

Degree programme	Type	Course
Geoinformation	OB	1

Contact lecturer

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Teaching staff

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Group languages

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

Prerequisites

This course has no specific requirements. Students should only have a basic knowledge of using general software such as Windows, Excel and Word. However it is advisable that students have basic knowledge on information technologies.

Objectives

1. Systematic coverage of web technology for implementing spatial data infrastructures as well of the different types of servers of geospatial information web services (map servers, metadata, geoprocessing, etc.) based on the standards of geospatial information services from OGC and ISO (WMS, WMTS, WFS, WPS, etc.).
2. Knowledge of the main free and commercial software for creating, publishing and managing the different types of geospatial information web services.

Learning outcomes

- CA13 (Present imaginative, creative and innovative proposals in projects for geospatial information systems, services, products and applications.) Present imaginative, creative and innovative proposals in projects for geospatial information systems, services, products and applications.
- CA14 (Create geovisualisation products for use in production and publishing.) Create geovisualisation products for use in production and publishing.
- CA15 (Design web geoservices servers of different types, contents and capabilities using standard protocols and the most prominent map server and other geoservice programmes.) Design web geoservices servers of different types, contents and capabilities using standard protocols and the most prominent map server and other geoservice programmes.
- KA13 (Define the characteristics of standard data models for geospatial information metadata.) Define

the characteristics of standard data models for geospatial information metadata.

- KA14 (Indicate the resources for interactive visual representation, animation and integration of multimedia content.) Indicate the resources for interactive visual representation, animation and integration of multimedia content.
- KA15 (Compare web geoservices of different types, contents and capabilities using standard protocols and the most prominent map server programmes.) Compare web geoservices of different types, contents and capabilities using standard protocols and the most prominent map server programmes.
- SA15 (Determine the typical geoservices of a spatial data infrastructure.) Determine the typical geoservices of a spatial data infrastructure.
- SA16 (Prepare metadata catalogue servers for the creation of geoservices.) Prepare metadata catalogue servers for the creation of geoservices.
- SA17 (Design information systems in service-oriented client-server architectures.) Design information systems in service-oriented client-server architectures.
- SA18 (Review the quality, traceability and implementation information in the metadata of geoinformation products and services.) Review the quality, traceability and implementation information in the metadata of geoinformation products and services.

Contents

Spatial data infrastructures and standards for geospatial services

1. Introduction to spatial data infrastructures (SDI).

SDI concept.

Background.

Human components.

Technical components.

IDEC.

IDEE.

INSPIRE.

Other examples of SDI.

2. Geospatial service standards of the *Open Geospatial Consortium* (OGC).

Presentation of OGC.

WMS standard.

OGC API standard.

Other OGC standards (WMTS, WFS, GML, SOS, SLD, etc).

Examples of implementation of OGC standards.

3. Metadata and geospatial service standards of the ISO TC211 Technical Committee.

Presentation of the ISO TC211 Technical Committee.

ISO 19115 standard.

ISO 19119 standard.

ISO 19139 standard.

Examples of implementation of ISO TC211 standards.

4. Map servers.

Geospatial service concept.

Map server concept.

Standard map servers.

Cloud platforms of geospatial services (*Google Maps, Instamaps, Carto, ArcGIS Online,...*).

5. Map service clients.

Web clients.

Desktop clients.

Geospatial service consumption by means of *JavaScript* libraries.

Mobile apps from geospatial services.

6. Preparing geoinformation to create map services.

Map services from data (spatial databases, shape files, GeoJSON files)

Tile cache map services (WMTS)

Tools for creating tiled map services (*GeoServer*, *ArcGIS Online*).

7. Creating and publishing metadata.

Metadata creation tools (*MetaD*, *ArcCatalog*).

Standard metadata service publishing tools (*GeoNetwork*).

Geospatial services for smart cities

1. Introduction to smart cities.

Open data concepts.

Use of Open data services.

Realtime Open data services.

Open data services visualization tools.

Examples of Open data services viewers.

2. Introduction to web sensors.

Concepts of sensors.

Realtime sensor services.

Examples of sensor services viewers.

3. Introduction to geospatial services.

Basic concepts of geospatial services.

Realtime geospatial services.

Geospatial services visualization tools.

Examples of geospatial services

4. Introduction to *VectorTiles*.

VectorTiles basics.

VectorTiles sample viewer

5. Examples of applications with geoservices

Learning activities and methodology

Title	Hours	ECTS	Learning outcomes
Solving practical exercises	69	2.76	CA13, KA14, SA17
Individual and group practical work guided by teachers	15	0.6	CA14, KA13, SA16, SA18
Lectures and practical exercises in a computer lab	36	1.44	CA15, KA15, SA15

Learning is achieved by means of three types of activities.

Directed activities: Directed activities are theoretical and practical lectures in a computer lab. They include solving case studies and practical exercises. Lectures are the common thread of the course. Lectures serve to systematize all the content, to present the state of the art of the different subjects, to provide methods and techniques for specific tasks, and to sum up the knowledge to learn. Lectures organize also the autonomous and complementary work done by the students

Supervised activities: Supervised activities are focused on the execution of a semester project, consisting of a real case study, carried out through workshop hours, autonomous work and tutorials. This semester project allows to apply together all the knowledge and technical skills learnt in all the courses of the semester. The semester project is a milestone for the students and the actual demonstration that they had achieved the learning goals of all the courses of the semester. It is also the main evidence for evaluation as students should have to submit at the end of the semester a report that summarizes the whole project and do an oral presentation.

Autonomous activities: Autonomous work of the students includes personal readings, data and documentation search, complementary exercises and the personal development of the semester project.

The activities that could not be done onsite will be adapted to an online format made available through the UAB's virtual tools. Exercises, projects and lectures will be carried out using virtual tools such as tutorials, videos, Teams sessions, etc. Lecturers will ensure that students are able to access these virtual tools, or will offer them feasible alternatives.

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

Continuous assessment activities

Title	Weight	Hours	ECTS	Learning outcomes
Oral presentations	20	6	0.24	CA13, KA13
Practical exercises	35	10.5	0.42	CA15, KA15, SA16, SA18
Report submissions	45	13.5	0.54	CA14, KA14, SA15, SA17

In the event that assessment activities cannot be taken onsite, they will be adapted to an online format made available through the UAB's virtual tools (original weighting will be maintained). Homework, activities and class participation will be carried out through forums, wikis and/or discussion on Teams, etc. Lecturers will ensure that students are able to access these virtual tools, or will offer them feasible alternatives.

CONTINUOUS EVALUATION. This subject/module does not incorporate single assessment.

a) Evaluation procedure and activities:

Evaluation of the course is based mostly on the semester project, that comprises two evaluation activities. The elaboration and submission of a synthesis report and the oral presentation of the project done. Given the technical content of the course, the weight assigned to the project report is 45% of the total course grading, assuming that it is the most appropriate means to explain all the technical details of the project, and a weight of 20% at the oral presentation. The course assessment is completed with the evaluation of the practical exercises done along the course, that account for another 35% of the total course grading.

Unless otherwise specified, the submission of exercises is mandatory. In order for the exercises to be averaged with the project, they must have an average grade of 5 or higher.

Except when expressly noticed, all the evaluation activities (report and oral presentation of the semester project, as well as practical exercises) have to be carried out individually.

Time assigned to each evaluation activity includes the time spent in making all the material evidences for evaluating each activity (e.g., writing of the report, preparing the presentation slides, etc.).

b) Evaluation schedule:

Memòria del projecte del 1er semestre: Elaboració al llarg del semestre. Lliurament al final del semestre, el 22 de gener de 2027.

Defensa oral del projecte del 1er semestre: Elaboració al llarg del semestre. Exposició oral al final del semestre, el 28 de gener de 2027.

Course practical exercises: Making and submission weekly or biweekly along the semester.

c) Grade revision:

Once the grades obtained are published, students will have one week to apply for a grade revision by arranging an appointment with the corresponding teachers.

d) Procedure for reassessment:

1st semester project report: It could be reassessed in the following two weeks after the submission date scheduled. Reassessment will require the submission of a new whole report in case of negative evaluation of the former report submitted.

1st semester project oral presentation: It could be reassessed in the following week after the date scheduled for the oral presentation. Reassessment will require doing again the oral presentation in case of negative evaluation of the former presentation done.

Course practical exercises: Can not be reassessed.

To have right to a reassessment the student will have to have been previously evaluated in a set of activities that account for at least two thirds of the total course grading. Therefore he or she will have to have been evaluated of the 1st semester project report (45%) and of the 1st semester project oral presentation (20%) in the dates scheduled.

The right to a reassessment will only be granted to students that, having not passed the course (e.g., having a total course grade below 5 over 10), had obtained at least a total course grade above 3,5 over 10.

e) Conditions for a 'Not assessable' grade:

Students will receive the grade 'Not assessable' instead of 'Fail' if they had not submitted neither the 1st semester project report nor done the 1st semester project oral presentation. Students will obtain a Not assessed/Not submitted course grade unless they have submitted more than 1/3 of the assessment items.

f) UAB regulations on plagiarism and other irregularities in the assessment process:

In the event of a student committing any irregularity that may lead to a significant variation in the grade awarded to an assessment activity, the student will be given a zero for this activity, regardless of any disciplinary process that may take place. In the event of several irregularities in assessment activities of the same subject, the student will be given a zero as the final grade for this subject..

Assessment activities with a zero grade because of irregularities can not be reassessed.

On carrying out each evaluation activity, lecturers will inform students of the procedures to be followed for reviewing all grades awarded, and the date on which such a review will take place.

For this subject, the use of Artificial Intelligence (AI) technologies is permitted exclusively for support tasks. Students must clearly identify which parts have been generated with this technology, specify the tools used, and include a critical reflection on how these have influenced the process and the final outcome of the activity. Non-transparency in the use of AI in this assessable activity will be considered a lack of academic honesty and may lead to a partial or total penalty in the activity's grade, or more severe sanctions in serious cases.

Bibliography

Fu, Pinde and Sun, Jiulin (2010). *Web GIS: Principles and Applications*. Redlands, California: ESRI Press. 450 pp. (ISBN-10: 978-1589482456)

Nogueras, Javier; Zarazaga, F.Javier and Muro, Pedro (2010) *Geographic Information Metadata for Spatial Data Infrastructures: Resources, Interoperability and Information Retrieval*. Springer.

Kopla, Bill (2009) *Beginning MapServer: Open Source GIS Development*. Apress.

YoungBlood, Brian and Iacovella, Stefano (2013) *Geoserver Beginner's Guide*. Packt Publishing.

Software

Qgis Server

GeoNetwork

Text editor. (VS Code to edit code)

Course groups and languages

The information provided is provisional until November 30. After this date, you will be able to consult the language of each group through this [link](#). To access the information, you will need to enter the course CODE

Type of teaching	Group	Language	Semester	Shift
(TEm) Theory (master)	1	Spanish	first semester	afternoon
(PLABm) Practical laboratories (master)	1	Spanish	first semester	morning-mixed