



UNIVERSITÀ  
DEGLI STUDI  
DI PADOVA



PHD COURSE  
IN STATISTICS

# Specialist Course | Cycle XXXIV

February, 2019 | Campus S. Caterina

## *Sampling Theory*

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|------------------|-------------------|--|---------------------|
| <b>Monday</b>    | <b>February 4</b> | <b>10.00 – 13.00</b><br><b>15.00 – 17.00</b> | <b>Aula Cucconi</b> |
| <b>Tuesday</b>   | <b>February 5</b> | <b>10.00 – 13.00</b><br><b>15.00 – 17.00</b> | <b>Aula Cucconi</b> |
| <b>Wednesday</b> | <b>February 6</b> | <b>09.00 – 12.00</b>                         | <b>Aula Cucconi</b> |

### Program

[www.stat.unipd.it/fare-ricerca/courses-201819-xxxiv-cycle](http://www.stat.unipd.it/fare-ricerca/courses-201819-xxxiv-cycle)

## **Sampling Theory**

### **Course Description**

The short course aims at providing to the students 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 also given to the use of auxiliary variables at the estimation stage through the regression method. The problem of the nonresponse will also be introduced and discussed.

### **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, cluster and two stage sampling
- Ratio and regression methods of estimation. The optimality of the regression estimator
- Asking sensitive questions: the randomized response technique
- The nonresponse

### **Bibliography**

Cicchitelli G., Herzel A., Montanari G.E. (1992). *Il Campionamento Statistico*. Il Mulino, Bologna

Cochran, W.G. (1977). *Sampling Techniques*. John Wiley & Sons, New York

Conti P.L., Marrella D. (2012). *Campionamento da Popolazioni Finite. Il Disegno Campionario*. Springer, Milano

Diana G., Perri P.F. (2010). Improved estimators of the population mean for missing data. *Communications in Statistics – Theory and Methods*, 39, 3245-3251

Diana G., Perri P.F. (2007). Estimation of finite population mean using multi-auxiliary information. *Metron*, LXV, 99-112

Diana G., Giordan. M., Perri P.F. (2011). An improved class of estimators for the population mean. *Statistical Methods and Applications*, 20, 123-140

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