UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

COURSE SYLLABUS

Introduction To Inference in Biostatistics

2526-1-F8205B006

Learning objectives

Aim of the course is to introduce students to the principles of statistical inference, with applications in the biomedical field.

Statistical concepts will be introduced from a formal perspective and illustrated through examples and exercises.

The course is addressed to students with no previous background in statistics.

Knowledge and Comprehension

This course will provide knowledge and understanding skills related to:

- elements of descriptive statistics

- concept of probability

- concept of discrete and continuous random variables

- concept of sample estimation and variability of an estimate

- concept of confidence intervals

- concept of statistical tests

Applying Knowledge and Understanding

By the end of the course, students will be prepared to take the other classes within the Master's Degree in Biostatistics.

Contents

- Descriptive statistics

- Introduction to Probability, statistical distributions and random variables

- Sample estimation and variability of an estimate

- Confidence Intervals

- Statistical testing

Detailed program

1. First Part

- 1.1 Why Study Biostatistics?
- 1.2 Graphical Data Presentation
- 1.3 Numerical Data Description
- 1.4 Probability
- 1.5 Discrete Random Variables and Probability Distributions
- 1.6 Continuous Random Variables and Probability Distributions
- 1.7 Sampling and Sampling Distributions

2. Second Part
- 2.1 Point Estimation and Interval estimation
- 2.2 Confidence intervals for a single population
- 2.3 Confidence intervals for comparing two populations
- 2.4 Statistical Hypothesis Testing
- 2.5 Tests for a Single Population
- 2.6 Tests for Comparing Two Populations
- 2.7 Additional Tests

Prerequisites

None

Teaching methods

21 2-hour lessons (theory and examples) held in direct-teaching mode and carried out in presence.

Assessment methods

Duration: 2 hours

Type: Written exam, with an optional oral exam, upon request by the student or by the instructors. The exam includes theoretical and reasoning questions and practical exercises. The oral exam will take place in person and access to the oral exam is granted only if the written exam is passed (>=18). The oral exam may confirm or modify the written exam grade.

Material: Consultation of personal material is not allowed. Statistical tables from the textbook will be provided by the instructors. The use of a calculator is permitted and must be brought from home.

Textbooks and Reading Materials

Main Textbook:

1. Statistica 9/Ed. (c) 2021 Pearson Italia - Paul Newbold

Other useful readings:

1. Principles of Biostatistics, M Pagano and K. Gauvreau. Third Edition, CRC press

2. An Introduction to Medical Statistics, M Bland. Fourth Edition. Oxford

3. The Art of Statistics: How to Learn from Data - David Spiegelhalter

Semester

Semester I, Period I

Teaching language

Lectures will be in italian

Sustainable Development Goals

GOOD HEALTH AND WELL-BEING | QUALITY EDUCATION