INTRODUCTION TO STATISTICS

Course Code STAT-101 **Credit Hours** 2 (1-1)

Course Introduction	
This course introduces students to the application of statistical methods in physical education and sports sciences. It covers descriptive and inferential statistics, data collection, analysis, interpretation, and presentation. The course emphasizes the practical use of statistics in evaluating physical education programs, sports performance, and research in sports sciences.	
Learning Outcomes	
On the completion of the course, the students will: • Understand the basic concepts and principles of statistics. • Collect, analyze, and interpret physical education and sports sciences data. • Apply statistical methods to evaluate and improve physical education programs and sports performance. • Use statistical software for data analysis. • Present statistical findings effectively in written and oral forms. • Critically evaluate research articles and studies in physical education and sports sciences.	
Course Content	
Week 1	**Introduction to Statistics** • Definition and importance of statistics in physical education • Types of statistics: descriptive and inferential • Role of statistics in sports sciences
Week 2	**Data Collection and Sampling** • Types of data: qualitative and quantitative • Sampling methods and techniques • Designing surveys and questionnaires
Week 3	**Descriptive Statistics** • Measures of central tendency: mean, median, mode • Measures of dispersion: range, variance, standard deviation • Data visualization: charts, graphs, and tables
Week 4	**Probability and Distributions** • Basic concepts of probability • Normal distribution and its properties • Other distributions: binomial, Poisson
Week 5	**Hypothesis Testing** • Formulating hypotheses • Types of errors: Type I and Type II • P-values and significance levels

Week 6	**Inferential Statistics: Estimation** • Confidence intervals • Point and interval estimates • Practical applications in physical education
Week 7	**Inferential Statistics: Comparison of Means** • T-tests: independent and paired samples • Analysis of variance (ANOVA) • Practical examples and exercises
Week 8	**Practical Session: Using Statistical Software** • Introduction to statistical software (e.g., SPSS, R) • Data entry and manipulation • Performing basic statistical analyses
Week 9	**Correlation and Regression Analysis** • Pearson and Spearman correlation coefficients • Simple linear regression • Multiple regression analysis
Week 10	**Non-Parametric Tests** • Chi-square test • Mann-Whitney U test • Kruskal-Wallis test
Week 11	**Reliability and Validity** • Concepts of reliability and validity • Methods to assess reliability and validity • Applications in Physical Education Research
Week 12	**Factor Analysis and Principal Component Analysis** • Introduction to multivariate statistics • Conducting factor analysis • Practical applications in sports sciences
Week 13	**Meta-Analysis** • Principles of meta-analysis • Steps in conducting a meta-analysis • Interpreting meta-analytic results
Week 14	**Practical Session: Advanced Statistical Techniques** • Hands-on practice with advanced statistical methods • Group projects and presentations • Practical applications and case studies
Week 15	**Ethical Considerations in Statistical Analysis** • Ethical issues in data collection and analysis • Ensuring accuracy and integrity in statistical reporting • Ethical guidelines and best practices

Week 16	**Review and Final Exam Preparation** • Review of key concepts and principles • Mock exams and practice questions • Final exam preparation

Textbooks and Reading Material

Textbooks

- Annamalai, A., & Soundararajan, S. (2016). Statistical methods for sports and physical education. PHI Learning.
- DeShea, L., & Toothaker, L. E. (2018). Introductory statistics for the health sciences. Jones & Bartlett Learning.
- Julious, S. (2017). An introduction to statistics in early phase trials. CRC Press.
- Stevens, J. (2012). Applied multivariate statistics for the social sciences. Routledge.
- Thomas, J. R., Nelson, J. K., & Silverman, S. J. (2015). Research methods in physical activity. Human Kinetics.
- Vincent, W. J., & Weir, J. P. (2019). Statistics in kinesiology. Human Kinetics.

Suggested Readings

- **Journals**: Journal of Sports Sciences, Research Quarterly for Exercise and Sport, Journal of Applied Statistics
- **Websites**: American Statistical Association (ASA), International Association for Sports Statistics
- **Videos**: Online tutorials on statistical software, webinars on statistical methods in sports sciences