Foundations of Geoinformation

Code: 104527
ECTS Credits: 6

Degree	Type	Year	Semester
2503743 Management of Smart and Sustainable Cities	FB	1	2

Contact

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Use of Languages

Principal working language: catalan (cat)

Some groups entirely in English: No

Some groups entirely in Catalan: Yes

Some groups entirely in Spanish: No

Teachers

Marc Castelló Bueno

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 acquiere 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 conceptiosn for the spatial representation.

Competences

- Analyse and model urban and regional dynamics using methodological instruments for qualitative and quantitative analysis.
- Critically analyse work carried out and demonstrate a desire to improve.
- Identify and use different sources, models and data bases of information generated by urban activity, as well as their principles of operation, access policies and standards.
- Students must be capable of collecting and interpreting relevant data (usually within their area of study) in order to make statements that reflect social, scientific or ethical relevant issues.
- Work cooperatively in complex and uncertain environments and with limited resources in a multidisciplinary context, assuming and respecting the role of the different members of the group.

Learning Outcomes

1. Be aware of and apply cartographic conventions allowing the appropriate design of maps as a means of transmitting information.
2. Be aware of distinct sources of primary and secondary data.
3. Choose and use distinct geometric shapes for the representation of territorial elements.
4. Critically analyse work carried out and demonstrate a desire to improve.
5. Develop and interpret cartographic documents for geographic information.
6. Process and use cartographic information.
7. Produce thematic maps for later publication through both analogue and digital media.
8. Students must be capable of collecting and interpreting relevant data (usually within their area of study) in order to make statements that reflect social, scientific or ethical relevant issues.
9. Work cooperatively in complex and uncertain environments and with limited resources in a multidisciplinary context, assuming and respecting the role of the different members of the group.

Content

Theme 1. Introduction to cartography

- Cartographic concepts
- History of cartography
- The map: basic elements, types and functions

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

- The layer concept
- Geographic information: types, components and characteristics
- Vector data and their formats
- Raster data and their formats

Theme 3. Territorial scales and their functions

- The scale concept
- Topography principles
- Orientation
- The relief representation

Theme 4. Cartograhic projections and their functions

- Cartographic projection concept
- UTM projection
- Absolute, relative georeferencing and address geocoding

Theme 5. Symbolization of information and graphic design

- Visual variables
- The simbolization 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.

Methodology

Theoretical knowledge is introduced and reinforced through:

- Oral exhibitions
- Guided teacher-class practices

The technical and instrumental skills will be developed in:

- Guided teacher-class practices
- Small groups practice sequence.

All the data, tutorials and materials of the subject will be available on the Virtual Campus, regular means of communication.

To follow the course students will ve provided with a specific GIS software: ArcGis (commercial) orQgis (open source)

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.

Activities

Title	Hours	ECTS	Learning Outcomes
Type: Directed			
Master classes	20	0.8	1, 8
Type: Supervised			
Training activities and a field trip	25	1	1, 3, 6
Type: Autonomous			
Training activities and personal study	43	1.72	4, 2, 5, 7, 6, 9

Assessment

Items of the evaluation:

2 Middle term exams (theorical-practical) (20% half-semester-20% at the end of semester)

Practical exercises (40%)

- Introduction to cartography. Map analysis (10%)
- Changes formats and solve queries (15%)
- Orientation, scales and slopes calculations (15%)

Final work (20%)

- Elaboration a poster with cartographic content

Requirements for being assessed

The degree requires to attend a minimum of 80% to be evaluated. Only absences due to illnees or similar reasons ay be justifiable.

Optional tasks

During the course, it will be other optional learning activities to complement the student's education. Delivery of these practices is optional.

Requirements to pass the cours

Two requirments:

- to have an average mark of 5/10;
- to have a minimum mark of 4/10 in each exam

If the students do not pass the subject, the mark will be the result of the evaluation.

Other aspects

If there is no justified cause, the assessement activties will be at the day and time agreed by the university timetable.

RESIT

When the ordinary assessment has finished, if the students fail, they can do a recovery exam according to the University dates. If the student wnats to do the recovery have to:

- deliver at least 80% of the practial work
- approve the recovery exam

It will only be possible to reassess the theorical and practical examn. Failed exercises may only be resit when the average mark does not reach 5. The maxim mark in case of resit is 6.

PROCEDURE FOR REVIEW OF QUALIFICATIONS

For each assessment activity, the coordinator of the subject will indicatea place, date and time of the review. In this context, the student can claim about the assessment activity qualification, which will be reviewed by the coordinator of the subject. Ifthe student does not submit to this review, this assessment activity will not be reviewed later.

QUALIFICATIONS

Honors. Granting an Honor is a decision of the coordinator of the subject. The UAB regulations can only be awarded to students having obtained a final grade of at least 9. It can be granted up to 5% of Honors of the total number of students enrolled.

A Student will be considered non-evaluable (NA) when it has not been presented the assessments activities whose weight are two thirds of the total grade of the subject.

PLAGIARISM AND OTHER IRREGULARITIES

Assessment activities qualified in this way and by this procedure will not be recoverable. If it is necessary to pass any of these assessment activities to pass the subject, this subject will be suspended directly, without opportunity to recover it in the same course. These irregularities include, among others:

- the total or partial copy of a lab exercise, report, or any other evaluation activity;
- let another student to copy; present a group work not done entirely by the members of the group (applied to all members and not only to those who have not worked);
- present as own materials prepared by a third party, even if they are translations or adaptations, and generally works with non-original and exclusive elements of the student;
- have communication devices (such as mobile phones, smart watches, pens with camera, etc.) accessible during theoretical-practical assessment tests (individual exams);
- talk with classmates during the individual theoretical-practice tests (exams);
- copy or attempt to copy from other students during the theoretical-practical assessment tests (exams);
- use or attempt to use written material related to thesubject during the theoretical-practical evaluation tests (exams), when these have not been explicitly allowed.

REPEATING STUDENTS

In case of repeating students, the mark of thepractices of the previous course cannot be validated. Without prejudice to other disciplinary measures deemed appropriate, and in accordance with the current academic regulations, irregularities committed by a student who may lead to a variation of the qualification in an assessable activity will be graded with zero (0).

Assessment Activities

Title	Weighting	Hours	ECTS	Learning Outcomes
Autonomous practices	40	30	1.2	4, 2, 1, 5, 3, 7, 6, 9
Final work. Cartographic composition and data sources searching	20	26	1.04	4, 2, 1, 5, 3, 7, 8, 6, 9
Theorical exam and practical exam	40	6	0.24	1, 3, 7, 6

Bibliography

CARTOGRAPHY MANUALS

Barber, P. (2006) El gran libro de los mapas, trad. en castellà. Barcelona: Paidós.

Dent, B.; Torguson, J. and Hodler, T. (2008) Cartography: Thematic Map Design. 6th edition. Boston: WCB /McGrawHill.

Joly, F. (1988) La cartografía, trad. en castellà. Vilassar de Mar (Barcelona): OikosTau.

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

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

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Bernhardsen, Tor. Geographic information system: An introduction. Nova York: John Wiley & Sons, 1999.

Burrough, P. A. Principles of Geographical Information Systems. Oxford: Oxford University Press, 1998.

Comas Vila, David. Fundamentos de los Sistemas de Información Geográfica. Barcelona: Ariel, 1993.

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Nunes, J. (2012). Diccionari terminològic de sistemes d'informació geogràfica. Enciclopèdia Catalana i Institut Cartogràfic de Catalunya, Barcelona. 551 p. Retrieved from http://www.termcat.cat/ca/Diccionaris_En_Linia/197

Oyala, V. (2011). *Sistemas de Información Geográfica.* Retrieved from http://volaya.github.io/libro-sig

Software

To follow the course students will ve provided with a specific GIS software: ArcGis (commercial) or Qgis (open source).