



UNIVERSITÀ
DEGLI STUDI
DI PADOVA



PHD COURSE
IN STATISTICS

Specialist Course | Cycle XXXVIII

February, 2023 | Campus S. Caterina

Sampling Theory

Pier Francesco Perri
Università della Calabria

Wednesday	February 8	10.00 – 12.30 15.00 – 17.30	Room SC20
Thursday	February 9	10.00 – 12.30 15.00 – 17.30	Room SC20
Friday	February 10	09.00 – 12.00	Room SC20

Program

<https://www.stat.unipd.it/ricerca/courses-202223-xxxviii-cycle>

SAMPLING THEORY

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Course Description

The short course aims at providing basic notions on sampling from finite population. The problem of estimating the population mean will be discussed starting from sampling with varying probabilities and emphasis will be given to the use of auxiliary variables at the estimation stage through the regression and calibration estimators.

Moreover, the problem of reducing nonsampling errors due to untruthful response and nonresponse will be introduced and discussed in the context of surveys on sensitive issues.

Objectives

- First and second order inclusion probabilities
- Sampling with varying probabilities and some selection schemes
- Estimation of the population mean through Horvitz-Thompson estimator
- Stratified and cluster samplings: design and estimation
- Estimation with auxiliary information: ratio, regression and calibration estimators
- Asking sensitive questions: the randomized response technique
- The nonresponse
- Brief overview with R

Bibliography

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- Cochran W.G. (1977). Sampling Techniques Wiley.
- Conti P.L., Marrella D. (2012). Campionamento da Popolazioni Finite. Il Disegno Campionario. Springer.
- Heeringa S.G., West B.T., Berglund P.A. (2010). Applied Survey Data Analysis. CRC Press.
- Lumley T. (2010). Complex surveys. A guide to analysis using R. Wiley.
- Särndal C.-E., Swensson B. Wretman, J. (1992). Model Assisted Survey Sampling. Springer.
- Tillè Y (2020). Sampling and Estimation from Finite Populations. Wiley.
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