- **Measures of Dispersion : Range, Quartile derivation, Mean Derivation, Standard derivation**
- **Coefficient of variation(C.V)**
- **Merits & Demerits**
- **Properties (with proof)**
- **Box – and – whisker plot**
- **Lorenz curve**
- **Stem – and – Leaf diagram**
- **Raw moments**

- Central moments
- Relationship between raw and central moments
- Skewness
- Kurtosis
- Examples

Unit - III Index numbers

- Introduction
- Uses of index numbers
- Steps for construction of index numbers
- Problems in the construction of index numbers
- Methods of constructing index numbers
 - Simple (Unweighted) Aggregate method
 - Weighted Aggregate method
 - Laspeyre's Price Index
 - Paasche's Price Index
 - Fisher's Price Index
 - Marshall Edgeworth Price Index
- Tests of consistency of Index number
 - Time reversal test
 - Factor reversal test

Unit - IV Vital Statistics

- Introduction
- Uses of Vital statistics and methods of collecting vital statistics
- Measurement of Mortality:
 - Crude Death Rate (CDR)
 - Specific Death Rate (SDR)
 - Standardized Death Rate (STDR)
 - Construction of Life tables and its uses.
- Measurement of Fertility:
 - Crude Birth Rate (CBR)
 - General Fertility Rate (GFR)
 - Specific Fertility Rate (SFR)
 - Total Fertility Rate (TFR)
 - Gross Reproduction Rate (GRR)
 - Net Reproduction Rate (NRR)

References:

1. Gupta S.C. : Fundamentals of Statistics
2. Gupta S.C. and V.K.Kapoor : Fundamentals of Mathematical Statistics
3. Agarwal B.L. : Basic statistics
4. Ken Black : Business Statistics
5. Gupta S.C. : Fundamentals of Applied Statistics

SARDAR PATEL UNIVERSITY
THIRD SEMESTER
(EFFECTIVE FROM JUNE, 2019)
SUBJECT: STATISTICS
COURSE CODE: US03CSTA22
(ELEMENTS OF PROBABILITY THEORY)

Course credit: 4

No. of lectures per week: 4

All units carry equal Weightage

Weightage: Internal – 30%, External – 70%

Objectives:

The main objective of this course is to introduce to the students the basic concepts of probability, axiomatic theory of probability, concept of random variable, probability distribution (univariate and bivariate) discrete random variables, expectation and moments of probability distribution. By the end of the course students are expected to be able

- 1. To distinguish between random and non-random experiments,**
- 2. To find the probabilities of events,**
- 3. To obtain a probability distribution of random variable (one or two dimensional) in the given situation,**
- 4. To apply standard discrete probability distribution to different situations.**

Unit - I Probability

- **Concept of Set theory, Permutation & combination**
- **Random experiment**
- **Sample space**
- **Events**
- **Types of sample space**
- **Meaning and definition of probability (classical & axiomatic)**
- **Laws of probability (with proof)**
- **Conditional probability and independent events**
- **Law of total probability**
- **Bayes' theorem (with proof)**
- **Examples**

Unit - II Random variables and probability distribution

- **Random variable**
- **Discrete and Continuous**
- **Probability mass function (p.m.f)**
- **Probability density function (p.d.f)**
- **Distribution function (c.d.f)**
- **Median, mode and partition values**

Unit - III Mathematical Expectation

- **Definition**
- **Properties (with proof)**
- **Moments, factorial moments, measures of central tendency, dispersion, skewness and kurtosis**

- Moments and Generating functions (non-standard distributions)
- Probability generating function (p.g.f), moment generating function (m.g.f.) and its properties.
- Cumulant generating function(c.g.f.)

Unit - IV Bivariate distribution

- Joint, marginal and conditional p.m.f of two random variables
- Joint, marginal and conditional p.d.f of two random variables
- Independence of two random variables (examples-nonstandard distribution)
- Product moments
- Correlation
- Conditional expectations.

References:

1. Gupta S.C. and Kapoor V.K. : Fundamentals of Mathematical Statistics
2. Gupta S.C. : Fundamentals of statistics
3. Mood A.M. and Graybill F.A. and Boes D.C.E.: Introduction to theory of statistics
4. Hogg and Craig: Introduction to Mathematical Statistics
5. Biswas Purna Chandra: Probability & Statistics (PHI Edition)

SARDAR PATEL UNIVERSITY
THIRD SEMESTER
(EFFECTIVE FROM JUNE, 2019)
SUBJECT: STATISTICS
COURSE CODE: US03CSTA23
(STATISTICS PRACTICAL – I)

Course credit: 2

No .of lectures per week: 4

Pascal Programming:

- Basics of Pascal Programming
- Simple programs using Pascal Language
- Algorithms of sum, largest number and arranging numbers in ascending or descending orders
- Write a Pascal program to calculate
 - Sum of numbers
 - A.M,G.M,H.M and C.V for ungrouped and grouped data
 - Coefficient of skewness and kurtosis based on moments and determine the nature of the distribution.
 - Median and Mode for ungrouped and grouped data
 - Mean deviation about mean, median and mode for ungrouped and grouped data.

SUBJECT: STATISTICS
(STATISTICS PRACTICAL – II)

Course credit: 2

No .of lectures per week: 4

Manual :

- **Construction of frequency distribution**
- **Analysis of Quantitative data : Computation of various measures of central tendency and partition values**
- **Measures of dispersion**
- **Box – and – whisker plot**
- **Stem – and – Leaf plot**
- **Skewness**
- **Kurtosis**
- **Index numbers**
 - **Methods of constructing index numbers**
 - **Simple (Unweighted) Aggregate method**
 - **Weighted Aggregate method**
 - **Laspeyre’s Price Index**
 - **Paasche’s Price Index**
 - **Fisher’s Price Index**
 - **Marshall Edgeworth Price Index**
 - **Tests of consistency of Index number**
 - **Time reversal test**
 - **Factor reversal test**
- **Vital Statistics**
 - **Measurement of Mortality:**
 - **Crude Death Rate (CDR)**
 - **Specific Death Rate (SDR)**
 - **Standardized Death Rate (STDR)**
 - **Construction of Life tables**
 - **Measurement of Fertility:**
 - **Crude Birth Rate (CBR)**
 - **General Fertility Rate (GFR)**
 - **Specific Fertility Rate (SFR)**
 - **Total Fertility Rate (TFR)**
 - **Gross Reproduction Rate (GRR)**
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