

## SYLLABUS DEL CORSO

### Piano degli Esperimenti

2122-3-E4102B043

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#### Learning objectives

The course aims to provide the conceptual basis and tools for the construction of basic sample designs in finite populations. The student must know how to plan, analyze and interpret data of an experimental design.

At the end of the course the student must be able to know how to orientate basically in the identification of sample units necessary for carrying out an experimental design.

#### *Knowledge and understanding*

This course will provide knowledge and understanding to:

- Main sampling plans from finite populations (case of continuous and dichotomous variables)
- Construction of the total/average / fraction estimator for the different sampling plans
- Main experimental designs
- Analysis of variance (ANOVA) in the context of the design of the experiments

#### *Ability to apply knowledge and understanding*

At the end of the course the students will be able to:

- Knowing how to apply the correct sampling plan based on population structure and the type of variable
- Knowing how to build a correct estimator and recognize its properties
- Knowing how to build a correct experimental plan
- Knowing how to perform analysis of variance

The course allows the student to acquire a solid foundation in the application of statistics to the biostatistics/statistical/demographic work context.

## Contents

Definition of a sample plan in the presence of finite populations. Analysis of data deriving from experimentation.

## Detailed program

- Sampling from finite populations
- Simple random sample
- Introduction to proportion estimate
- Stratified sampling
- Cluster sampling
- Introduction to panel sampling
- Fully randomized design (one factor)
  
- One way ANOVA; two or more ways ANOVA
- $2^k$  factorial design
- Randomized block design.

## Prerequisites

No formal prerequisites required

## Teaching methods

Lectures of theory and examples in the classroom.

## Assessment methods

The exam includes a written test, including exercises and theory questions.

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## **Textbooks and Reading Materials**

For sampling techniques:

Frosini B.V., Montinaro M., Nicolini G., Il campionamento da popolazioni finite, UTET, 1999 ; Cochran W.G., Sampling Techniques, J. Wiley, New York, 1977.

For design of experiments:

Cochran W.G., Cox M.G., Experimental Designs, II ed. Wiley, New York, 1992

Montgomery, D.C., Progettazione e analisi degli esperimenti, McGraw-Hill, Milano, 2005

## **Semester**

II Semester, I period

## **Teaching language**

Italian

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