Course guide
310623 - 310623 - Design and Implementation of Geoservices

Unit in charge:	Barcelona School of Building Construction
Teaching unit:	751 - DECA - Department of Civil and Environmental Engineering.

Degree:	BACHELOR'S DEGREE IN GEOINFORMATION AND GEOMATICS ENGINEERING (Syllabus 2016). (Compulsory subject).

Academic year: 2025   **ECTS Credits:** 6.0   **Languages:** Catalan, Spanish

LECTURER

Coordinating lecturer:	Nuñez Andres, Maria Amparo
Others:	Juan Carlos González González

PRIOR SKILLS

Complete learning of GIS.

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:
CE17EGG. Knowledge, use and application of instruments and photogrametric and topographic methods appopiate to the realization of non cartographic raisings.

Generical:
CG1EGG. Design and develope geomatic and topographic projects.
CG4EGG. Capacity to take decisions, leadership, management of human ressources and direction of interdisciplinary teams related with the special information.
CG5EGG. Determine, measure, evaluate and represent the ground, tridimensional objects, points and trajectories.
CG6EGG. Reunite and interpret information of the ground and all of this geographic and economically related with the ground.
CG7EGG. Management and execution of investigation projects, developement and innovation inside the scope of this engineering.
CG8EGG. Planification, project, direction, execution and management of measurements processes, information systems, image exploitaiton, positioning and navegation; modeling, representation and visualization of the territorial information in, under and above the ground surface.
CG10EGG. Plannification, project, direction, execution and mangement of processes and products of application in the environment, agronomy, forest and miner engineering inside the geomatic field

Transversal:
CT3. TEAMWORK: Being able to work in an interdisciplinary team, whether as a member or as a leader, with the aim of contributing to projects pragmatically and responsibly and making commitments in view of the resources that are available.

CT4. EFFECTIVE USE OF INFORMATION RESOURCES: Managing the acquisition, structuring, analysis and display of data and information in the chosen area of specialisation and critically assessing the results obtained.

CT5. FOREIGN LANGUAGE: Achieving a level of spoken and written proficiency in a foreign language, preferably English, that meets the needs of the profession and the labour market.

Basic:

CB2EGG. The students must know how to apply their knowledge to the work or vocation in a professional way and possess the competences that are used to be demonstrated by the elaboration and defense of arguments and the resolution of problems inside their own field of study.

CB3EGG. The students must have the capacity to gather and interpret relevan data (normally inside the field of study) to emet judgements that include a reflexion into relevant social, cientific or ethic contents.

TEACHING METHODOLOGY

Master classes.
Participative expository classes.
Laboratory practice.
Autonomous work.
Teamwork.

LEARNING OBJECTIVES OF THE SUBJECT

Mapping development for Web.
Python learning.
Flow of geoprocesses.

STUDY LOAD

Type	Hours	Percentage
Hours medium group	36,0	24.00
Self study	90,0	60.00
Hours large group	24,0	16.00

Total learning time: 150 h

CONTENTS

1: Internet protocols an Web services.

Description:
This first topic of the subject deals with the study of the stack of TCP/IP protocols that form the basis on which multiple higher-level protocols are articulated, including the HTTP protocol and its HTTPS variant. In addition, there will be an incursion into the protocols for the transmission of information in XML or JSON format, as in the case of SOAP and REST, respectively.

Specific objectives:
Basic learning protocols of internet.

Full-or-part-time: 9h
Practical classes: 6h
Self study : 3h

2. Types of geoserveis and protocols.

Description:
The second topic of this subject is about the study of the main types of existing geoservices (WMS, WFS, WMTS, WCS, CSW, WPS, etc.) and the information transmission protocols they use (KVP, SOAP and REST).

Specific objectives:
Geoservices.

Related activities:
Activity 1

Full-or-part-time: 9h
Practical classes: 6h
Self study : 3h

3. Python language and WebGIS aplications with OpenLayers/Leaflet.

Description:
Learning of Javascript and Python programming languages, oriented to the development of Web applications that include geographic information viewers and the automation of processes that deal with this type of information, respectively.

Specific objectives:
Process automation.

Related activities:
Activity 1a.
Activity 1b.

Full-or-part-time: 44h
Practical classes: 14h
Self study : 30h

4. Automation of data processing flows with FME Form

Description:
Implementation of geographic information processing flows with FME Form

Specific objectives:
Learning of the ArcGIS Server and Geoserver platforms.

Related activities:
Activity 2.

Full-or-part-time: 23h
Practical classes: 9h
Self study : 14h

5. Geoservices with ArcGIS Server and FME Server.

Description:
Data processing geoservices with ArcGIS Server and FME Server.

Specific objectives:
FME Server.

Related activities:
Activity 3.

Full-or-part-time: 16h
Practical classes: 6h
Self study : 10h

ACTIVITIES

Activity 1a: Programming a Python application.

Description:
Develop an application that allows you to perform different analisis with geographic data and generate a service in ArcGIS Server.

Material:
PyCharm, ArcGIS Pro and ArcGIS Server

Full-or-part-time: 11h
Self study: 1h
Practical classes: 10h

Activity 2: Creation of REST, WMS, WFS and WPS services with ArGIS Server

Description:
Expand the knowledge of WPS services and their implementation through the two platforms. The services will be created and the student will have to make a comparison of both.

Material:
ArcGIS Pro, ArcGIS Server

Full-or-part-time: 13h
Self study: 2h
Practical classes: 11h

Activity 3: Creation of processing services with FME Server.

Description:
Publication of geoprocessing services created with FME Desktop and published with FME Server.

Material:
FME Desktop and FME Server.

Delivery:
Practice delivery.

Full-or-part-time: 13h
Self study: 11h
Practical classes: 2h

Activiy 1b: WebGIS application with OpenLayers/Leaflet

Description:
Develop an application that allows you to view different services using OpenLayers or Leaflet

Delivery:
Report and programming code submission

Full-or-part-time: 3h
Self study: 1h
Practical classes: 2h

GRADING SYSTEM

Theoretical-practical exam: 35%
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Revaluation exam
The exam dates will be posted on the EPSEB website.
Activity 1: 20% (10% 1a +10%1b)
Activity 2: 5%
Activity 3: 5%
You will not be able to take the revaluation exam with a grade lower than a 3.5, nor if you have not presented all the practices.
The revaluation exam will cover the one with mark lower than 5
Attendance and class work will be valued.

EXAMINATION RULES.

All evaluation tests are mandatory.

BIBLIOGRAPHY

Basic:
- Jennings, Nathan. A Python Primer for ArcGIS. Workbook 1. Lexington, Kentucky: Nathan Jennigs, 2015. ISBN 9781466274594.
- Jennings, Nathan. A Python Primer for ArcGIS. Workbook II. Grat Britain: Amazon, 2015. ISBN 9781505893441.
- Fu, Pinde. Getting to know Web GIS. Redlands, California: ESRI Press, 2015. ISBN 9781589483842.

RESOURCES

Computer material:
- ArcGIS for Server. Software
- ArcGIS for Desktop. Software
- FME Desktop. FME Desktop.