GUÍAS DOCENTES

Universidad de Jaén

School of Engineering of Jaén

Geographic information systems

2024-2025

Grado en Ingeniería Geomática y Topográfica (E.P.S. Jaén)

Acceso Mayores 40
Guías docentes UJA
Horarios de tutorías
Llamamientos PAU
Movilidad (Coordinador)
P.O.D.
Solicitud bilingüismo

Syllabus 2024-25 - 13212020 - Geographic Information Systems (Sistemas de información geográfica)

Caption
- Level 1: Tutorial support sessions, materials and exams in this language
- Level 2: Tutorial support sessions, materials, exams and seminars in this language
- Level 3: Tutorial support sessions, materials, exams, seminars and regular lectures in this language

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DEGREE: Grado en Ingeniería geomática y topográfica
FACULTY: SCHOOL OF ENGINEERING OF JAÉN
ACADEMIC YEAR: 2024-25
COURSE: Geographic Information Systems

SYLLABUS

1. COURSE BASIC INFORMATION

NAME: Geographic Information Systems
CODE: 13212020 ACADEMIC YEAR: 2024-25
LANGUAGE: English LEVEL: 1
ECTS CREDITS: 6.0 YEAR: 3 SEMESTER: PC

2. LECTURER BASIC INFORMATION

NAME: MESA MINGORANCE, JOSÉ LUIS
DEPARTMENT: U119 - INGENIERÍA CARTOGR. GEODESICA Y FOTOGRAM
FIELD OF STUDY: 505 - INGENIERÍA CARTOGRÁFICA, GEODÉSICA Y FOTOGRAMETRÍA
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LANGUAGE: English LEVEL: 1

3. CONTENT DESCRIPTION

Lesson 1.- Introduction to SIG

- Definitions. Components.
- Applications fields
- Limitations and tendencies

Lesson 2.- Bases and tools of the cartographic modeling

- System and model. The geographic data
- Data dictionaries
- UML (ISO 19501)

Lesson 3.- Topology and spatial index

- Topology (bases, 9I model, etc.)
- Graph theory
- Segment/interval tree or equivalent

Lesson 4.- Spatial and temporal model in ISO

- ISO 19107,19136,19137,19108

Lesson 5.- Vector GIS.

- Layers, Geodatabases and objects
- Storage (graphic, topological and thematic)
- Dynamic segmentation.
- Time and 3D.
- Algorithms (intersection, overlap, point in polygon, topology).

Lesson 6.- Raster GIS.

- Basis of the tessellation.
- Storage structures.
- Time and 3D.
- Conversion between structures.
- Algorithms (Sliding, MM, clustering, distances).

Lesson 7.- Digital Models.

- Model CN, RU, RTI
- Storage structures.
- RTI creation Algorithms
- Calculation Algorithms (slopes, directions, flows, viewsheds, watersheds).

Lesson 8.- GIS Analysis.

Vector Spatial Analysis.

Raster Spatial Analysis.

Analysis of digital terrain models.

Lesson 9.- GIS projects.

Paradigm and GIS project stages

Viabilities.

Information on projects.

Personnel and training.

Select tool (software).

Program practical classes

1.- Entering data. Gegraphical reference

2.- Database Management Data System

3.- Vector analysis

4.- Raster analysis

5.- Network analysis

6.- Models of process

7.- Multicriteria analysis

8.- Programming in Python

4. COURSE DESCRIPTION AND TEACHING METHODOLOGY

- Master classes where the theoretical part of the subject is developed. Different activities will be proposed through the development of specific topics and presentation of works. (CB2R, CB3R, CB5R, CE10R, CE11R, CE17R, CE18R, CE22R, CT1, CT2, CT4)
- Classes in small groups in which practical assumptions are developed, exercises relationships, all to encourage student participation through their intervention in their exposure. (CE10R, CE11, CE17R, CE18R, CE22R, CT1, CT2, CT4, CT6).

Students with special educational needs should contact the Student Attention Service (Servicio de Atención y Ayudas al Estudiante) in order to receive the appropriate academic support

5. ASSESSMENT METHODOLOGY

With the theory exam, the competencesCB2R, CB3R, CB5R,, CE10R, CE17R,CE22R, CE10,CE17,CE18,CE22 y CT2 are evaluated. With the accomplishment of practices, the competences CE11R, CE18R, CE22R, CE10,CE17,CE18,CE22, CT1,CT4 y CT6 are evaluated

The student must pass the theory exam and also overcome the practical activities which will order from the teacher

6. BOOKLIST (Access the bibliography in the Library catalog)

MAIN BOOKLIST:

- EN ISO 19107: geographic information : spatial schema : (ISO 19107:2003). Edition: -. Author: -. Publisher: Brussels: CEN, cop. 2005
- Fundamentals of spatial information systems. Edition: -. Author: Laurini, Robert. Publisher: London [etc.]: Academic Press, 1999 (Library)
- GIS fundamentals : a first text on geographic information systems. Edition: 4th ed. Author: Bolstad, Paul. Publisher: White Bear Lake, Minn. : Eider Press, 2012 (Library)

ADDITIONAL BOOKLIST:

- Digital terrain modeling: principles and methodology. Edition: -. Author: Li, Zhilin. Publisher: Boca Raton, (etc.): CRC Press, cop. 2005 (Library)
- Managing geographic information system projects. Edition: -. Author: Huxhold, William E.. Publisher: New York ; Oxford: Oxford University Press, 1995 (Library)
- Sistemas de información geográfica. Edition: 1 ed. , 3 reimp.. Author: Santos Preciado, José Miguel. Publisher: Madrid : Universidad Nacional de Educación a Distancia, 2007 (Library)
- Teaching geographic information science and technology in higher education. Edition: -. Author: -. Publisher: Chichester, West Sussex ; Hoboken, N.J. : Wiley Blackwell, 2012 (Library)
- Geographic information systems & science. Edition: 3rd ed.. Author: -. Publisher: Hoboken, NJ : Wiley, 2011 (Library)

7. SUSTAINABLE DEVELOPMENT GOALS

Educación de calidad

DETAILED INFORMATION

The contents of this teaching guide comply with the following Sustainable Development Goals (SDGs):

4.4 By 2030, significantly increase the number of young people and adults who have the necessary skills, particularly technical and professional, to access employment, decent work and entrepreneurship.
4.5 By 2030, eliminate gender disparities in education and ensure equal access to all levels of education and vocational training for vulnerable people, including people with disabilities, indigenous peoples and children in situations of vulnerability.
4.7 By 2030, ensure that all learners acquire the theoretical and practical knowledge necessary to promote sustainable development, including through education for sustainable development and sustainable lifestyles, human rights, gender equality, the promotion of a culture of peace and non-violence, global citizenship and the appreciation of cultural diversity and the contribution of culture to sustainable development.
4.c By 2030, significantly increase the supply of qualified teachers, including through international cooperation for teacher training in developing countries, especially least developed countries and small island developing States.

8. VIRTUAL / CLASSROOM TEACHING SCENARIO

MIXED SCENARIO

As the Center indicates, the attendance for the Geomatics and Topography Engineering Degree in the third year is 100% in a mixed or multimodal setting, both for Theory and Practice classes. For this reason we adopt in this scenario all the premises previously established in the Teaching Guide.

TEACHING METHODOLOGY AND TRAINING ACTIVITIES:

A1. Exhibition classes in large group:
1. 30 Hours.
2. Format: 100% presential.
3. Methodology: Master classes where the theory syllabus will be developed and activities will be proposed, through questions, work, and a list of problems, to encourage student participation. Classes will take place at the time established by the Center.

A2. Small group classes:
1. 30 Hours.
2. Format: 100% presential.
3. Methodology: The practical classes will begin with an introduction and explanation from the teacher, leaving the development of the same to the student. These practice sessions will take place and take place at the times set by the Center.

Tutorials:
1. Format: Presential, they can also be done non-presential if the student requests it.
2. Methodology: Presential tutoring. In non-presential tutoring, they will be synchronous tutoring at the time set for this purpose, by videoconference, by appointment. Non-presential tutoring can be asynchronous by email.

EVALUATION SYSTEM.

1. Theory test and practical assumptions.

a. Format: Presential.
b. Description: Mastery exam of the theoretical and practical knowledge of the subject.
c. Percentage: 60%.
d. Mandatory character.

2. Evaluation of the works.
a. Format: Presential.
b. Description: To pass the practices, the works that are in charge throughout their development must be handed in. The student who in the ordinary call will not deliver the practices developed in class, must present and defend the same or those commissioned by the teacher in the following extraordinary calls, within the period established by the teachers of the subject.
c. Percentage: 40%.
d. Mandatory character.
3. Overall evaluation:
It will be necessary to pass the theory exam as well as the evaluation of the practices to be able to pass the whole of the subject.

9. VIRTUAL TEACHING SCENARIO

NON-PRESENTIAL SCENARIO.
In the non-presential scenario, what is raised in the presential scenario will be maintained, with the only difference that any presential activity will be replaced by videoconferences.

A1. Exhibition classes in large group:
1. 30 Hours.
2. Format: Non-presential.
3. Methodology: Master classes where the theory syllabus will be developed and activities will be proposed, through questions, work, and a list of problems, to encourage student participation. Classes will take place at the time established by the Center. The development of the classes will be through videoconference.

A2. Small group classes:
1. 30 Hours.
2. Format: Non-presential.
3. Methodology: The practical classes will begin with an introduction and explanation from the teacher, leaving the development of the same to the student. These practice sessions will take place and take place at the times set by the center. The development of the classes will be through videoconference.

Tutorials:
1. Format: Non-presential.
2. Methodology: Synchronous tutoring at the time set for this purpose, by videoconference, by appointment. Non-presential tutoring can be asynchronous by email.

EVALUATION SYSTEM.

1. Theory test and practical assumptions.
a. Format: Non-presential. The exam will be synchronous, and the most appropriate tools will be used for the development of the written exam that the University of Jaén makes available to us.
b. Description: Mastery exam of the theoretical and practical knowledge of the subject.
c. Percentage: 50%.
d. Mandatory character.

2. Evaluation of the works.
a. Format: No presential delivery through virtual teaching platform.
b. Description: To pass the practices, the works that are in charge throughout their development must be handed in. The student who in the ordinary call will not deliver the practices developed in class, must present and defend the same or those commissioned by the teacher in the following extraordinary calls, within the period established by the teachers of the subject.
c. Percentage: 50%.
d. Mandatory character.

3. Overall evaluation:
a. It will be necessary to pass the theory exam as well as the evaluation of the practices to be able to pass the whole of the subject.

MEANS:
The technical means that the University of Jaén makes available to the university community will be used for the proper development of the subject in a non-presential format.

DATA PROTECTION CLAUSE (on line exams)

Institution in charge of data processing: Universidad de Jaén, Campus Las Lagunillas, s/n, 23071 Jaén

Data Protection Delegate: dpo@ujaen.es

Purpose: In accordance with the Universities Law and other national and regional regulations in force, carrying out exams and assessment tests corresponding to the courses students are registered in. In order to avoid frauds while sitting the exam, the exam will be answered using a videoconference system, being able the academic staff of the University of Jaén to compare and contrast the image of the person who is answering the exam with the student's photographic files. Likewise, in order to provide the exam with evidential content for revisions or claims, in accordance with current regulation frameworks, the exam will be recorded and stored.

Legitimacy: compliance with legal obligations (Universities Law) and other national and regional regulations currently in force.

Addressees: service providers who are the owners of the platforms where the exams are carried out and with whom the University of Jaén has signed the corresponding data access contracts.

Storage periods: those established in current in force regulations. In the specific case of exam videoconference recordings, not before the examination records and transcripts are closed or the exam can still be reviewed or challenged.

Rights: you can exercise your right of access, amendment, cancellation, opposition, suppression, limitation and portability by sending a letter to the postal or electronic address indicated above. In the event that you consider that your rights have been violated, you may submit a complaint to the Andalusian Council for Transparency and Data Protection www.ctpdandalucia.es

CLASS RECORDING CLAUSE PERSONAL DATA PROTECTION

Person in charge: Universidad de Jaén, Paraje Las Lagunillas, s/n; Tel.953 212121; www.ujaen.es

Data protection delegate (DPO): TELEFÓNICA, S.A.U. ; Email: dpo@ujaen.es

Procedure aim: To manage proper recordings of teaching sessions with the aim of facilitating learning process under a multimodal and/or online teaching

Period for record storage: Images will be kept during legal term according to regulations in force

Legitimacy: Data will be managed according to legal regulations (Organic Law 6/2001, December 21, on Universities) and given consent provided by selecting corresponding box in legal admission documents

Data recipients (transfers or assignments): Any person allowed to get access to every teaching modality

Rights: You may exercise your rights of access, rectification, cancellation, portability, limitation of processing, deletion or, where appropriate, opposition. To exercise these rights, you must submit a written request to the Information, Registration and Electronic Administration Service of the University of Jaen at the address above, or by e-mail to the address above. You must specify which of these rights you are requesting to be satisfied and, at the same time, you must attach a photocopy of your ID card or equivalent identification document. In case you act through a representative, legal or voluntary, you must also provide a document that proves this representation and identification. Likewise, if you consider that your right to personal data protection has been violated, you may file a complaint with the Andalusian Data Protection and Transparency Council www.ctpdandalucia.es