



DEGREE CURRICULUM

# THEMATIC CARTOGRAPHY AND GIS

Coordination: ALONSO LOGROÑO, MARÍA PILAR

Academic year 2020-21

# THEMATIC CARTOGRAPHY AND GIS 2020-21

## Subject's general information

|  |   |        |           |                  |
|--|---|--------|-----------|------------------|
| Subject name   | THEMATIC CARTOGRAPHY AND GIS  |        |           |                  |
| Code   | 101151  |        |           |                  |
| Semester   | 2nd Q(SEMESTER) CONTINUED EVALUATION  |        |           |                  |
| Typology   | Degree  | Course | Character | Modality         |
|  | Bachelor's Degree in Geography  | 1      | COMMON    | Attendance-based |
| Course number of credits (ECTS)  | 6   |        |           |                  |
| Type of activity, credits, and groups                                    | Activity type   | PRALAB | TEORIA    |                  |
|  | Number of credits   | 2      | 4         |                  |
|  | Number of groups  | 1      | 1         |                  |
| Coordination   | ALONSO LOGROÑO, MARÍA PILAR   |        |           |                  |
| Department   | GEOGRAPHY AND SOCIOLOGY   |        |           |                  |
| Teaching load distribution between lectures and independent student work | Presential classes (online or in the classroom): 60 hours<br>Autonomous work of the student: 90 hours |        |           |                  |
| Important information on data processing                                 | Consult <a href="#">this link</a> for more information.   |        |           |                  |
| Language   | Spanish. English as a language of most of the programs used   |        |           |                  |
| Distribution of credits  | 4 teóricos credits<br>2 of Practicas  |        |           |                  |

| Teaching staff              | E-mail addresses     | Credits taught by teacher | Office and hour of attention |
|-----------------------------|----------------------|---------------------------|------------------------------|
| ALONSO LOGROÑO, MARÍA PILAR | pilar.alonso@udl.cat | 6                         |                              |

## Subject's extra information

The main purpose of this subject is to enable the student to reach the basic knowledge that allows him to propose and elaborate a thematic map according to a correct cartographic language that can adapt to the reading in the different contexts in which it can have utility. Both academic and professional. The knowledge obtained should be framed in the use of new spatial information technologies, which allow the student to use thematic mapping as a basic tool for spatial analysis. Therefore, with this subject, the student also introduces himself to the fundamentals of Geographic Information Systems and begins to familiarize himself with GIS management skills.

## Learning objectives

Students who achieve this subject will be able to:

- Use a vocabulary specific to the cartographic process when analyzing and developing a thematic map.
- Understand the significance of mapping management for territorial analyzes.
- Discuss and critically evaluate cartographic documents.
- To deepen in the techniques and methods of cartographic representation through computer means.
- Develop specific skills related to the knowledge of working techniques, especially those related to obtaining, analyzing, processing and representing geographic information.
- Understand the concept and components of Geographic Information Systems.
- Develop thematic maps through geographic information systems
- Acquire the skills for the instrumental management of the most important computer applications.
- Manage databases.
- Learn the management of GIS programs.

All these objectives translate into the following learning outcomes:

- Familiarity with the usual vocabulary and concepts in the use of maps
- Reading, understanding and taking advantage of the information on the topographic maps
- Familiarity with the cartographic resources available online
- Connection of the cartographic conventions and traditions
- Capacity to choose the most suitable form of expression from a wide range of graphic resources
- Adequate choice in the use of graphic resources
- Use of thematic mapping programs, both commercial and online
- Full familiarity with the logic of GIS
- Domini of the basic tools of a GIS
- Agility in the relationship of databases and cartography

## Competences

Competences

CB4 To be able to transmit information, ideas, problems and solutions to a specialized and non-specialized audience

CB5 Know how to develop those learning skills necessary to undertake further studies with a high degree of autonomy

CG3 Characterize the spatial diversity of the territories

CE1 Use methods and techniques of analysis and interpretation of statistical sources

CE3 Express geographical knowledge through thematic mapping

CE4 Use and treat (manipulate) the information proper to topographic cartography

CE5 Learning to extract sources of geographic information from existing resources on the internet

CT3 Acquire training in the use of new technologies and information and communication technologies

CT2 Acquire a significant command of a foreign language, especially english

## Subject contents

1. Introduction to thematic cartography: cartographic communication;

- 1.1. Cartography components;
- 1.2. The supports for thematic cartography
- 1.3. The graphic semiology (The cartographic signs and codes).
- 1.4. The cartographic problems and criteria of cartographic representation.

2. Visual variables in the seva utilització in cartography.

- 2.1 Form
- 2.2. Size
- 2.3. Value

2.4. Plots

2.5. Color

2.6 The combinations of tipus of implantation and visual variables.

3. Introduction to the basic concepts of cartography in digital format through the GIS

3.1. Understanding GIS.

3.2. Components of GIS.

3.3. Main fields of application of GIS.

3.4. The significance of GIS in the matrices referred to the spatial analysis.

3.5. Vector and raster geographic information systems

4. Getting Started with GIS through ArcGis

4.1. Main GIS tools

4.2. Strategic initiation and resolution of spatial problems from the GIS.

## Methodology

We will use a participatory methodology alternating the theoretical explanation with the practice that will be carried out on the computer with ArcGIS. Exercises of increasing complexity will be carried out, culminating in the completion of the course work. The assimilation of the concepts of the cartographic process for their application in the elaboration of maps through the use of Geographic Information Systems are the basis of the learning process of this subject. The mapping will be carried out using GIS, which implies the need to work with specific computers and programs. The course will be carried out combining:

1.- Master classes, with exposition by the teacher

2. Practical classes. A series of practices will be proposed in which they will have to demonstrate the mastery of the cartographic concepts and techniques and the use of the GIS tool that will have been explained previously.

3.- Realization learning folder with all the material and the pertinent corrections

4.- Student work. carrying out a work where a territorial problem must be solved in the most effective way through the use of the GIS tool

Alternança tool for classes magistrals (online) and Practices for the coordinator (computer room). The student will have available a virtual campus Differents dossier explaining Totes the theoretical explanations and the development of the practices with detailed instructions on the processes.

## Development plan

The assimilation of the concepts of the cartographic process for its application in the elaboration of maps through the use of Geographic Information Systems are the basis of the learning process of this subject. Mapping will be done through geographic information systems so some concepts related to them will be introduced. The use of computer tools will mean the need to work with computers in the classroom.

The attendance hours of the subject will be developed according to the following distribution:

Theoretical and practical classes: 45 hours

Non-contact hours: 105 hours

Master classes alternate with practices with a computer.

1. Introduction to thematic cartography. Cartographic communication (2 weeks)

2. Visual variables and their use in cartography (3 weeks)

3. Introduction to the basic concepts of mapping in digital format through GIS (4 weeks) .

4. Initiation to work with GIS through ArcGis (7 weeks)

The assimilation of the concepts of the cartographic process with a view to their application in the elaboration of maps through the use of Geographic Information Systems are the basis of the learning process of this subject. The elaboration of cartography will be carried out through geographic information systems, so some concepts related to them will be introduced. The use of computer tools will suppose the need to work with computers. The student is provided with a software license so that they can work with the GIS tool.

In addition to the schedule established for thursday and friday, 5 Wednesday on dates and on Afternoon classes will be held online or in the computer room, three-hour classes 15,30 a 18,30 (24/3; 7/4; 14/4; 28/4; 12/5)..

In the event that online classes, sessions can be registered, in this case in accordance with current regulations on data protection of a personal nature, we inform you that:

- The organisation responsible for the recording and use of the image and voice is the University of Lleida - UdL (contact details of the representative: General Secretariat. Plaza Víctor Siurana, 1, 25003 Lleida; sg@udl.cat; contact details of the data protection officer: dpd@udl.cat).
- The recorded images and voices shall be used exclusively for teaching purposes.
- The recorded images and voices shall be saved and preserved until the end of the current academic year, and shall be destroyed in accordance with the terms and conditions specified in the regulations on the preservation and disposal of administrative documents of the UdL, and the documentary evaluation tables approved by the Generalitat de Catalunya (<http://www.udl.cat/ca/serveis/arxiu/>).
- The voices and images are considered necessary to teach this subject, and teaching is a right and a duty of the teaching staff of the Universities, which they must exercise under academic freedom, as provided for in article 33.2 of the Organic Law of Universities (Ley Orgánica de Universidades) 6/2001, of December 21. For this reason, the UdL does not need the consent of the students to register their voices and images with the sole and exclusive purpose of teaching in this particular subject.
- The UdL shall not transfer the data to third parties, except in the cases strictly provided for by the Law.
- The student can access their data; request correction, deletion or portability; object to its processing and request its limitation, as long as it is compatible with the purposes of teaching, by writing to dpd@udl.cat. You can also submit a complaint to the Catalan Data Protection Authority, via a mail to its website (<https://seu.apd.cat>) or other non-electronic means.

## Evaluation

L'avaluació de l'assignatura es realitzarà a través de les diferents Tasques realitzades en següent Proportion:

| Evaluation mechanisms                                | Description  | %*  |
|--|--|-----|
| <b>Practices</b>                                     | Learning of the cartographic tools in general and the SIG in particular, through the presentation of a file with the results of the compression of the tool. | 40  |
| <b>Evaluation</b>                                    | Written test for the theoretical approaches.   | 20  |
| <b>Practices with GIS and decartography programs</b> | Realization of a Project where a territorial problem must be solve efficiently with the use of the SIG.  | 40  |
| <b>TOTAL</b>   |  | 100 |

\*: percentage on the final grade.

Students who combine their degree with a full time job have the right to ask for alternative assessment within 5 days after the beginning of the semester. For information, please send an e-mail to [academic@lletres.udl.cat](mailto:academic@lletres.udl.cat) or ask for information at the Faculty's secretary (Secretaria de la Facultat de Lletres).

## Bibliography

### Basic bibliography. Available at the library.

- Aguilera Arilla, M.J. y otros (2003): *Fuentes, tratamiento y representación de la información geográfica*. Unidades didácticas de la UNED. Madrid. 421 págs.
- Bertin, Jacques. *Semiology of graphics : diagrams, networks, maps* / Jacques Bertin. 1967.
- Collado, J.C. y Navarro, J.M. (2013): *ArcGis 10 Prácticas paso a paso*. Universitat Politècnica de Valencia.
- Escolano, S..(2015) *Sistemas de información geográfica. Una introducción para estudiantes de Geografía*. Pressas de la Universidad de Zaragoza, Colección Textos docentes, núm. 253
- Gutiérrez Puebla, Javier ; Gould, Michael (1994): *SIG, sistema de información geográfica*. Editorial Síntesis, S.A. Madrid. p. 251.
- Moreno Jiménez, A. (2005): *Sistemas y análisis de la Información Geográfica. Manual de autoaprendizaje con ArcGis*. Editorial Ra-Ma. Madrid. 878 págs.
- Olaya, V. (2016): *Sistemas de Información Geográfica*. <http://volaya.github.io/libro-sig/>.
- Peña Llopis, J. (2006): *Sistemas de Información Geografica aplicados a la gestión del territorio*. Universidad de Alicante. San Vicente (Alicante)
- Santos Preciado, J.M. (2011). *Los Sistemas de Información Geográfica vectoriales : el funcionamiento de ArcGis* / José Miguel Santos Preciado . 1a. ed. ; 1a. reimp. Madrid : Universidad Nacional de Educación a Distancia. Cuaderno de prácticas.
- Santos Preciados, J.M. (2008): *Análisis estadística de la información geográfica*. Cuadernos de la UNED. Madrid. 395 págs.

### Additional bibliography.

- Bosque Sendra, Joaquín (1997): *Sistemas de información geográfica*. Ediciones Rialp, S.A., 2ª edición.
- Burrough, P.A. y McDonnell, R. (2000): *Principles of geographical information systems*. Oxford University Press.
- Calvo Melero, Miguel (1993): *Sistemas de información geográfica digitales: sistemas geomáticos IVAP*, Instituto Vasco de Administración Pública. Oñati (Guipuzcoa). pp. 616.
- Conesa, C.; Álvarez, Y. y Granell, C. (ed.) (2004). *Empleo de los SIG y la Teledetección en Planificación Territorial*. Universidad de Murcia.
- Dent, Borden D. (2009) *Cartography :thematic map design*. - 6a. ed. Boston [etc.] : McGraw-Hill, cop.
- Gómez, M. y Barredo, J.I. (2005): *Sistemas de información geográfica y evaluación multicriterio en la ordenación del territorio*. Madrid, Ra-Ma.
- Madden, M (ed) (2009). *Manual of Geographic Information Systems*. ASPRS.
- Martin Dodge, Rob Kitchin and Chris Perkins: (2011) *The map reader : theories of mapping practice and cartographic representation*. Willey-Blackwell. Oxford.
- Miller, H.J. y Shaw, S.L. (2001): *Geographic Information Systems for Transportation. Principles and Aplications*. Oxford University Press.
- ROBINSON, A. H. et al. (1989). *Elementos de cartografía*. Barcelona, Omega. Última edición norteamericana: 1995, John Wiley and Sons, Nueva York.
- Santos Preciados, J.M. (2002): *Tratamiento informático de la información geográfica*. Cuadernos de la UNED. Madrid. 380 págs.
- Slocum, T.A. et al. (2009). *Thematic Cartography and Geovisualization*. 3ª ed. Pearson-Prentice Hall, Upper Sedle River, N.J.
- Tomlinson, R. (2008). *Pensando en el SIG: planificación de Sistemas de Información Geográfica dirigida a gerentes*. ESRI Press.
- Zanin, C; Tremelo, MC. (2010). *Savoir faire une carte : Aide à la conception et à la réalisation d'une cartethématiqueunivariée*. Belin. Paris.

### Magazines:

- Revista Mappemonde: <http://mappemonde.mgm.fr/>
- Revista Mapping España: [www.revistamapping.com](http://www.revistamapping.com)

The Cartographic Journal: <http://www.cartography>

International Journal of Geographical Information Science

Geofocus-Revista Internacional de Ciencia y Tecnología de la Información Geográfica

## Websites related to cartography and information.

- Llista sobre \*SIG en espanyol

<http://listserv.rediris.es/archives/sig.html>

- ESRI

<http://WWW.esri.es>

- Institut Cartogràfic i Geològic de Catalunya

<http://www.icgc.es/>

- Instituto Geográfico Nacional

<http://www.mfom.es/ign/>

- Atles electrònic de Catalunya

[.gencat.net/hipermapa/ client/211003/baseaea\\_high.html](http://gencat.net/hipermapa/client/211003/baseaea_high.html) /

- INE – Instituto Nacional de Estadística

[www.ine.es](http://www.ine.es)

- Institut de Estadística de Catalunya

[www.idescat.es](http://www.idescat.es)