UAB
Universitat Autònoma de Barcelona

Methods and Techniques for Spatial Analysis

Code: 104238
Credits: 6

2026/2027

Degree programme	Type	Course
Geography, Environmental Management and Regional Planning	FB	1

Contact lecturer

Name : Ana Vera Martin

Email : ana.vera@uab.cat

Teaching staff

Angels Perez Mateos

Group languages

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

Prerequisites

To take this course, students must have a command of Catalan and/or Spanish at level B2 or higher.

Objectives

Methods and Techniques for Space Analysis are taught the First Year of the Degree in Geography, Environment and Territorial Planning.

This subject offers a basic introduction to the representation of data in Geography, to describe and analyze the territorial phenomena. The subject follows an approach based on the resolution of specific tasks of description or analysis, ordered according to types of data, purpose and field of application. For each specific task, the appropriate methods of data analysis (graphical, statistical or cartographic) are presented systematically, together with the necessary basic concepts and application cases.

The objectives of the subject are:

- Capacity to solve basic tasks of analysis and presentation of data (visualization and graphical description, statistics and cartography) to describe and characterize territories or natural and social phenomena that take place in the territory.
- Provide the necessary conceptual, methodological and technical background for subjects or regional subjects, as well as for the most advanced instrumental subjects in the treatment and analysis of geographical information.

The subject covers the conceptual, methodological and technical aspects to solve practical works of geographical analysis:

- Concepts about the nature of analysis and geographic information.
- Methodological approach, documentation, operational design, implementation and presentation of results of a project.
- Compilation of data, their recording and manipulation by spreadsheets, and their organization through databases.
- Resolution of the needs of the exploration of the information, and of description and classification of the territories or phenomena studied, through techniques of graphic representation, description and statistical classification and cartographic representation.
- Introduction to new techniques: automatic mapping, geographic information systems, remote sensing, geolocation.
- Access to sources, data and other resources related to geoinformation.
- Treatment and representation of data as an instrument to describe and analyze socio-spatial phenomena.
- Application of data processing in scientific research.

Concepts of visual communication are for the elaboration of graphic or cartographic documents effective for visualization, analysis and presentation of data.

Learning outcomes

- CM07 (Interpret relevant data that include a reflection on social, scientific or ethical issues from cartographic data and spatial analysis.) Interpret relevant data that include a reflection on social, scientific or ethical issues from cartographic data and spatial analysis.
- CM08 (Communicate the results of a study using different techniques and methods of representation and spatial analysis.) Communicate the results of a study using different techniques and methods of representation and spatial analysis.
- CM09 (Plan the work in an autonomous and effective way in order to achieve the objectives set by means of the choice of variables and the use of the appropriate methodologies of graphic representation.) Plan the work in an autonomous and effective way in order to achieve the objectives set by means of the choice of variables and the use of the appropriate methodologies of graphic representation.
- KM11 (List the main cartographic tools in relation to spatial analysis.) List the main cartographic tools in relation to spatial analysis.
- SM11 (Structure the collection of information for a specific study through the use of databases and other resources related to geoinformation.) Structure the collection of information for a specific study through the use of databases and other resources related to geoinformation.
- SM12 (Describe a territory or natural phenomenon by means of data representation (visualisation and graphic, statistical and cartographic description).) Describe a territory or natural phenomenon by means of data representation (visualisation and graphic, statistical and cartographic description).

Contents

BLOCK 1. DATA ANALYSIS IN GEOGRAPHY

1. Methods of geographical analysis
2. Geographical information
3. Geographical data sources

BLOCK 2. VISUALIZATION AND DESCRIPTION OF GEOGRAPHICAL DATA

1. Statistical methods and graphs for thematic description (univariate)

2. Graphical and statistical methods for exploring thematic relationships (bivariate)
3. Diagrams with proper names
4. Graphical and statistical methods for thematic classification

BLOCK 3. COMMUNICATION AND PRESENTATION OF RESULTS

1. Elements of graphic design
2. Format and media for the presentation of results

Gender perspectives will be taken into account in the various examples studied, and non-sexist language will be used.

Learning activities and methodology

Title	Hours	ECTS	Learning outcomes
Course exercices and course work	21	0.84	CM07, CM08, KM11, SM11, SM12
Master classes	39	1.56	CM07, CM08, SM11, SM12
Course work tutorial	3	0.12	CM07, CM08, KM11, SM11, SM12
Independent student work	34	1.36	CM07, CM08, CM09, KM11, SM11, SM12
Course exercices and course work	39	1.56	CM07, CM08, CM09, KM11, SM11, SM12
Field trip (PCAM)	8	0.32	CM08, SM12

The course is structured around directed, supervised, and autonomous activities.

The course content will be developed through:

- Lectures by the teaching staff
- In-class exercises
- Individual exercises
- Course project
- Field trip

The practical component is divided into three phases that reflect the learning process:

- In-class exercises: these constitute the first step, in which students' engagement with and understanding of the content are assessed during in-person classroom sessions.
- Individual exercises: these represent the second step, in which students' acquisition of the subject matter is assessed through individual assignments.
- Group course project: this corresponds to the third step, in which each group selects a topic and decides which graphical representations are most appropriate for presenting geographical information on that specific topic.

The field trip, including an overnight stay, will be carried out in coordination with the *Fundamentals of Physical*

Geography field trip.

The use of non-sexist language will be ensured, and methodologies and examples will incorporate a gender perspective.

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

Continuous assessment activities

Title	Weight	Hours	ECTS	Learning outcomes
Classe attendance	5%	0	0	CM07, CM08, CM09, SM12
Exam	40%	4.5	0.18	CM07, CM08, SM12
Theoretical test	20%	1.5	0.06	KM11, SM11, SM12
Course exercices	15%	0	0	CM09, KM11, SM11, SM12
Course work	20%	0	0	CM07, CM09, KM11, SM11

A) ASSESSMENT ACTIVITIES

1 - Course exercises to monitor the continuous assessment of the content. *Assessment of course exercises:* Formal aspects, the relevance of the answer demonstrating the level of knowledge achieved on the subject, the resolution, representation, and interpretation of results, as well as the correct performance of calculations will be assessed.

2 - Course project, where the knowledge acquired during the semester is applied and publicly presented. This presentation will take place during the field trip with an overnight stay. The topics for the course project will be shared with the Fundamentals of Physical Geography course.

Assessment of the course project: Formal aspects, the formulation of the objective and analysis variables, the use of graphical representation and analysis methodologies, the development and resolution of the stated problem, and the public defense of the project will be assessed.

3 - Practical exam (3 tests) to consolidate the applied knowledge of Methods and Techniques of Spatial Analysis in Geography. Three practical tests will be carried out. The final exam grade will be the average of the 3 midterms, but the average will only be calculated if each test has been passed individually. Otherwise, the failed exam must be retaken.

4 - Theoretical exam (2 tests) to consolidate the theoretical knowledge of Methods and Techniques of Spatial Analysis in Geography. Two practical tests will be carried out. The final exam grade will be the average of the 2 midterms, but the average will only be calculated if each test has been passed individually. Otherwise, the failed test must be retaken.

The hours allocated for exercises and the course project are included within the supervised activities and autonomous work.

B) OTHER ASPECTS TO CONSIDER

- To calculate the average alongside the exercises and the course project, it is COMPULSORY to pass both the theoretical and practical exams. If an exam is failed, it will not be averaged with the other

grades and must be retaken.
- Continuous assessment makes the submission of all learning activities COMPULSORY in order to pass the course.
- Exercises submitted after the deadline will receive a maximum grade of 5.
- To be eligible to sit the exam, it is COMPULSORY to have submitted all exercises. Submissions CANNOT be made after the exam date. If the assignments are not submitted, the student will not be allowed to take the exam.
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C) NON-ASSESSABLE

Students will receive a grade of "No Avaluable" (Non-Assessable) provided they have not submitted more than 30% of the assessment activities.

D) REVIEWS

The maximum deadline for providing feedback and communicating the grades of the assessment activities is three weeks.

At the time each assessment activity is conducted, the professor will inform students (via Moodle) about the procedure and the date for grade reviews.

E) RETAKES

- Any failed theoretical and practical exams will be retaken; it is not possible to sit a retake if the exam has not been previously assessed.
- Assessment activities (course project, exercises, practical exams, and theoretical exams) cannot be retaken if they were failed as a result of plagiarism, copying, or the fraudulent use of AI.

F) PLAGIARISM / FRAUD

If a student commits any irregularity that could lead to a significant variation in the grade of an assessment act, that specific assessment act will be graded with a 0, regardless of any disciplinary process that may be initiated. If multiple irregularities are committed within the assessment acts of the same course, the final grade for the course will be 0.

G) SINGLE ASSESSMENT

This course does not provide a single assessment system option.

H) AI

This course permits the use of Artificial Intelligence (AI) technologies exclusively for tasks involving [***bibliographical research or information searches, text correction, or translations, at the discretion of the teaching staff]. In the case of courses within philology degrees, the use of translation tools must be authorized by the professor. Other scenarios may be considered, always subject to the professor's approval.

The student must:

1. Identify the parts that have been generated using AI.
2. Specify the tools used.

3. Include a critical reflection on how these tools influenced the process and the final outcome of the activity.

A lack of transparency regarding the use of AI in an assessable activity will be considered a breach of academic honesty, resulting in a grade of 0 for the activity with no option to retake it, or greater sanctions in severe cases.

I) EXCHANGE STUDENTS

Exchange students requesting to take an exam ahead of schedule must present the professor with a written document from their home university that justifies their request.

Bibliography

References in spanish (statistics and cartography)

Cortizo Àlvarez, Tomás (1998) *Los gràficos en geografia*. Gijón: Tria-ka.

Ebdon, David (1982) *Estadística para geógrafos*. Vilassar de Mar: Oikos-Tau.

Estebánez, José y Bradshaw, Roy P. (1978) *Técnicas de cuantificación en geografía*. Madrid: Tebar Flores.

Gutiérrez Puebla, Javier; Rodríguez, Rodríguez Vicente y Santos Preciado, José Miguel (1995) *Técnicas cuantita-tivas: Estadística básica* Vilassar de Mar: Oikos-Tau.

Raso, José María; Martín Vide, Javier y Clavero Pedro (1987) *Estadística bàsica para ciencias sociales*. Barcelo-na: Ariel.

References in english (statistics and cartography)

Matthews, Huge i Foster, Ian (1989) *Geographical Data: Sources, Presen-tation and Analysis* Oxford: Oxford University Press. 140 p.

Mitchell, Andy (1999) *The ESRI Guide to GIS Analysis. Volume 1: Geographic Patterns and Relation-ships* Redlands (California, USA): Environmental Systems Research Institute, Inc. 186 p.

Monmonier, Mark (1993) *Mapping It Out: Expository Cartography for the Humanities and Social Sciences*. Chicago (Illinois, USA): The University of Chicago Press. 301 p.

Walford, Nigel (1994) *Geographical Data Analysis*. Chichester (UK): John Wiley & Sons, Ltd. 446 p.

Software

Software:

EXCEL

Triplot

Course groups and languages

The information provided is provisional until November 30. After this date, you will be able to consult the language of each group through this link. To access the information, you will need to enter the course CODE

Type of teaching	Group	Language	Semester	Shift

(TE) Theory	1	Catalan	second semester	morning-mixed
(PLAB) Practical laboratories	1	Catalan	second semester	morning-mixed
(PCAM) Field practices	1	Catalan	second semester	morning-mixed
(TE) Theory	2	Catalan	second semester	morning-mixed
(PLAB) Practical laboratories	2	Catalan	second semester	morning-mixed
(PCAM) Field practices	2	Catalan	second semester	morning-mixed