

Foundations of Geoinformation

Code: 106934
ECTS Credits: 6

2025/2026

Degree	Type	Year
Management of Smart and Sustainable Cities	FB	2

Contact

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Teachers

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Teaching groups languages

You can view this information at the [end](#) of this document.

Prerequisites

There are no prerequisites related to this subject, although it will be useful to have computer and statistics skills.

Objectives and Contextualisation

The subject will provide the necessary elements to acquire and understand the cartographic conceptions for the spatial representation of territorial dynamics.

A Smart City aims to provide a high quality of life, consuming the least resources. However, in order to represent urban dynamics and analyze the city, it is essential to acquire and understand the cartographic conceptions for the spatial representation.

Learning Outcomes

1. CM09 (Competence) Relate knowledge and skills in geomatics with those provided by other technicians in interdisciplinary teams.
2. KM14 (Knowledge) Apply cartographic conventions that allow for an appropriate design of maps as a means of transmitting information.
3. SM13 (Skill) Develop management platforms, integration of citizen services and governance based on the use of geoinformation.

Content

Theme 1. Introduction to cartography

- Cartographic concepts
- The maps, the reason of the subject
- The Geographic Information systems

Theme 2. Principles of geospatial representation: points, lines and polygons

- What are the layers?
- What is geographic information?
- Data models: vector and raster

Theme 3. Territorial scales and their functions

- The scale concept
- The scale calculation
- The maps according to the scale: large, medium, and small scale

Theme 4. Cartographic projections and their functions

- Geodesy and references systems
- The projection concept
- The UTM projection

Theme 5. Symbolization of information and graphic design

- Visual variables
- The symbolization in points, lines and polygons
- Graphic design: basic principles and cartographic composition

Theme 6. Data sources

- Alphanumeric data sources: world, European, Spanish, Catalan and locals
- Spatial data sources: world, European, Spanish, Catalan and locals

The schedule, with the sequencing of the themes and the assessment activities, will be uploaded to the virtual campus at the beginning of the course.

Activities and Methodology

Title	Hours	ECTS	Learning Outcomes
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Type: Directed			
Home assignments, activities and self-teaching	43	1.72	
Lectures	20	0.8	
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Type: Supervised			
Assignments	25	1	
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Theoretical concepts are introduced and reinforced through the instructor's oral presentations, as well as through independent student work with specific materials and dynamic learning activities proposed by the course instructor.

Technical and instrumental skills are developed through a series of guided practical sessions conducted during class time or completed individually and/or in small groups in an independent manner.

All data and course materials will be made available on the Virtual Campus, which will be used as the main channel of communication.

Note: Fifteen minutes of one class, as scheduled by the department or degree program, will be reserved for students to complete evaluations of teaching performance and the course/module.

Use of Artificial Intelligence

The use of Artificial Intelligence (AI) technologies is permitted in this course as part of completing assignments, provided the final result reflects a significant personal contribution from the student in terms of analysis and critical reflection. Students must: (i) identify which parts have been generated using AI; (ii) specify the tools used; and (iii) include a critical reflection on how these tools have influenced the process and the final outcome of the assignment. Failure to be transparent about the use of AI in assessable activities will be considered academic misconduct and will result in a grade of zero for the affected work, with no opportunity for recovery, or even more severe penalties in cases of serious breaches.

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
Autonomous practical work	40	30	1.2	CM09, KM14, SM13
Final work. Cartographic composition and data sources search	20	26	1.04	CM09, KM14
Theory and practical tests	40	6	0.24	CM09, KM14, SM13

IMPORTANT

This course/module does not offer a single-assessment option.

CONTINUOUS ASSESSMENT

Assessment Components

- 2 partial theoretical-practical exams: 20% (mid-semester) + 20% (end of semester)
- Practical exercises: 40%
 1. Introduction to cartography, map analysis & critique: 10%
 2. Orientation, calculation of scales & slopes: 10%
 3. Cartographic sources: 20%
- Final project (20%): Creation of an urban thematic map

Criteria for Assessment

Student evaluation is based on independently completed practical assignments. At least 80% of these assignments must be submitted within the deadlines set by the instructor. Students who do not meet this requirement will not be allowed to sit the exam, and their final grade will be recorded as "Not Assessable." Attendance will be monitored in both theoretical and practical sessions. Students must attend at least 80% of scheduled sessions to be eligible for evaluation. Otherwise, the final grade will be "Not Assessable." Students who successfully complete the course and meet the attendance requirement will receive a 5% bonus on their final grade.

Optional Assignments

Throughout the course, several dynamic and optional learning activities may be offered to further students' learning. Submission of these assignments is voluntary.

Requirements to Pass the Course

The theoretical-practical exams are graded separately for theory and practical components. The average of the two theory and two practical exam scores will only be calculated if both components have a minimum mark of 4. Exams are passed if the average for each component is at least 5. Both the theory and practical parts of the course must be passed individually with an average mark of 5 to be included in the final grade. For example, if a student scores 6 and 4 in the theory sections and 5 and 4 in the practical sections, they will not meet the minimum requirements, since the averages are 5 (theory) and 4.5 (practical); both components must reach at least 5. In this case, the student may retake one or both components.

If a student fails the course, the official grade will reflect their actual assessment results.

Other Relevant Information

It is important to note that assessment activities will only be scheduled at the designated times. Exceptions are only possible with a justified reason, advance warning, and with instructor approval. Missed activities for other reasons cannot be recovered.

Resit (Retake) Policy

If, after the ordinary assessment, a student fails, they may sit for a resit exam on the dates scheduled by the Faculty, under the same conditions as the main exam: at least 80% of practical assignments must have been submitted. Passing the course after failing the main exam requires passing the resit exam. Both theoretical and practical exam components may be retaken. Failed practical assignments may only be retaken if their average is less than 5 and only if the assignment was submitted. The maximum grade for retaken assignments is 6.

Review of Grades

For each assessed activity, a specific time and place for grade review will be set. During this review, students may discuss their grades with the instructor. Appeals regarding grades will be considered by the responsible instructor. If a student does not attend the review, there will be no further opportunity to review that activity.

Grades and Distinctions

The awarding of Distinction or "Honors" is at the discretion of the instructor responsible for the subject. According to UAB regulations, Honors may only be awarded to students with a final grade of 9.00 or higher. A maximum of 5% of enrolled students may receive this distinction. A student will be marked as "Not Assessable" if they have not participated in activities amounting to at least 80% of the total course grade.

Academic Integrity: Misconduct and Plagiarism

Assessment activities found to involve academic misconduct are not recoverable. If passing such an activity is required to pass the course, the course will automatically fail with no possibility for recovery in the same academic year. Examples of misconduct include, but are not limited to:

- Total or partial copying of practical work, reports, or any other assessment; allowing another student to copy.
- Submitting a group assignment not completed entirely by group members.
- Presenting someone else's work as your own, including translations, adaptations, or any non-original content exclusive to the student.
- Accessing communication devices (such as mobile phones, smart watches, etc.) during individual theory or practical exams.

Assessment for Repeating Students

Repeating students cannot revalidate grades from practical assignments from previous years. In accordance with academic regulations, any detected irregularity that may affect the grade will result in a zero (0), regardless of other disciplinary measures that may be imposed.

Bibliography

Cartography Handbooks

- Barber, P. (2006) El gran libro de los mapas, trad. en castellà. Barcelona: Paidós.
- Clark, John O. E. (ed.) (2006): Joyas de la Cartografía. 100 ejemplos de cómo la cartografía definió, modificó y aprehendió el mundo. Londres: The Chrysalis Building.
- Dent, B.; Torguson, J. and Hodler, T. (2008) Cartography: Thematic Map Design. 6th edition. Boston: WCB /McGrawHill.
- Desclaux-Salachas, Jasmine (2017): The Art of Cartographics: Designing the Modern. Londres: Goodman Books.
- Joly, F. (1988) La cartografía, trad. en castellà. Vilassar de Mar (Barcelona): OikosTau.
- Monmonier, Mark (2018): How to lie with maps (3^a edició). Chicago: University of Chicago Press.
- Rabella, J.M., Panareda, J.M., Ramazzini, G. (2011). Diccionari terminològic de cartografia. Enciclopèdia Catalana i Institut Cartogràfic de Catalunya, Barcelona. 417 p. Consultable a http://www.termcat.cat/ca/Diccionaris_En_Linia/197
- Rabella, Josep Ma. (1986): "La proyección cartográfica de Arno Peters: valoración cartográfica y valoración didáctica", Didáctica Geográfica, núm. 14, pp. 117-124.
- Robinson, A.H.; Morrison, J.L.; Muehrcke, P.C.; Kimerling, A.J. and Guptill, S.C. (1995) Elements of Cartography. 6th edition. New York: John Wiley and Sons
- Sánchez, Judith (2021): Cartógrafas, a lo largo de la historia. Instituto Geográfico Nacional. Madrid.
- Vázquez, Francisco i Martín, José (1989): Lectura de mapas. Madrid: InstitutoGeográfico Nacional.

GIS Handbooks

- Bernhardsen, Tor. Geographic information system: An introduction, 3rd Edition. Nova York: John Wiley & Sons, 2002.
- Bolstad, P. (2016), GIS Fundamentals. Available in: <http://www.paulbolstad.net/gisbook.html>
- Bosque Sendra, Joaquín i García, Rosa C. (2000): "El uso de los sistemas de información geográfica en la planificación territorial", Anales de Geografía de la Universidad Complutense, núm. 20, pp. 49-67 (<https://revistas.ucm.es/index.php/AGUC/article/view/AGUC0000110049A/31281>).
- Burrough, P. A. Principles of Geographical Information Systems, 3rd Edition. Oxford: Oxford University Press, 2015.
- Comas Vila, David. Fundamentos de los Sistemas de Información Geográfica. Barcelona: Ariel, 1993.
- Gutierrez Puebla, Javier; Gould, Michael. SIG: Sistemas de Información Geográfica. Madrid: Síntesis, 1994.
- Nunes, J. (2012). Diccionari terminològic de sistemes d'informació geogràfica. Enciclopèdia Catalana i Institut Cartogràfic de Catalunya, Barcelona. 551 p. Consultable a http://www.termcat.cat/ca/Diccionaris_En_Linia/197
- Oyala, V. (2020). Sistemas de Información Geográfica. Consultable a <http://volaya.github.io/libro-sig>

Online resources

- Revista Catalana de Geografia (Institut Cartogràfic i Geològic de Catalunya) --> <http://www.rcg.cat/hereroteca.php>
- Mappemonde --> <http://mappemonde.mgm.fr/>
- Geofocus. Revista Internacional de Ciencia y Tecnología de la Información Geográfica --> <https://www.geofocus.org/index.php/geofocus>

Software

A specific GIS software is used to complete the course: MiraMon (free for students).

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	612	Catalan	first semester	afternoon
(PLAB) Practical laboratories	611	Catalan	first semester	afternoon
(PLAB) Practical laboratories	612	Catalan	first semester	afternoon
(TE) Theory	61	Catalan	first semester	afternoon