

**Anekant Education Society's
Tuljaram Chaturchand College of Arts, Science and
Commerce, Baramati**

Autonomous

Course Structure for F. Y. B. Sc. (Computer Science) STATISTICS

Semester	Paper Code	Title of Paper	No. of Credits
I	UCSST111	Statistical Methods -I	2
	UCSST112	Probability and Some Discrete Probability Distributions	2
	UCSST113	Practical-I	2
II	UCSST121	Statistical Methods- II	2
	UCSST122	Continuous Probability Distributions and Testing of Hypothesis	2
	UCSST123	Practical-II	2

SYLLABUS (CBCS) FOR F. Y. B. Sc.(CS) STATISTICS

(w. e. from June, 2022)

Name of the Programme	: B.Sc. Computer Science
Program Code	: USCO
Class	: F.Y.B.Sc.
Semester	: I
Course Name	: Statistical Methods I
Course Code	: UCSST111
No. of lectures	: 36
Credit	: 2 credits

Course Outcomes:

The students will acquire knowledge about the;

1. data representation and visualization
2. central tendency and its various measures
3. dispersion and its various measures
4. skewness and kurtosis
5. concept of inventory which are used in software development

TOPICS/CONTENTS:

UNIT 1: Data Representation

(8L)

- 1.1 Definition, importance, scope and limitations of statistics.
- 1.2 Scales of measurements: Nominal, Ordinal, Interval & Ratio.
- 1.3 Data Condensation: Types of data (Primary and secondary), Attributes and Variables, Discrete and Continuous variables, classification and construction of frequency distribution.
- 1.4 Graphical Representation: Histogram, Frequency polygon, Frequency curve, Ogive Curves, Steam and leaf chart.
- 1.5 Numerical problems related to real life situations.

UNIT 2: Measures of central tendency

(8L)

- 2.1 Concept of central tendency, requisites of good measures of central tendency.
- 2.2 Arithmetic mean: Definition, computation for ungrouped and grouped data, combined mean, weighted mean, merits and demerits.
- 2.3 Median and Mode: Definition, formula for computation for ungrouped and grouped data, graphical method, merits and demerits. Empirical relation between mean, median and mode. (without proof)

2.4 Partition Values: Quartiles, Percentiles, Deciles, Box Plot.

2.5 Numerical problems related to real life situations.

UNIT 3: Measures of Dispersion (6L)

3.1 Concept of dispersion and measures of dispersion, requisites of good measures of dispersion, absolute and relative measures of dispersion.

3.2 Range and Quartile Deviation: definition for ungrouped and grouped data and their coefficients, merits and demerits.

3.3 Variance and Standard deviation: definition for ungrouped and grouped data, coefficient of variation, combined variance & standard deviation, merits and demerits.

3.4 Numerical problems related to real life situations.

UNIT 4: Moments, Skewness and Kurtosis (8L)

4.1 Raw and central moments: definition for ungrouped and grouped data (only first four moments), relation between central and raw moments upto fourth order. (without proof)

4.2 Measures of Skewness: Types of skewness, Pearson's and Bowley's coefficient of skewness, Measures of skewness based on moments.

4.3 Measures of Kurtosis: Types of kurtosis, Measures of kurtosis based on moments

4.4 Numerical problems related to real life situations.

UNIT 5: Inventory Control (6L)

5.1 Introduction.

5.2 Principal items of inventories.

5.3 Need and importance of inventory.

5.4 ABC analysis.

5.5 Basic parameters to operate the inventory system: Maximum level, Re-order level, Minimum level.

5.6 The pay off matrix approach to select an optimal strategy (EMV criterion).

5.7 Numerical problems related to real life situations.

References:

1. Fundamentals of Applied Statistics (3rd Edition), Gupta and Kapoor, S.Chand and Sons, New Delhi, 1987.
2. An Introductory Statistics, Kennedy and Gentle.
3. Statistical Methods, G.W. Snedecor, W.G. Cochran, John Wiley & sons, 1989.
4. Kantiswroop, Gupta : Operations Research, Sultan Chand and Sons Publisher.

SYLLABUS (CBCS) FOR F. Y. B. Sc.(CS) STATISTICS

(w. e. from June, 2022)

Name of the Programme	: B.Sc. Computer Science
Program Code	: USCO
Class	: F.Y.B.Sc.
Semester	: I
Course Name	: Probability and Some Discrete Probability Distributions
Course Code	: UCSST112
No. of lectures	: 36
Credit	: 2 credits
Course Outcomes:	

Students are expected to be able to,

1. distinguish between random and non-random experiments.
2. find the probabilities of various events.
3. obtain probability distribution of univariate discrete and continuous random variables.
4. apply Binomial distribution in real life situations.
5. apply Poisson distribution in real life situations.

TOPICS/CONTENTS:

Unit 1: Sample Space and Events

(6L)

- 1.1 Concepts of experiments, deterministic and nondeterministic experiments.
- 1.2 Definitions: Sample space, Types of sample space, Event, Types of Events: Elementary event, Complementary event, Sure event, Impossible event.
- 1.3 Concept of occurrence of an event, Equally-likely events
- 1.4 Algebra of events (Union, Intersection, Complementation).
- 1.5 Definitions of Mutually exclusive events, Exhaustive events.
- 1.6 Algebra of events and its representation of events in set theory notation:
Occurrence of the following events:
 - i) at least one of the given events
 - ii) none of the given events
 - iii) all of the given events
 - iv) mutually exclusive events
 - v) mutually exhaustive events
 - vi) exactly one event out of the given events.
- 1.7 Numerical problems related to real life situations.

Unit 2: Probability

(13L)

2.1 Concept of Multiplication principle and Permutation and Combination

2.2 Classical Probability: Classical definition of probability, examples ,Probability model, probability of an event, examples. Axiomatic definition of probability.

Important results and their proofs:

i) $0 \leq P(A) \leq 1$,

ii) $P(A) + P(A^c) = 1$

iii) $P(\Phi) = 0$

iv) If $A \subset B$, $P(A) \leq P(B)$

v) $P(A \cup B) = P(A) + P(B) - P(A \cap B)$ (Addition theorem of probability) and its generalization (Statement only).

Numerical problems related to real life situations.

2.3 Conditional Probability

i) Concepts and definitions of Conditional Probability

ii) Definition of conditional probability of an event.

iii) Multiplication theorem for two events. Examples.

iv) Partition of sample space.

v) Idea of Posterior probability, Statement and proof of Bayes' theorem, examples on Baye's theorem.

2.4 Independence of Events

i) Concept of Independence of two events.

ii) Proof of the result that if A and B are independent then,

a) A and B^c ,

b) A^c and B

c) A^c and B^c are independent.

iii) Pairwise and Mutual Independence for three events.

iv) Numerical problems related to real life situations.

UNIT 3: Random Variable

(4L)

3.1 Definition of random variable (r.v.) , discrete and continuous random variable.

3.2 Definition of probability mass function (p.m.f.) of discrete r.v. and probability density function of continuous r.v.

3.3 Cumulative distribution function (c.d.f.) of discrete and continuous r.v. and their properties. (Characteristic properties only)

3.4 Definition of expectation and variance of discrete and continuous r.v., theorem on expectation and variance (statement only).

3.4 Determination of median and mode using p.m.f. only.

3.5 Numerical problems related to real life situations.

UNIT 4: Standard Discrete Distributions

(13L)

4.1 Uniform Distribution : definition, mean, variance

4.2 Bernoulli Distribution : definition, mean, variance, additive property

4.3 Binomial Distribution : definition, mean, variance, additive property

4.4 Poisson Distribution : definition, mean, variance, mode, additive property, limiting case of $B(n, p)$

4.5 Numerical problems related to real life situations

References:

1. Bhat B. R., Srivenkatramana T and Madhava Rao K. S. (1997): Statistics: a Beginner's Text, Vol. II, New Age International (P) Ltd.
2. Goon A. M., Gupta M. K., Das Gupta B. (1999): Fundamentals of Statistics, Vol.II, World Press, Calcutta.
3. Hogg R. V. and Crag R. G.: Introduction to Mathematical Statistics Ed.4.
4. Gupta and Kapoor : Fundamentals of Mathematical Statistics, Sultan Chand and Sons, New Delhi.
5. Meyer P.L.(1970): Introductory Probability and Statistical Applications, Edition Wesley.
6. Rohatgi V. K. and Saleh A. K. Md. E. (2002): An Introduction to probability and statistics. John wiley & Sons (Asia)
7. Gupta and Kapoor : Fundamentals of Applied Statistics, Sultan Chand and Sons, New Delhi.

SYLLABUS (CBCS) FOR F. Y. B. Sc.(CS) STATISTICS

(w. e. from June, 2022)

Name of the Programme	: B.Sc. Computer Science
Program Code	: USCO
Class	: F.Y.B.Sc.
Semester	: I
Course Name	: Practical – I
Course Code	: UCSST113
No. of lectures	: 36
Credit	: 2 credits

Course Outcomes:

At the end of this course students are expected to be able

1. Represent statistical data diagrammatically and graphically.
2. Compute various measures of central tendency and dispersion
3. Compute various measures of moments, skewness and kurtosis.
4. Interpret summary Statistics of computer output.
5. To use statistical tools like graphical representation, summary statistics of data with the help of MS-Excel.

Sr. No.	Title of Experiments
1.	Measures of Central Tendency
2.	Measures of Dispersion
3.	Problems on Simple Probability, Conditional Probability, Bayes' Theorem and Independence of Event
4.	Measures of Skewness and Kurtosis
5.	Fitting of Binomial distribution
6.	Fitting of Poisson distribution
7.	Introduction to EXCEL
8.	Diagrammatic Representation and Descriptive Statistics Using EXCEL
9.	Computation of probabilities of discrete probability Distributions using EXCEL
10.	Project: Data collection, its condensation and Representation