

STATISTICS/ BIostatISTICS

COURSE DETAILS

Semester I

A1 – DISCIPLINE SPECIFIC CORE COURSE

KU1DSCSTA101: DESCRIPTIVE STATISTICS

Semester	Course Type	Course Level	Course Code	Credits	Total Hours
1	CORE	100	KU1DSCSTA101	4	90

Learning Approach (Hours/ Week)			Marks Distribution			Duration of ESE (Hours)
Lecture	Practical/ Internship	Tutorial	CE	ESE	Total	
3	1	1	50	50	100	3(T)+2(P)*

COURSE DESCRIPTION

This course serves as an introduction to statistical methods, covering key concepts and techniques essential for understanding and analyzing data. Through a combination of theoretical concepts and practical applications, students will learn key statistical techniques and methodologies for summarizing and interpreting data. The course is divided into four units, each focusing on different aspects of statistical analysis.

COURSE OBJECTIVES:

- Understand the fundamental concepts of statistics: Students will grasp the basic principles and terminology of statistics, including the definition and scope of the field.
- Recognize and classify types of data: Students will be able to identify and categorize different types of data, including quantitative and qualitative data, and understand the scales of measurement (nominal, ordinal, interval, and ratio).
- Utilize various data presentation techniques: Students will learn to present data effectively using tabular and graphical methods, including histograms, frequency polygons, bar charts, pie diagrams, stem and leaf charts, and ogives.
- Understand the concepts of central tendency, dispersion, skewness and kurtosis and their measures.

COURSE OUTCOMES

After successful completion of this course, students will be able to understand:

SL #	Course Outcomes
CO1	Concepts of statistical population and sample, types of variables and attributes.
CO2	Tabular and graphical representation of data based on variables.
CO3	Measures of central tendency, dispersion and their computations.
CO4	Moments, skewness and kurtosis and their uses.

MAPPING OF COs to PSOs

SI No	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	✓	✓	✓	✓	✓
CO2	✓	✓		✓	✓
CO3	✓	✓	✓	✓	✓
CO4	✓	✓	✓		✓

COURSE CONTENTS

UNIT 1

Statistical methods: - definition and scope of statistics, concepts of statistical population and sample, Data: - quantitative and qualitative, attributes, variables, scales of measurement nominal - ordinal, interval and ratio. Presentation: - tabular and graphical, including histogram, frequency polygon, Bar chart, Pie diagram, stem and leaf chart and ogives. **(15 Hours)**

UNIT 2

Measures of Central Tendency (Mathematical and positional averages) and their properties: Mean, median, mode, harmonic mean, geometric mean, weighted mean, quartiles, deciles, percentiles. Short-cut method for the evaluation of mean of raw and grouped data. **(20 Hours)**

UNIT 3

Measures of Dispersion :- Range, quartile deviation, mean deviation, standard deviation and variance. Relative and absolute measures of dispersion, coefficients of dispersion based on: - Range, quartile deviation, mean deviation, standard deviation; Short-cut method for the

evaluation of variance and standard deviation for raw and grouped data. Boxplot and Lorenze curve. **(20 Hours)**

UNIT 4

Measures of skewness and kurtosis: Moments, raw moments, central moments, relation between raw moments and central moments, absolute moments. Short-cut method for the evaluation of central moments of raw and grouped data, various measures of skewness and kurtosis. **(20 Hours)**

UNIT 5 (Teacher Specific Module- Optional)

History of Statistics, data entering using EXCEL/SPSS, understanding the usage of various statistical and mathematical functions in EXCEL/SPSS. Preparation of a questionnaire, data collection (online/offline) and analysis of data using methods explained in Units 1 to 4, preparation and submission of a report. **(15 Hours)**

TEXT BOOKS

1. Gupta, S. C. and Kapoor, V. K. (2020). *Fundamentals of Mathematical Statistics*. Sultan Chand and Sons' Publishers, New Delhi.
2. Dabas, P. (2024). *Descriptive and Inferential Statistics Using R*. Sultan Chand and Sons' Publishers, New Delhi.
3. Mood, A.M., Graybill, F.A. and Bose, D.C. (2007). *Introduction to the Theory of Statistics, 3rd Edn.*, (Reprint), Tata McGraw-Hill Pub. Co. Ltd.

SUGGESTED READINGS:

1. Spiegel, M. R. and Stephens, L. J. (2017). *Schaum's Outline of Statistics*, 6th Edn., McGraw-Hill Education.
2. Gun, A. M., Gupta, M.K. and Dasgupta, B. (2008). *Fundamentals of Statistics*. India: World Press.
3. Armitage, P., Berry, G., and Matthews, J. N. S. (2008). *Statistical Methods in Medical Research*. John Wiley & Sons.

TEACHING LEARNING STRATEGIES

- Lecturing, Visualization, Team Learning

MODE OF TRANSACTION

- Direct class room Lecture, Seminar, Discussion, ICT based lecture,

ASSESSMENT RUBRICS

Refer to section 7 of FYIMP- Computational Science - Scheme and Syllabus for the 4 credit courses with 3 Credit Theory + 1 Credit Practical.

Semester II

A2– DISCIPLINE SPECIFIC CORE COURSE

KU2DSCSTA102: FIRST COURSE ON THEORY OF PROBABILITY

Semester	Course Type	Course Level	Course Code	Credits	Total Hours
2	CORE	100	KU2DSCSTA102	4	90

Learning Approach (Hours/ Week)			Marks Distribution			Duration of ESE (Hours)
Lecture	Practical/ Internship	Tutorial	CE	ESE	Total	
3	1	1	50	50	100	3(T)+2(P)*

COURSE DESCRIPTION:

This course provides a comprehensive introduction to probability theory, covering foundational concepts, axiomatic definitions, conditional probability, independence, and the practical applications of Bayes' theorem. The course is structured into four units, each focusing on different aspects of probability theory.

COURSE OBJECTIVES:

- To develop a solid understanding of the fundamental concepts of probability theory, including random experiments, sample space, events, and basic probability calculations.
- To acquire knowledge of different definitions of probability, including classical, empirical, and axiomatic definitions, and understand the properties and limitations of each.
- To develop proficiency in applying mathematical concepts such as sets, sigma algebras, and measures to describe probability spaces and analyze probabilities of events.
- To enhance problem-solving skills by applying probability concepts to a variety of