Course guide
310623 - 310623 - Geoservices: Design and Implementation

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: 2022   ECTS Credits: 6.0   Languages: Catalan, Spanish

LECTURER

Coordinating lecturer: Mercedes Sanz Conde

Others: Juan Carlos González González
        Ramiro Marco Figuera
        Mercedes Sanz Conde

PRIOR SKILLS

Complete learning of a 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.

General:
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. Planification, 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 responsively 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 relevant data (normally inside the field of study) to emit judgements that include a reflexion into relevant social, scientific or ethical contents.

TEACHING METHODOLOGY
Master classes.
Laboratory practice.
Autonomous work.
Teamwork.

LEARNING OBJECTIVES OF THE SUBJECT
Development of mapping for Web.
Learning Python.
Flow of geoprocesses.

STUDY LOAD

<table>
<thead>
<tr>
<th>Type</th>
<th>Hours</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hours large group</td>
<td>24,0</td>
<td>16.00</td>
</tr>
<tr>
<td>Hours medium group</td>
<td>36,0</td>
<td>24.00</td>
</tr>
<tr>
<td>Self study</td>
<td>90,0</td>
<td>60.00</td>
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</tbody>
</table>

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: 14h
Practical classes: 6h
Self study : 8h
2. Types of geoservices 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: 19h
Practical classes: 9h
Self study: 10h


Description:
Study of the implementation of different types of geoservices through the capabilities offered by the platforms Arcgis Server, Geoserver and, in the specific case of processing services (WPS), FME Server. Python programming language.

Specific objectives:
Arcgis Server, Geoserver, FME.

Related activities:
Activity 2.

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

4. Introduction to Javascript.

Description:
Introduction to the Javascript language and its application for the design of geographic information viewers and interaction interfaces with WPS services.

Specific objectives:
Javascript.

Related activities:
Activity 3.

Full-or-part-time: 22h
Theory classes: 12h
Self study: 10h
ACTIVITIES

**Activity 1:** Conceptual study of the implementation of a REST protocol interface to geographic information Web services.

**Description:**
The WMTS protocol was the first in the family of standards published by the Open Geospatial Consortium that included a REST interface. On the basis of the characteristics of the REST protocol, the student is asked to formulate a proposal to apply the protocol to a typology of Web geographic information services.

**Full-or-part-time:** 10h
Practical classes: 1h
Self study: 9h

**Activity 2:** Creation of a WPS service in the Arcgis Server, Geoserver and FME Server environments

**Description:**
Deepen knowledge of WPS services and their implementation through three existing platforms in the market. The student will have to make an additional effort to create the services, making a comparative analysis of the advantages and disadvantages of each of the three platforms.

**Material:**
ArcGIS Server, Geoserver, FME.

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

**Activity 3:** Creating a viewer with the Openlayers Javascript library that connects to a WPS service.

**Description:**
The student will work with ArcGIS Desktop and will make the necessary changes in cartography to proceed with the publication of services resulting from the viewing with and without tiles within the ArcGIS environment for Server.

**Specific objectives:**
Use the coneixement of the WPS serveis and the Javascript file.

**Material:**
ArcGIS Desktop and ArcGIS Server.

**Delivery:**
Delivery of practice.

**Full-or-part-time:** 9h 40m
Practical classes: 3h
Self study: 6h 40m

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**GRADING SYSTEM**

Theoric_practical exam: 25%
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Activity 1: 20%
Activity 2: 10%
Activity 3: 20%
EXAMINATION RULES.

All evaluation tests are mandatory.

BIBLIOGRAPHY

Basic:

RESOURCES

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