UAB
Universitat Autònoma de Barcelona

Spatial Analysis and Models

Code: 104256
ECTS Credits: 6

2025/2026

Degree	Type	Year
Geography, Environmental Management and Spatial Planning	OB	3

Contact

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Teaching groups languages

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

Prerequisites

There is no prerequisites in this course.

Objectives and Contextualisation

Space Analysis and Models is taught in the third course in the Degree *Geografia, Medi Ambient y Planificació Territorial*.

The objectives are:

- Use the scientific method in the formalization, resolution and interpretation of Geography Models.
- To achieve the different levels of abstraction that models provide as a tool for interpreting geographical and social phenomena.
- To formulate and solve cases of spatial analysis using the different types of geographical models.
- Use of geographical information at various scales, performing the interpretation of results.
- Develop the skills of self-employed and teamwork.

Learning Outcomes

1. CM21 (Competence) Carry out group work combining Network Theory, Interaction Models and Location-Assignment Models.
2. KM31 (Knowledge) Recognise the main spatial analysis models used in spatial planning.
3. SM24 (Skill) Solve exercises in the classroom and in the computer laboratory based on statistical information on theoretical situations and/or on real cases related to territorial planning at different levels.
4. SM24 (Skill) Solve exercises in the classroom and in the computer laboratory based on statistical information on theoretical situations and/or on real cases related to territorial planning at different levels.

Content

BLOCK 1. Introduction to modeling and the scientific method

1. Models: concept and type. The models of the Nodal Region by P. Haggett.
2. The scientific method. Deductive inductive. The scale in geographic analysis. The positivist and normative approaches.
3. The theoretical, normative, methodological, technical and instrumental assumptions of the models.

BLOCK 2. Theory of Networks

1. Topological networks and graphs: concepts and techniques. Compare the properties of connectivity and accessibility.
2. Connectivity models.
3. Topological accessibility models.
4. Non-topological accessibility models.

BLOCK 3. Interaction Models

1. Concept of Interaction. Variables and parameters. Types of models. The friction of distance.
2. The space unit: area and center. Efficiency of limits, movement and packaging.
3. The unrestricted gravity model.
4. Gravity models with restriction at source and in destination restriction.
5. The gravity model with double restriction: origin and destination.
6. The Population Potential model. Single Circle (MCU) and Double Circle (MCD).
7. The rupture point model.

BLOCK 4. Allocation Models

1. Assignment Models (1). General approach of allocation models.
2. Assignment Models (2). Resolution

BLOCK 5. Linear Programming and Simplex Method

1. Linear Programming (1). Introduction.
2. Linear Programming (2). Graphic Method.
3. Simplex Method (1).
4. Simplex Method (2).
5. Simplex Method (3). Computer resolution system (LINDO program).

BLOCK 6. Transport Models

1. Transport model (1). Theoretical approach.
2. Transport model (2). Prototype example
3. Transportation model (3). Example of a prototype with LINDO.

BLOCK 7. Localization Model - Assignment (L - A)

1. Theoretical approach of Models of L - A.
2. Development of model L - A.
3. Resolution of a practical case L-A.

In the different examples, we use non-sexist language and gender perspective will be taken into account.

Activities and Methodology

Title	Hours	ECTS	Learning Outcomes
Type: Directed			

Master classes and exercices	47	1.88	KM31, SM24, KM31
Type: Supervised			
Supervision of exercices and course work	25	1	CM21, KM31, CM21
Type: Autonomous			
Own study, plannning and execution of exercices and course work	75	3	CM21, KM31, CM21

The subject is structured from supervised and autonomous supervised activities where the student will learn to develop interactively in the contents of the subject with the support of the teaching staff, at different levels.

The contents of the subject will be developed through the following activities:

- Oral presentations of teachers (in the case of the face-to-face group).
- Reading of books and articles (individual activity of the students complementary to the work of classroom).
- Exercise of classroom exercises and the computer lab based on statistical information, both in theoretical situations and in real cases.
- Research work in a small group, related to the class syllabus.

The practical activity is structured in two axes:

1. Guided and tutored practices in each of the subjects. The activities can be of different types such as: text comments, methodological and theoretical knowledge verification or problem solving (manually and through specific software).
2. Completion of a group work that combines Network Theory, Interaction Models and Location-Assignment Models.

In the different examples gender aspects will be taken into account.

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
Assistance	5%	0	0	KM31, SM24
Course exercices	30%	0	0	CM21, KM31, SM24
Course work	25%	0	0	CM21, KM31, SM24
Exam	40%	3	0.12	KM31, SM24

A) ASSESMENT ACTIVITIES:

1 - Theoretical and practical exam to evaluate the contents. It consists of two partial examinations with a duration of one hour and a half each with a weight of 40% of the note.

Assessment of the exam:The partials will consist of two parts: a theoretical part and a practical part. From the theoretical part, the relevance of the answer, the achievement of the degree of knowledge on the subject will be valued. And, of the practical part will value separately the approach, the resolution and the interpretation of the results, as well as the correct realization of the calculations. To pass the exam you must have a 5 in each part of the exam. No half of the two parts will be made if they are not approved.

2 - The practical part, will be carried out in group, the activities will be delivered during the semester:

2.1 - Individual assessment practices with a weight of 35% of the mark.

2.2 - Course work with a weight of 25% of the mark.

2.3 - Assistance with a weitght of 5% of the mark.

Assessment of the practices: The formal aspects, the correct calculation of the indicators (as long as this is the objective of the practice), the adequate realization of a structured analysis on the results obtained, the interpretation of the results, in the case Specific of the analyzes of the texts will be especially valued the capacity to extract and exhibit the most relevant information and relate it to the contents of the subject.

Assessment of the course work: The formal aspects, the approach of the objectives, the problem and the models used for an improvement in the planning of the services, the definition of the analysis variables, the resolution of the results, discussion, conclusions and oral presentation in class.

B) OTHER CONSIDERATIONS

In order to calculate the average with the course exercises and the course project, it is MANDATORY to have passed both the practical and theoretical exams. If the exam has not been passed, the average with the other assessment components will not be calculated.

Continuous assessment requires the MANDATORY submission of all learning activities in order to pass the course.

Exercises submitted after the deadline will receive a maximum grade of 5.

To be eligible to sit for the exam, it is MANDATORY to have submitted all exercises. Late submissions after the exam date will not be accepted. Students who fail to submit the required work will not be allowed to take the exam.

C) NOT ASSESSED

Students who fail to submit at least 1/3 of the assessed activities will receive a Not Assessed grade.

D) REVIEW PROCEDURE

At the time each assessment activity takes place, students will be informed via the Moodle platform about the procedure and date for reviewing grades.

E) RE-EVALUATION

Students may retake failed practical and theoretical exams, provided they were previously attempted. It is not possible to retake an exam that was not previously assessed.

Assessment activities (course project, exercises, practical and theoretical exams) cannot be retaken if they were failed due to plagiarism, copying, or fraudulent use of AI.

The maximum grade for a resit exam is 7 out of 10.

F) PLAGIARISM

If a student commits any irregularity that may significantly affect the grade of an assessment activity, that activity will be graded with a zero, regardless of any disciplinary actions that may be initiated. If multiple irregularities occur in assessment activities for the same course, the final grade for the course will be zero.

G) SINGLE ASSESSMENT

This course does not offer a single (final-only) assessment system.

H) AI

This subject allows the use of AI technologies exclusively for support tasks such as [***bibliographic or content-based searches, text correction or translations, where applicable]. In the case of subjects in a Modern Languages degree, use of translation must be specifically authorised by the teacher. Other specific situations may be contemplated, as deemed appropriate by the teacher.

The student must clearly (i) identify which parts have been generated using AI technology; (ii) specify the tools used; and (iii) include a critical reflection on how these have influenced the process and final outcome of the activity.

Lack of transparency regarding the use of AI in the assessed activity will be considered academic dishonesty; the corresponding grade may be lowered, or the work may even be awarded a zero. In cases of greater infringement, more serious action may be taken.

Bibliography

The references will be complemented during the semester.

Basic References

GRIMA, Clara (2021). *En busca del grafo perdido.* Barcelona: Editorial Planeta.

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HAGGET, Peter; CLIFF, Andrew D. i FREY, Allan (1977). *Locational analysis in human geography*. Vol. I: Locational modelos. Vol. II: Locational methods. London: Edward Arnold.

HARVEY, David (1983). *Teorías, leyes y modelos en geografía*. Madrid: Alianza universidad.

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Complementary References

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THOMAS, R.W. y HUGGET, R.J. (1980). *Modelling in geography. A mathematical approach*. London: Harper & Row, Publishers.

Software

Software:

LINDO

AracGis Pro

QGis

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
(PAUL) Classroom practices	1	Catalan	second semester	morning-mixed
(PLAB) Practical laboratories	11	Catalan	second semester	morning-mixed
(PLAB) Practical laboratories	12	Catalan	second semester	morning-mixed
(TE) Theory	1	Catalan	second semester	morning-mixed