



UNIVERSITÀ  
DEGLI STUDI  
DI PADOVA



PHD COURSE  
IN STATISTICS

# Specialist Course | Cycle XXXVII

February, 2022 | Campus S. Caterina

## *Sampling Theory*

**Pier Francesco Perri**  
*Università della Calabria*

<b>Wednesday</b>	<b>February 9</b>	<b>10.00 – 12.30</b> <b>15.00 – 17.30</b>	<b>Room SC20</b>
<b>Thursday</b>	<b>February 10</b>	<b>10.00 – 12.30</b> <b>15.00 – 17.30</b>	<b>Room SC20</b>
<b>Friday</b>	<b>February 11</b>	<b>09.00 – 12.00</b>	<b>Room SC20</b>

### Program

<https://www.stat.unipd.it/ricerca/courses-202122-xxxvii-cycle>

# SAMPLING THEORY

Pier Francesco Perri | Università della Calabria

## 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

- Chaudhuri A., Chistofides T.C. (2013). *Indirect Questioning in Sample Survey*. Springer.
- Cicchitelli G., Herzel A., Montanari G.E. (1992). *Il Campionamento Statistico*. Il Mulino.
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- 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.
- Tillé Y (2020). *Sampling and Estimation from Finite Populations*. Wiley.
- Valliant R., Dever J.A., Kreuter F. (2018). *Practical Tools for Designing and Weighting Survey Samples*. Springer.