

**COURSE DATA****Data Subject**

Code	41056
Name	Modelling techniques and geographical information systems
Cycle	Master's degree
ECTS Credits	10.0
Academic year	2020 - 2021

Study (s)

Degree	Center	Acad. year	Period
2001 - M.D. in Environmental and Territorial Management Techniques	Faculty of Geography and History	1	Second term

Subject-matter

Degree	Subject-matter	Character
2001 - M.D. in Environmental and Territorial Management Techniques	4 - Methods and techniques applied to land use planning	Optional

Coordination

Name	Department
SALOM CARRASCO, JULIA	195 - Geography

SUMMARY

The main objective of this course is that the student learns to develop studies and analysis applied to different specific objectives of the spatial planning using geographic information systems as a tool for information management, representation and spatial modeling. First, the student will learn how to design and manage relational databases and different tools that allow for the creation and dissemination of cartography in the web. Second, the student will learn to develop studies and analysis applied to different specific objectives using GIS as a tool for spatial modeling: land suitability studies aimed at informing proposals for the allocation of land uses, localization projects of infrastructures and equipment; and studies and analysis on the markets and the firms to doing proposals for localization and management in a business environment.



PREVIOUS KNOWLEDGE

Relationship to other subjects of the same degree

There are no specified enrollment restrictions with other subjects of the curriculum.

Other requirements

None

OUTCOMES

2001 - M.D. in Environmental and Territorial Management Techniques

- Capacidad de organización, planificación y gestión de la información ambiental y territorial
- Técnicas de análisis cuantitativo
- Manejo de Sistemas de Información Geográfica aplicados a los problemas medioambientales y territoriales
- Conocer y aplicar las teorías, enfoques y técnicas de concertación y participación sociocomunitaria.
- Capacidad de realizar la planificación territorial: análisis, diagnóstico y propuestas.
- Students should apply acquired knowledge to solve problems in unfamiliar contexts within their field of study, including multidisciplinary scenarios.
- Students should be able to integrate knowledge and address the complexity of making informed judgments based on incomplete or limited information, including reflections on the social and ethical responsibilities associated with the application of their knowledge and judgments.
- Students should demonstrate self-directed learning skills for continued academic growth.
- Students should possess and understand foundational knowledge that enables original thinking and research in the field.

LEARNING OUTCOMES

Design of territorial information systems

Studies and proposals of geomarketing

Projects of location of activities and services



DESCRIPTION OF CONTENTS

1. Basic concepts on relational databases and geodatabases

- Data bases. Basic concepts.
- The entity-relationship model
- Database design
- Database management: practices in Microsoft Access
- Geodatabases: concept and development in ArcCatalog

2. 'On line' cartography

- Academic geography vs Neogeography
- Cartography dissemination in the web

3. Environmental Factors Analysis using GIS raster

Operations for the Environmental factors analysis using raster models. Generation of raster models using geo-statistical techniques. Modelling using non-parametric estimation techniques. Estimate of Core type. Techniques for analyzing the landscape through neighborhood operations on raster models. Suitability Analysis for land uses.

4. Models for locating equipment and services

- Public facilities and services
- Determination of areas of influence and market potential of private establishments
- Models for locating private services
- A professional application: geomarketing

5. Statistical analysis with GIS

- Basic indicators of spatial statistics
- Detection of spatial patterns: Average Nearest Neighbor, General G Getis-Ord, Function K of Ripley, I of Moran global
- Cluster detection: Anselin local Morans I, Getis-Ord Hot Spot Analysis or GI *
- Grouping analysis



WORKLOAD

ACTIVITY	Hours	% To be attended
Computer classroom practice	60,00	100
Tutorials	2,00	100
Study and independent work	90,00	0
Preparation of evaluation activities	70,00	0
Resolution of case studies	28,00	0
TOTAL	250,00	

TEACHING METHODOLOGY

All classes take place in the computer room, and have a theoretical and practical focus. Theoretical content and the use of IT tools will be explained.

Classes will be supplemented by individual work aimed at performing simplified applications with real data and with the results shown as reports. To prepare this work, outside of class time students have access to a fully equipped classroom, as well as a virtual classroom.

Seminars: designed to show practical experience and present and discuss student work.

EVALUATION

The evaluation model is:

- Attendance at seminars (minimum requirement of 80% attendance)
- Examination: 25%
- Guided work: 70%
- Complementary activities: 5%

REFERENCES

Basic

- BOSQUE SENDRA, J. (1994): Sistemas de Información Geográfica: prácticas con PC ARC/INFO e IDRISI, Ra-Ma, Madrid.
- BOSQUE SENDRA, J. y MORENO JIMÉNEZ, A. (2004): Sistemas de Información Geográfica y localización de instalaciones y equipamientos, Ra-Ma, Madrid.



- GÓMEZ DELGADO, M. Y BARREDO CANO, J.I. (2005): Sistemas de información geográfica y evaluación multicriterio en la ordenación del territorio, Ra-Ma, Madrid, 2ª edición actualizada.
- MORENO JIMÉNEZ, A., COORD. (2005): Sistemas y Análisis de la Información Geográfica. Manual de autoaprendizaje con ArcGis, Ra-Ma, Madrid

Additional

- ADSUARA, X. ET AL. (2000): Criterios generales para la integración del planeamiento urbanístico y territorial en un Sistema de Información Territorial (SIT), Ciudad y Territorio. Estudios Territoriales, nº 124, pp.183-208
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- AMAGO, F.S. (2000): Logística y marketing geográfico. Geomarketing para tomar decisiones visualmente, Barcelona, Logis Book
- BOSQUE SENDRA, J. Y GARCÍA, R.C. (2000): El uso de los sistemas de información geográfica en la planificación territorial, Anales de Geografía de la Universidad Complutense, 20: 49-67
- BOSQUE SENDRA, J., GÓMEZ DELGADO, M., RODRÍGUEZ ESPINOSA, V., DÍAZMUÑOZ, M.A., RODRÍGUEZ DURÁN, A.E., Y VELA GAYO, A. (1999): Localización de centros de tratamiento de residuos: una propuesta metodológica basada en un SIG, Anales de Geografía de la Universidad Complutense, 19: 295-323
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- CHOU, Y.-H. (1996): Exploring spatial analysis in geographical information systems. Santa Fe, On Word Press.
- CONESA GARCÍA, C., ÁLVAREZ ROGEL, Y. y GRANELL PÉREZ, C. (2004, eds.): El empleo de los SIG y la teledetección en la planificación territorial: aportaciones al XI Congreso de Métodos Cuantitativos, SIG y Teledetección. Murcia, Universidad de Murcia.
- DEL POZO, F., BOSQUE SENDRA, J., GÓMEZ DELGADO, M. Y MORENO JIMÉNEZ, A. (2000): Hacia un sistema de ayuda la decisión espacial para la localización de equipamientos, Estudios Geográficos, Vol. 61, Nº 241, 2000 ,pags. 567-598
- DE MIGUEL, A., PIATTINI, M. y MARCOS, E. (1999). Diseño de Bases de Datos Relacionales. Ra-ma
- GÓMEZ, M., RODRÍGUEZ, V.M., RODRÍGUEZ, A.E., CHUVIECO, J., CHUVIECO, E.(1995): Diseño de carreteras mediante un sistema de información geográfica: costes de construcción y costes ambientales, Ciudad y Territorio. Estudios Territoriales, III, 104, pp.361-376
- GUTIÉRREZ PUEBLA, J., GARCÍA PALOMARES, J.C., ALVENTOSA, C., REDONDO ,J.C. Y PANIAGUA, E. (2002): Accesibilidad peatonal a la red sanitaria de asistencia primaria en Madrid, Anales de Geografía de la Universidad Complutense, Vol. Extraordinario, pp.269-280



- GETIS, A. y J.K. ORD. 1992. The Analysis of Spatial Association by Use of Distance Statistics, *Geographical Analysis* 24(3).
- MORENO JIMÉNEZ, A. (1995): Planificación y gestión de servicios a la población desde la perspectiva territorial: Algunas propuestas metodológicas, *Boletín de la A.G.E.*, nº 20, p. 115-134
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- MORENO JIMÉNEZ, A. Y PRIETO FLORES, M.E. (2004): ¿Cómo afecta la unidad espacial a la visualización y modelado del área de mercado con sistemas de información geográfica?: Implicaciones para el geomarketing, *Estudios Geográficos*, vol. 65, n. 257, p. 617-636
- TUDELA SERRANO, M. L. Y MOLINA RUIZ, J. (2005): Estudio de viabilidad ambiental para la localización de parques eólicos en un municipio de la región de Murcia, *Papeles de Geografía*, 41-42; pp. 225-236
- VALLEJO VILLALTA, I. y JOAQUÍN MÁRQUEZ PÉREZ, J.(2006): SIGCOMSE: Un sistema de información geográfica aplicado al comercio en la ciudad de Sevilla, *GeoFocus (Informes y comentarios)*, nº 6, p. 28-38, http://geofocus.rediris.es/2006/Informe3_2006.pdf
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- ALLEN D.W. (2011): *GIS tutorial. Spatial Analysis Workbook*. Esri Press, Redlands. California

ADDENDUM COVID-19

This addendum will only be activated if the health situation requires so and with the prior agreement of the Governing Council

SEMI-PRESENTIAL TEACHING

1. Contents

The contents initially included in the teaching guide are maintained

2. Workload and time schedule



The activities and their hours of dedication in ECTS credits marked in the original course guide will be kept. If the classrooms capacity according to the sanitary norms allows it, the theoretical and practical class attendance will be 100%; if the capacity couldn't be guaranteed, the class attendance would be reduced, replacing face-to-face classes with synchronous non-face-to-face teaching.

If the sanitary situation changes and no access to the University facilities is possible, all teaching activities will be carried out completely online (synchronous non-classroom teaching). In this case, the adaptations will be communicated to the students through the Virtual classroom.

3. Teaching Methodology

Theory and practice classes that may be complemented with different types of materials and activities in the Virtual classroom.

Tutorials will be done online (through the UV corporate mail) or face-to-face by prior appointment with the teacher.

If the sanitary situation changes and no access to the University facilities is possible, teaching and tutorials will be carried out completely online. In this case, the adaptations will be communicated to the students through the Virtual classroom.

4. Evaluation

The evaluation criteria established in the Course Guide are kept.

If the University facilities were closed on the dates set in the official calendar for the exams, the face-to-face exam would be replaced by an online test.

5. Bibliographic references

The recommended bibliography in the Course Guide is kept. If the sanitary situation changes and the access to the recommended bibliography is not possible, it will be replaced by materials accessible online.

