Course Title:	**Biostatistics III – Decision Making**
Course Code:	**BSTA-201**
Semester:	**III**
Credit Hours:	**03**

Learning Outcomes

By the end of this course, students will be able to:

1. apply basic statistical concepts commonly used in Health Sciences.
2. use basic analytical techniques to generate results.
3. interpret results of commonly used statistical analyses in written summaries; and
4. demonstrate statistical reasoning skills correctly and contextually.

Course Outline

Unit – I

1.1 Concept of sampling and sampling Distributions

Sampling, Probability and non-probability sampling, sampling and non-sampling errors. Sampling designs of Simple random and Stratified sampling. Random Numbers and their uses in sampling. Sampling distribution of a statistic and its standard error. Sampling Distributions with Applications: sample mean, sample proportion, difference between two proportions and means.

1.2 Statistical Inference

Statistical Inference, Concept of Point and Interval Estimation. Concept of Hypothesis and Types. Testing of Hypothesis with Confidence Intervals and Applications to healthcare data:

1. One Sample Inference for Mean, Proportion and Variance.
2. Two Sample Inference for Means (independent and Dependent), Proportions and Variances.
3. Tests based on Chi-Square distributions: Association, Fisher's Exact, Homogeneity.
4. Hypothesis testing in the regression model (Intercept & Regression Coefficient)
5. Hypothesis testing about correlation coefficient.

- **Teaching-learning Strategies:**

Class Lecture method, which includes seminars, discussions, assignments and projects. (Audio-visual tools are used where necessary)

- **Assignments-Types and Number with calendar:**

According to the choice of respective teacher.

- **Assessment and Examinations:**

According to the University's Semester Rules.

Sr. No.	Elements	Weightage	Details

1.	Midterm Assessment	35%	It takes place at the mid-point of the semester.
2.	Formative Assessment	25%	It is continuous assessment. It includes: Classroom participation, attendance, assignments, and presentations, homework, attitude and behavior, hands-on-activities, short tests, quizzes etc.
3.	Final Assessment	40%	It takes place at the end of the semester. It is mostly in the form of a test, but owing to the nature of the course the teacher may assess their students based on term paper, research proposal development, field work and report writing etc.

Textbook:

6. Longford, N. T. (2021). *Statistics for Making Decisions*. CRC Press.

Suggested Readings:

1. Chaudhry, S.M. & Kamal, S. (2021). *Introduction to Statistical Theory Part II*. Ilmi Kitab Khana, Urdu Bazar, Lahore.
2. Johnson, R.A. & Wichern, D.W. (2003). *Business Statistics: Decision making with data,* John Wiley & Sons Inc.
3. Levine, D.M., Kschbiel, T.C. & Berenson, M.L. (2009). *Business Statistics: A first course* (5^{th} ed.). Pearson Education.
4. Macfie, B.P. & Nufrio, P.M. (2006). *Applied Statistics for public policy*, Prentice Hall of India.
5. Suchmacher, M., & Geller, M. (2012). *Practical biostatistics: a friendly step-by-step approach for evidence-based medicine*. Academic Press.