Advanced Methodology in Social Research

Code: 44038
ECTS Credits: 6

2025/2026

Degree	Type	Year
Social Policy, Employment and Welfare	OT	0

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Teachers

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Teaching groups languages

You can view this information at the end of this document.

Prerequisites

Basic knowledge and skills are needed in relation to the methodology of the social sciences, the design of social research and the methods and techniques of production and analysis of qualitative and quantitative data.

Objectives and Contextualisation

The objective of the Advanced Social Research Methodology module [ASRM] is the theoretical and applied knowledge of the methodology and the diversity of advanced methods and techniques in the analysis of data for social research, addressing various methodological perspectives, both quantitative and qualitative

This general objective is complemented by three specific ones:

1. Orient the process of conducting a research work establishing the criteria and the necessary tasks of its methodological design and the relevant application of research methods and techniques in order to adapt them to theoretical models and achieve the rigor of scientific research.
2. Acquire the skills of using the software corresponding to the data analysis techniques used.
3. Provide information and learning of research methods and techniques with applied character, with special reference to the research lines of the module's professors and the Department's research teams.

Competences

- Continue the learning process, to a large extent autonomously.
- Design and conduct research projects on work, gender and social policy, using advanced qualitative and quantitative research techniques.
- Put forward innovative proposals for the relevant field of study.
- Use acquired knowledge as a basis for originality in the application of ideas, often in a research context.
- Use and manage bibliography and IT resources in the field of study.

Learning Outcomes

1. Continue the learning process, to a large extent autonomously.
2. Critically examine a research project from a methodological perspective, identifying the different designs, methods and techniques, and their advantages and disadvantages.
3. Put forward innovative proposals for the relevant field of study.
4. Use acquired knowledge as a basis for originality in the application of ideas, often in a research context.
5. Use and manage bibliography and IT resources in the field of study.
6. Use computer programs at an advanced level to analyze the results of the implementation of the methods and techniques learned during the master.

Content

The contents of the module are structured around 4 thematic blocks:

Analysis of Quantitative Data [AMD]
Advanced Qualitative Analysis [AQA]
Social Network Analysis [AXS]
Computational Social Simulation [SSC]

1. Multivariate Analysis of Quantitative Data [AMD]. 10 hours
Prof. Pedro López-Roldán

A first objective of this part is to offer a general classification overview of the different quantitative data analysis techniques. Secondly, given the variety and extent of existing procedures for the treatment of sociological information, it is chosen to consider in this part of the module some of the most fundamental analysis techniques that make it easier to establish the basic conceptual foundations and allow later to deepen in their knowledge as well as in other analysis procedures. On the one hand, interdependence analysis techniques such as the analysis of multidimensional contingency tables or factorial and cluster analysis techniques for the construction of typologies will be discussed, on the other hand, those of dependency analysis such as variance analysis and regression analysis. The subject will provide the foundation for the selection of techniques covered, with a very applied orientation. Additionally, training will involve two necessary elements: the essential formal aspects of the techniques, but where the main objective is the understanding and interpretation of the information they generate for the realization of an applied study; the second is the use of SPSS statistical software that will allow to illustrate and apply the knowledge related to the different analysis procedures.

2. Advanced Qualitative Analysis [AQA]. 10 hours

Prof. Oriol Barranco

In this block, it is intended, in the first place, to critically reflect on qualitative data collection methods, with special emphasis on interviews and focus groups as well as onanalysis of documents. The objective is that the students can recognize and reflect critically on the theoretical and epistemological foundations of these

techniques and, in addition, acquire the necessary technical instruments to carry out a systematic, transparent and rigorous analysis.

On the other hand, in relation to the data analysis, this block will focus on two types of analysis procedures that have certain points in common, but also important differences: the Content Analysis and the Constant Comparative Method (Grounded Theory). The necessary guidelines will be given so that these analytical orientations can be applied through the qualitative analysis program ATLAS.ti. As a result of the course, students should have the necessary technical knowledge to be able to develop an analysis of textual data (but also visual or sound) with the help of specific software and, in addition, situate methodologically and epistemologically their approach.

3. Analysis of Social Networks [SNA]. 8 hours

Prof. Dafne Muntanyola

The analysis of social networks is an interdisciplinary approach and a privileged starting point to renew our vision of social reality. In this thematic block the theoretical and methodological bases of the analysis of social networks, the procedures to collect, analyze and interpret matrices of reticular data with specialized software and different current applications of social network analysis will be presented. With this content it is expected that students can identify the conditions in which the introduction of social network analysis is feasible and appropriate in the design of an investigation and, in addition, they can collect, analyze and combine this data with other types of information. to formulateand / or contrast hypotheses of interest.

4. Computational Social Simulation [CSS]. 4 hours

Prof. F. J. Miguel Quesada

The use of social simulation computer models (computational social simulation) is an alternative to the sociological analysis' classical perspectives based upon the "language of variables" (explanatory factors) and on the "interpretation of meaning" (hermeneutics) that attempts to articulate useful issues of both perspectives. The advantages and problems of an experimental approach for understanding and explaining (and replicating) social processes are emphasized, to the point of allowing real people to interact and "live" within a virtual environment in order to study their behaviour and mental contents. In a single session, a brief introduction to the epistemological sense of working with "virtual societies" built and put into operation with own resources of Artificial Intelligence is provided, as well as a technical approach to a simple tool that allows this construction.

Content of the program

BLOCK 1. Multivariable analysis of quantitative data [AMD]

1. Introduction to quantitative data analysis
1.1. Presentation: contents, dynamics and evaluation
1.2. General concepts and classification of quantitative data analysis techniques
2. Analysis of multidimensional contingency tables (ATC) and log-linear analysis (ALL)
3. Analysis of variance (AVA)
4. The regression analysis
4.1. Linear Regression Analysis (ARE)
4.2. Logistic regression analysis (ARL)
5. The construction of typologies
5.1. Factor analysis
- Principal component factor analysis (ACP)
- Correspondence factor analysis (ACO)
5.2. Analysis of Classification (ACL)

BLOCK 2. Advanced Qualitative Analysis [AQA]

1. Current approacheson data quality and validity
2. Textual materials for analysis
2.1. Types and characteristics of materials and data

2.2. The production of the data and its quality, validity and reliability
3. Current approaches in textual qualitative analysis
3.1. Types of analysis
3.2. The interpretation of the data
3.3. Validity and rigor in the qualitativeanalysis
4. The generalization and theorization in the qualitative -textual- analysis
4.1. Types and strategies of qualitative generalization
4.2. Theorization based on qualitative studies
5. Content analysis
5.1. Introduction. Content analysis and lexicometric analysis in social research
5.2. Characteristics and procedures of qualitative content analysis
6. The constant comparative method
6.1. The grounded theory and the constant comparative method
6.2. Characteristics and procedures of the constant comparative method
7. The use of CAQDAS in the analysis of qualitative data
7.1. The use of computer tools in the analysis of qualitative data. The CAQDAS in context
7.2. The qualitative content analysis conducted with Atlas.ti
7.3. The constant comparative method made with Atlas.ti

BLOCK 3. Social Network Analysis [AXS]

1. Introduction to the theory and analysis of social networks
1.1. From the network metaphor to network analysis
1.2. The theory and analysis of social networks as a perspective
1.3. Origin and applications of social network analysis
2. Basic definitions of social network analysis
2.1. Units, contents and form of relationships
2.2. Types of networks and data types
2.3. Notation and representation of networks
3. Network study design
3.1. Methodological approaches
3.2. Sociocentric networks
3.3. Personal networks
4. Basic concepts and general guidelines for analysis
4.1. Basic concepts for analysis
4.2. Network composition indicators
4.3. Networkstructureindicators
5. Software for social network analysis

BLOCK 4. Computational Social Simulation [SSC]

1. Social systems: Micro-Macro model and (inter) action with emerging effects
2. Modeling in the CC.SS .: Definition, Types and Use
3. Social simulation methods: Social Computational Models based on Agents (ABM)
4. Netlogo v6: Installation and first steps. Examples. Self-learning resources
5. Design of virtual societies with Netlogo
5.1. Structure and User Interface (GUI)
5.2. Basic elements: agents, attributes, procedures. Groups of agents (Agentsets vs. Breeds)
5.3. Dynamics: Basic orders (ASK) and Command blocks: Conditional and loops
5.6. Outputs: Plots, Output, Files. Export and Analysis.
6. Advanced elements:
6.1 Links between agents (links) and Social networks
6.2 Mental representations (list, vectors, arrays)
6.3. Design of virtual experiments: Behavior Analyzer.
7. Design of experiments with human agents: Participatory social simulation

Activities and Methodology

Title	Hours	ECTS	Learning Outcomes
Type: Directed			
Classroom practices	13	0.52	2, 3, 1, 4, 5, 6
Master classes	19	0.76	2, 3, 1, 4, 5, 6
Type: Supervised			
Group and individual tutorials on the basis of social research and monitoring and correction of the exercises and works of the module	15	0.6	2, 3, 1, 4, 5, 6
Type: Autonomous			
Individual preparation of the activities in the classroom and the work of evaluation	66	2.64	2, 3, 1, 4, 5, 6
Readings	37	1.48	2, 3, 1, 4, 5, 6

The module will combine master teaching, in which the theoretical contents and examples of each module content will be presented and in which a dynamic that facilitates active and participatory learning will be fostered, with various training activities for teaching and learning the subject:

1. Seminars of analysis of readings and study of cases with their presentation and debate.
2. Individual and group follow-up tutorials.
3. Realization of exercises in the classroom and practices in the computer room to know, apply and interpret the information of each analysis technique and the procedure for obtaining it with the corresponding software.

In the Virtual Campus of the module, in a Moodle environment, all the information, materials and activities of the module are available.

Annotation: Within the schedule set by the centre or degree programme, 15 minutes of one class will be reserved for students to evaluate their lecturers and their courses or modules through questionnaires.

Assessment

Continous Assessment Activities

Title	Weighting	Hours	ECTS	Learning Outcomes
Practical exercice of Computacional Social Simulation	13,5%	0	0	2, 3, 1, 4, 5, 6
Practical work of qualitative data analysis	31,25%	0	0	2, 3, 1, 4, 5, 6
Practical work of quantitative data analysis	31,25%	0	0	2, 3, 1, 4, 5, 6

Practical work of social network analysis	25%	0	0	2, 3, 1, 4, 5, 6

The final grade of the module will be the result of the weighted average of each of the four blocks. In particular, the evaluation of each block will be the following:

BLOCK 1. Multivariate Analysis of Quantitative Data [MAD]

The evaluation of the blog will require the completion of a practical work of data analysis. From considering the relationships between various variables, it will be necessary to analyze them with the aim of contrasting a hypothesis based on the literature. You can choose to: a) build a typology using a combination of factor analysis and classification analysis procedures; b) do a contingency table and log-linear analysis c) do a multiple regression analysis (linear or logistic), or d) a multifactor variance analysis. The work will be presented in the format of a research article where an account will be given of the formulation of a sociological model with the corresponding statement of the hypotheses of the relationship between the variables, the presentation of the analysis design used and the subsequent comparison of that model with the analysis and interpretation of the data. The work will have a maximum length of 8 pages (about 3000 words) of writing, including the graphs and tables prepared, in addition to the bibliography and the appendix.

BLOCK 2. Advanced Qualitative Analysis [AQA]

Active participation and the critical capacity demonstrated in the discussions of the compulsory readings made in class are essential. From this participation will be extracted a first element of assessment of the work of the students. On the other hand, this note can be complemented by a practical work in which the student will have to analyse a text. With this exercise the student can increase the grade to a maximum of three points. If any person does not pass or cannot be evaluated from the discussion of the readings due to their lack of participation, they must compulsorily perform the analysis of a text. In this case, the maximum grade that can be obtained willbe a 6.

BLOCK 3. Social Network Analysis [SNA]

The evaluation of the course will be carried out in the first place by developing an applied research exercise (the work will have a maximum length of 2000 words). The exercise can be done inagroup, with a maximum of 2 students. On the other hand, it will be ensured that the research topic chosen for this exercise has to do totally or partially with the research of the Master's Thesis. A moment will be reserved in session 2 to prepare the exercise for the course.

BLOCK 4. Computational Social Simulation [CSS]

The evaluation of this block will imply the attendance and follow-up of the sessions in the classroom, as well as the delivery of an operational adaptation of the computational model used in class, which "improves" some specific aspect of the represented phenomenon. This delivery will be individual or in pairs, and will consist of an executable file (NetLogo model) plus a report with information on the improvement proposed, the results of the obtained results exploitation, the statement of conclusions and a critical comment on the methodology put into practice (PDF format).

Bibliography

Analysis of Quantitative Data [ADQN]

Basic bibliography

López-Roldán, P.; Fachelli, S. (2015). *Metodología de la investigación social cuantitativa*. Bellaterra (Barcelona): Dipòsit Digital de Documents, Universitat Autònoma de Barcelona. 1a. edición.

http://ddd.uab.cat/record/129382 | http://pagines.uab.cat/plopez/content/misc

López-Roldán, P. (2015). *Recursos para la investigación social*. Dipòsit Digital de Documents. Bellaterra (Barcelona): Universitat Autònoma de Barcelona.

http://ddd.uab.cat/record/89349 | http://pagines.uab.cat/plopez

Further readings

Abu-Bader, S. H. (2021). *Using Statistical Methods in Social Science Research. With a Complete SPSS Guide*. New York: Oxford University Press.

Adams, K. A.; Lawrence, E. K. (2019). *Research Methods, Statistics, and Applications*. Thousand Oaks, California: Sage Publications.

Aldas, J.; Uriel, E. (2017). *Análisis multivariante aplicado con R* (2.ª ed.). Madrid: Paraninfo

Ato García, M.; López García, J. J. (1996). *Análisis estadístico para datos categóricos*. Madrid: Síntesis.

Bailey, K. D. (1994). *Typologies and Taxonomies. An Introduction to Classification Techniques*. Thousand Oaks (California): Sage.

Brown, B. L.; Hendrix, S. B.; Hedges, D. W.; Smith, T. B. (2011). *Multivariate analysis for the biobehavioral and social sciences. A graphical approach*. Hoboken: John Wiley & Sons.

Cea d'Ancona, M. A. (2012). *Fundamentos y aplicaciones en metodología cuantitativa*. Madrid: Síntesis.

Cea d'Ancona, M. A. (2002/2014). *Anàlisis multivariable. Teoría y práctica en la investigación social*. Madrid: Síntesis.

Christensen, R. R. (1997). *Log-linear models and logistic regression.* New York: Springer-Verlag.

Correa Piñero, A. D. (2002). *Análisis logarítmico lineal*. Madrid: La Muralla.

Everitt, B.; Hothorn, T. (2011). *An introduction to applied multivariate analysis with R*. New York: Springer.

Greenacre, M. J. (2008). *La práctica del análisis de correspondencias*. Madrid: Fundación BBVA.

http://www.fbbva.es/TLFU/tlfu/esp/publicaciones/libros/fichalibro/index.jsp?codigo=300

García Ferrando, M. (1987). *Socioestadística. Introducción a la estadística en sociología*. 2a edició amp. Madrid: Alianza. Alianza Universidad Textos, 96.

Guillén, M. F. (1992). *Análisis de regresión múltiple*. Madrid: Centro de Investigaciones Sociológicas.

Hahs-Vaughn, D. L. (2017). *Applied multivariate statistical concepts*. Nueva York: Routledge.

Hair, J. F., Black, W. C.; Babin, B. J.; Anderson, R. E. (2013). *Multivariate data analysis*. Pearson new international edition (7.ª ed.). Harlow:Pearson.

Hernández Encinas, L. (2001). *Técnicas de taxonomía numérica*. Madrid: La Muralla.

Harlow, L. L. (2014). *The essence of multivariate thinking. Basic themes and methods* (2.ª ed.). Nueva York: Routledge.

Joaristi Olariaga, L.; Lizasoain Hernandez, L. (1999). *Análisis de correspondencias*. Madrid: La Muralla.

Lévy Mangin, J. P.; Varela Mallou, J. (2003/2008) *Análisis multivariables para las ciencias sociales*. Madrid. Pearson-Prentice Hall.

López-Roldán, P.; Fachelli, S. (2018). *Metodología de construcción de tipologías para el análisis de la realidad social*. Bellaterra (Cerdanyola del Vallès): Dipòsit Digital de Documents, Universitat Autònoma de Barcelona. 2a. edición.

MacFarland, T. W. (2012). *Two-Way Analysis of Variance: Statistical Tests and Graphics Using R*. New York: Springer.

Marradi, A. (1990). Classification, typology, taxonomy. *Quality & Quantity*, 24, 129-157.

Mateos-Aparicio, G.; Hernandez Estrada, A. (2021). An*alisis multivariante de datos: Cómo buscar patrones de comportamiento en Big Data*. Madrid: Pirámide.

Meneses, J. (2019). *Introducción al análisis multivariante*. Barcelona: UOC

Miller, J. E. (2013). *The Chicago guide to writing about multivariate analysis* (2.ª ed.). Chicago: The University of Chicago Press.

Pérez López, C. (2004). *Técnicas de análisis multivariante de datos. Aplicaciones con SPSS*. Madrid: Pearson Prentice Hall.

Pituch, K. A.; Stevens, J. P.(2016). *Applied multivariate statistics for the social sciences* (6.ª ed.). Nueva York: Routledge.

Powers, D. A.; Xie, Y. (2008). *Statistical Methods for Categorical Data Analysis*. Bingley, U.K.: Emerald. 2a. edició.

Sánchez Carrión, J.J. (1999). *Manual de análisis estadístico de los datos*. Madrid: Alianza. Manuales, 055.

Sánchez Carrión, J. J. (Ed.) (1984). *Introducción a las técnicas de multivariable aplicadas a las ciencias sociales*. Madrid: Centro de Investigaciones Sociológicas.

Sánchez Carrión, J. J. (1989). *Análisis de tablas de contingencia. El uso de los porcentajes en ciencias sociales*. Madrid: Centro de Investigaciones Sociológicas-Siglo XXI.

Tabachnick, B. G.; Fidell, L. S. (2019). *Using multivariate statistics* (7.ª ed.). Nueva York: Pearson.

Tejedor, F. J. (1999). *Análisis de varianza: introducción conceptual y diseños básicos.* Madrid: La Muralla.

VV.AA. (1996). La construcció de tipologies. Exemples. Monogràfic de *Papers. Revista de Sociologia*, 48.

http://ddd.uab.cat/search?cc=papers&f=issue&p=02102862n48&rg=100&sf=fpage&so=a&ln=en

Social Networks Analysis [SNA]

Basic bibliography

Lozares, C., Verd, J. M. (2015). "Bases socio-metodológicas del análisis de redes sociales". En Manuel García Ferrando, Francisco Alvira, Luis Enrique Alonso, Modesto Escobar (eds.): *El anàlisis de la realidad social. Métodos y técnicas de investigación*. Madrid: Alianza Editorial. 4ª edición.

Molina, J. L. (2001). *El análisis de redes sociales. Una introducción*. Barcelona: Ediciones Bellaterra.

Further reading

Galaskiewicz, J.;Wasserman, S. (1993). "Social Network Analysis. Concepts, Methodology, and Directions for the 1990". *Sociological Methods & Research*, 22 (1):3-22.

Granovetter, M.(1973). The Strength of Weak Ties. *American Journal of Sociology*, 78 (6), 1360-1380.

Knoke, D.; Kuklinski, J. H. (1982). *Network analysis*. Newbury Park, London: Sage.

Lemieux, V. (1999). *Les réseaux d'acteurs sociaux*. París: PUF.

Lozares, C. (1996). "La teoría de redes sociales". *Papers,* 48:103-126.

Lozares, C. (2005). "Bases socio-metodológicas para el Análisis de Redes Sociales". *Empiria* 10: 9-35.

Lozares, C. (2006). "Las representaciones fácticas y cognitivas del relato de entrevistas biográficas: un análisis reticular del discurso". *REDES, Revista hispana para el análisis de redes sociales, vol. 10.* http://revista-redes.rediris.es

Lozares C., López-Roldán, P., Verd, J. M., Martí, J., Molina, J. L., Bolíbar, M., Cruz, I. (2011) "El análisis de la Cohesión, Vinculación e Integración sociales en las encuestas Ego-net". *REDES-Revista hispana para el análisis de redes sociales*, vol. 20. http://revista-redes.rediris.es

Lozares, C., Verd, J. M., Martí, J., López-Roldán, P. (2003). "Relaciones, redes y discurso: revisión y propuestas en torno al análisis reticular de datos textuales". *Revista española de investigaciones sociológicas*, 101: 175-200.

Lozares, C., Verd, J. M. (2011). "De la Homofilia a la Cohesión social y viceversa". *REDES-Revista hispana para el análisis de redes sociales*, vol. 20. http://revista-redes.rediris.es

Lozares, C., Verd, J. M., Cruz, I.,Barranco, O. (2014). "Homophilyand heterophily in personal networks. From mutual acquaintance to relationship intensity". Quality & Quantity, 48: 2657-2670

Martí, J., Lozares, C., (2008). "Redes organizativas locales y capital social: Enfoques complementarios desde el análisis de redes sociales". *Portularia. Revista de Trabajo Social*. 8 (1): 23-39.

Requena,F.(1991). "Redes sociales y mecanismos de acceso al mercado del trabajo." *Sociología del Trabajo*, 1990-1991, 11:117-140.

Scott, J. (1991). *Social Network Analysis*. Newbury Park, London: Sage.

Verd, J. M., Lozares, C., Martí J., López P. (2000). "Aplicació de les xarxes socials a l'analisi de la formació invisible en l'empresa". *Revista Catalana de Sociologia*,11, 87-104

Verd, J.M., Martí, J. (2000). "Muestreo y recogida de datos en el análisis de redes sociales", *Qüestiió, Quaderns d'Estadística i Investigació Operativa*, 23 (3): 507-524.

Verd, J. M., Lozares, *C.* (2012).Reconstructing Social Networks through Text Analysis: From Text Networks to Narrative Actor Networks. En Dominguez, Silvia y Hollstein, Betina (Eds): *Mixed Methods Social Networks Research. Design and Applications*. Cambridge: Cambridge University Press.

Wasserman, S.; Faust, K. (2013) *Análisis de redes sociales. Métodos y aplicaciones*. Madrid: Centro de Investigaciones Sociológicas. [Edición original en inglés publicada en 1994]

Computacional Social Simulation [CSS]

Basic bibliography

Axelrod, R. (1986). An evolutionary approach to norms. *The American Political Science Review*, *80*(4), 1095-1111.

Axelrod, R. (2005). Agent-based Modelling as a Bridge Between Disciplines. En K. L. Judd & L. Tesfatsion (Ed.), *Handbook of Computational Economics, Vol. 2: Agent-Based Computational Economics* . Handbooks in Economics Series, North-Holland.

Edmonds, B., Hernández Iglesias,C., &Troitzsch, K. G. (2008). *Social simulation technologies, advances, and new discoveries*. Hershey, PA: Information Science Reference.

Epstein, J. M. (2007). *Generative Social Science: Studies in Agent-Based Computational Modeling*. Princeton, NJ: Princeton University Press.

Epstein, J. M. & Axtell, R. (1996). *Growing Artificial Societies: Social Science from the Bottom Up*. MIT Press, Cambridge: MA.

Gilbert, N. (2007). *Agent-Based Models*. SAGE Quantitative Applications in the Social Sciences (Vol. 153). London: London: Sage Publications.

Gilbert, N. & Troitzsch, K. G. (2007). *Simulación para las ciencias sociales*. Madrid: McGraw-Hill.

INSISOC. (2010). Manual de Netlogo en español. <http://sites.google.com/site/manualnetlogo/> (21/12/2010)

Johnson, T. & al. (2010). *Laboratorio de Aprendizaje de NetLogo*. http://online.sfsu.edu/~jjohnson/NetlogoTranslation/index.html (21/12/2010)

López Paredes, A. (2004). *Ingeniería de sistemas sociales*. Valladolid: UVA.

Macy, M.(2002).From Factors to Actors: Computational Sociology and Agent-Based Modeling. *Annual Review of Sociology*, *28*, 143-166.

Marney, J. P. & Tarbert, H. F. E. (2000). Why do simulation? *Journal of Artificial Societies and Social Simulation*, *3*(4).

Miguel, F. J. & Hassan Collado, S. (2012). "La investigación mediante simulación social multiagente". En Arroyo y Sádaba (ed.) *Metodología de la investigaciónsocial, innovaciones y aplicaciones*. Madrid: Síntesis, Cap. 14.

Railsback, S. F. & Grimm, V. (2012). *Agent-based and individual-based modeling: a practical introduction*. Princeton: Princeton University Press.

Schut, M. (2007). *Scientific handbook of simulation of collective intelligence*. < http://www.mpcollab.org/MPbeta1/node/143> (21/12/2010)

Teahan, W. J. (2010). *Artificial Intelligence: Agent Behaviour*. < http://bookboon.com/en/textbooks/it-programming/artificial-intelligence-agent-behaviour-i> (04/05/2012).

Vidal, J. M. (2009). Fundamentals of Multiagent Systems. < http://www.scribd.com/doc/2094479/Fundamentals-of-Multiagent-Systems>

Software

IBM SPSS Statistics https://www.ibm.com/es-es/analytics/spss-statistics-software

Atlas/ti https://atlasti.com/es/

Visone https://visone.ethz.ch/html/about.html

Ucinet http://www.analytictech.com/archive/ucinet.htm

Wilensky, U. (1999). NetLogo. http://ccl.northwestern.edu/netlogo/. Center for Connected Learning and Computer-Based Modeling, Northwestern University, Evanston, IL.

Groups and Languages

Please note that this information is provisional until 30 November 2025. You can check it through this link. To consult the language you will need to enter the CODE of the subject.

Name	Group	Language	Semester	Turn
(TEm) Theory (master)	1	Spanish	second semester	afternoon