Academic Year 2024-2025
Ph.D. in "Life Course Research" – Socio-demographic curriculum

- Statistical methods for complex data -

24-27 March 2025 (online: MS Teams)

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Objectives

The digital transformation and the diffusion of innovative technologies allow scientists to collect increasingly complex data, providing a wealth of information about social phenomena. This course focuses on the statistical approaches to measuring, mapping, and understanding such phenomena in the modern world, discussing the contributions of other disciplines, from social science to computer science. Primary statistical approaches are introduced, emphasising social network analysis and textual data analysis, as well as their interactions. A further aim of the course is to present how complex data can be fruitfully exploited to analyse social relationships and behaviours on social media. Case studies using various datasets are presented and discussed. Students attending the course will gain hands-on experience employing R software to implement empirical analyses based on the methods discussed during the lectures.

Program

Monday, 24 March 2025 (*Instructors*: *Giordano – Misuraca*, 14:00-17:00 - 3h)	**Tuesday, 25 March 2025** *(Instructors: Misuraca – Giordano,* 10:00-13:00 - 3 h)
- Social Network Analysis - *From relationships to data* *Exploring network data structures* *Clustering on networks (Community detection)*	**- Textual Data Analysis -** *From text to data* *Topic extraction and visualisation*

Wednesday, 26 March 2025 *(Instructors: Giordano – Misuraca,* 10:00-13:00 - 3 h)	**Thursday, 27 March 2025** *(Instructors: Misuraca – Giordano,* 10:00-13:00 - 3 h)
- Text Mining - *Using textual networks* *Sentiment Analysis*	**- Case studies discussion -** *Social Networks and Text Mining in practice*

Requirements

Elements of network analysis and multidimensional data analysis

Suggested lectures

Materials provided by the instructors

Further reading:

- Social Network analysis

1. Scott, J., & Carrington, P. J. (2011). The SAGE handbook of social network analysis. SAGE publications. Link
2. Csardi, G., Nepusz, T. (2006). "The igraph software package for complex network research." *InterJournal*, Complex Systems, 1695. <https://igraph.org>.

- Textual Data Analysis

1. Bécue-Bertaut, M. (2018). Textual Data Science with R. CRC Press
2. Misuraca, M., Forciniti, A., Scepi,G., & Spano, M. (2020). Sentiment Analysis for Education with R: packages, methods and practical applications. *arXiv*, doi: 10.48550/arXiv.2005.12840
3. Grün, B., & Hornik, K. (2011). topicmodels: An R package for fitting topic models. *Journal of statistical software*, *40*, 1-30.
4. Giordano, G.; Misuraca, M. (Eds.) Cham Springer Nature Pag.1-396. New Frontiers in Textual Data Analysis | SpringerLink
5. Lebart, L., Salem, A., Berry, L. (1998). Correspondence Analysis of Lexical Tables. In: Exploring Textual Data. Text, Speech and Language Technology, vol 4. Springer, Dordrecht. https://doi.org/10.1007/978-94-017-1525-6_4