DISCIPLINE SPECIFIC CORE COURSE -17 – :
Methods in Biostatistics
Zoo-DSC-17

CREDIT DISTRIBUTION, ELIGIBILITY AND PRE-REQUISITES OF THE COURSE

Course title & Code	Credits	Credit distribution of the course			Eligibility criteria	Pre-requisite ofthe course (if any)
		Lecture	Tutorial	Practical/ Practice		
Methods in Biostatistics Zoo-DSC-17	**04**	**02**	**Nil**	**02**	**Passed Class XII with Biology/ Biotechnology**	**NIL**

Learning Objectives

The learning objectives of this course are as follows:

- to provide an overview of the fundamental concepts of biostatistics.
- to apprise students to the various statistical methods and software tools for understanding data analysis in biological sciences.
- to familiarize students with basic training and develop skills required for analysis of experimental data in biological sciences.
- to encourage students to pursue higher studies or career in biostatistics as Data Analyst, Data Scientist, Software Developer, Machine Learning Analyst, Research Scientist, Academicians, etc.

Learning Outcomes

By studying this course, students will be able to

- better understand the basic concepts of Biostatistics and its various applications in different fields of biological sciences.
- acquire basic skills to set up hypothesis and design research studies.
- enable students to differentiate among various experimental designs and apply appropriate statistical tests.
- develop the skills to collect and represent data in tabular and graphical forms.
- analyze data and interpret experimental results using calculator, spread sheets software and online/offline software tools.

Syllabus of DSC-17

UNIT- 1: Introduction to Biostatistics **1 hr**

Aim and scope; applications in biological sciences.

UNIT- 2: Statistical Data **4 hrs**

Sampling methods; Primary and secondary data; Qualitative and quantitative data; Discrete and continuous data; Presentation of data- graphical representation of data.

UNIT- 3: Descriptive Statistics **9 hrs**

Concepts of statistical population and samples, parameter and statistics; Measures of Central tendency and Dispersion - Mean, Median and Mode (grouped and ungrouped data); Variance, Standard Deviation and Standard Error; Coefficient of Variance.

UNIT- 4: Probability and Distributions **2 hrs**

Normal, Binomial and Poisson; Skewness and Kurtosis.

UNIT- 5: Testing of Hypothesis **4 hrs**

Null and Alternative hypotheses; Concepts of statistical errors - Type I and Type II errors; Confidence Intervals and Confidence levels.

UNIT- 6: Statistical tests **6 hrs**

Chi Square tests; Z test, t Tests - paired and unpaired; F test (one way ANOVA).

UNIT- 7: Correlation and Regression **4 hrs**

Correlation Coefficient; Linear regression analysis.

Practical **(60 hrs)**

(Laboratory periods: 15 classes of 4 hours each)

1. To learn calculation and graphical representation of data with computers (e.g. MS Excel/SPSS/SigmaStat/Prism).
2. To compute Coefficient of Variance from data collected and measure variability.
3. To collect data on different parameters (e.g. height/weight) of animal/plant samples and test for significance, difference between mean, mode and median.
4. To compute 'test of independence' and 'goodness of fit' with samples/data provided using Chi square test.
5. To perform Z test/ F test (ANOVA) for given samples/data provided.
6. Submission of Project report based on field studies (sample collection, data analysis and interpretation using above statistical tests).

Essential/recommended readings

1. Daniel, W.W. and Cross, C.L. (2018) Biostatistics: Basic Concepts and Methodology for the Health Sciences 11th Edition, John Wiley & Sons, Inc.
2. Motulsky, H. (2016) Essential Biostatistics: A Non-mathematical Approach Oxford University Press

Suggestive readings

1. Zar, Jerrold H. (1999). Biostatistical Analysis, IV Edition, Pearson EducationInc and Dorling Kindersley Publishing Inc. USA

NOTE: Examination scheme and mode shall be as prescribed by the Examination Branch, University of Delhi, from time to time.