Master of Information and Comunication Sciences

Emphasis: Geomatics

NAME OF THE SUBJECT:

SERVICIOS WEB GEOGRÁFICOS

- Obligatory (**X**): Basic (**X**) Complementary ( )
- Elective (): Intrinsic ( ) Extrinsic ( )

NUMBER OF ACADEMIC CREDITS: Four (4).

COURSE TYPE: THEORETICAL: ___ PRACTICAL: ___ THEORETICAL-PRACTICAL: X_
Methodological alternatives:
Master Class (**X**), Seminar ( ), Seminar - Workshop ( ), Workshop (**X**), Practice (**X**), Tutored projects (**X**), Other: ___oral presentation____

Justification

SYNOPSIS OF THE SUBJECT:

Over the past two decades, some significant changes have been taking place regarding the flexibility, scalability and interoperability of Geographic Information Systems technologies. This is largely due to the establishment of the Open Geospacial Consortium (OGC) as an effort by the international community of experts from companies, academia, organizations and individuals to work together on the development and design of standards and technical specifications in the area. of Geoinformatics. Much of the OGC's work is focused on defining recommendations and guidelines regarding geographic web services. In the same way as the Internet user community has benefited from defining common languages and technologies, which are not limited to the use of specific web browsers or platforms, and exploiting the advances in cloud computing and the use of mobile platforms, great progress has also been made in these aspects in the field of Geomatics.

JUSTIFICATION:

The student of the Master in Information and Communication Sciences (MCIC for its acronym in Spanish) with an emphasis on Geomatics requires knowledge of the mechanisms that

allow interoperable access to both spatial database resources and to spatial analysis processes and advanced image digital processing, which they will be able to implement. In addition, the student must possess the knowledge not only of the basics of the standards and technical specifications that allow interoperability between GIS technologies, but also they must know and manage the tools that allow the implementation, as well as exploit the existing web geographic services available at national and international level to provide efficient and effective solutions in the field of Geomatics.

It is necessary for the MCIC student to acquire skills in the autonomous process of knowledge appropriation, which is achieved by incorporating theoretical-practical activities in this academic space that must be developed autonomously and show evidence of it through exhibitions and the completion of tutored projects.

Although it is true, this academic space contemplates an initial approach to the basics of XML technology, it is recommended that the student have a good command of this subject, which would decrease the respective time and learning curve, freeing him/her to be ready more promptly to address the interoperability aspects of this academic space.

PREREQUISITE: None

Content

GENERAL OBJECTIVE

Expose, implement and exploit the fundamentals and technologies associated with open standards, recommendations or technical specifications in relation to web geographic

services, using existing computer tools on the market and solutions published and implemented nationally and internationally.

SPECIFIC OBJECTIVES

- Review the main open standards and technical specifications of web geographical services, through consultation of OGC reports and technical publications, as well as examples implemented at national and international level.
- Implement geographic map web services (WMS), using free software and open source solutions.
- Implement geographic Web Feature Services (WFS), using free-software and open source solutions.
- Implement geographic Web Coverage Services (WCS), using free and open source software solutions.
- Deploy Catalog Services of Web (CSW), using free software and open source solutions.
- Implement Web Processing Services (WPS), using free-software and open source solutions.
- Exploit existing web geographic services at national and international level by accessing them through the specification issued by the OGC.

SYNTHETIC PROGRAM:

The specific problems to which this academic space hopes to answer are framed in the following questions.

What are web geographic services and what are their benefits and limitations?
What are the open standards and technical specifications at the web geographic service level?
How to use free and open source software computing tools to deploy web geographic services?
How can web geographic services be consumed using specifications issued by the Open Geospatial Consortium (OGC)?

Through face-to-face, cooperative and autonomous working sessions, this academic space will address the different scientific or technical knowledge that must be achieved gathered in the related programmatic units below.

Unit 1 Introduction to Web Geographic Services.
Unit 2 Web Map Services (WMS) and Web Map Tiled Services (WMTS)
Unit 3 Web Feature Services (WMTS)
Unit 4 Web Coverage Services (WCS)
Unit 5 Catalog Services of Web (CSW)

Unit 6 Web Processing Services (WPS)

Strategies

METHODOLOGY:

To achieve the stated objectives, an active type methodology will be used, which allows participants to analyze, synthesize and evaluate the addressed topics. This academic space will use intensive pedagogies, which support autonomous work outside the classroom, the culture of dialogue and ongoing evaluation. These will promote a work ethic, a greater appreciation of time and a commitment to the goal that it recognizes as its own. What will be sought is that the student undertakes tasks that require reflection and analysis, that is formed in the principles of research and in the use of bibliography and publications on the subject by using the following methodological alternatives:

Master class
The teacher will deliver through exhibitions and using interactive teaching tools the main concepts associated with each subject. For each theoretical session, the corresponding readings and consultation topics that support the formation of knowledge will be left.

Oral presentations
In some sessions, students will study and consult on a topic of interest. The oral presentation will be held to present each topic, showing the definitions, their current status and the relevance of each one of them in the web geographic services. These exhibitions will be accompanied by practical demonstrations, which will allow to visualize the application of the topic being discussed or that will allow to visually explain the topic for its better assimilation.

Workshops
Each theoretical session requires a practical complementary work, that is why workshops will be held in class and / or extra-class that seek solutions to different problems raised, presenting a written work of some of them. These workshops will be carried out by students using a platform that is proposed by the teacher.

Final tutored work
By integrating the acquired knowledge and the minimum mastery of web geographic services tools and technologies, a final project or course work will be developed. The best works may be published in the spaces offered by the University and the Master, in order to promote the work carried out by the students.

	Hours			Teacher hours / week	Student hours / week	Total Hours Student / semester	Academic credits
Type of course	DW	CW	AW	(DW + CW)	(DW + CW +AW)	X 18 weeks	
	64	40	40	6	9	144	4

Direct Presential Work (DW): classroom work in plenary session with all students.
Mediated-Cooperative Work (CW): Teacher tutoring work to small groups or individually to students.
Autonomous Work (AW): Student work without the presence of the teacher, which can be done in different instances: in work groups or individually, at home or in a library, laboratory, etc.)

Resources

PHYSICAL RESOURCES REQUIRED:
Didactic elements and tools, video projector, computers, board, documents and readings will be used to complement the aspects that are taught in class. The following ICT resources will be used, since they are tools with which students should be familiar as a contribution to the development of their skills:

Virtual classrooms: There will be a virtual space provided by the Faculty of Engineering on its UDIN platform. This space will become an interaction channel in which the necessary resources for the development of the course will be made available, such as: this syllabus, theoretical documents, workshops, spaces for students to carry out presentations of exhibitions, workshops, advances in the project of course.

Institutional Mail: for exceptional cases such as scheduling virtual meetings or special requests for which there is no access in the virtual classroom.

Guidance and complementary texts:

BIBLIOGRAPHY:

The following books may be used to support the learning process with relevant information.

- Yue, P. (2013). Semantic Web-based Intelligent Geospatial Web Services. SpringerBriefs in Computer Science.
- Li, S. (Ed.), Dragicevic, S. (Ed.), Veenendaal, B. (Ed.). (2011). Advances in Web-based GIS, Mapping Services and Applications. London: CRC Press, https://doi.org/10.1201/b15452 .
- BERNAVÉ, Miguel Ángel y LÓPEZ, Carlos. Fundamentos de las Infraestructuras de Datos Espaciales (IDE). España: Universidad Politécnica de Madrid, 2012. ISBN: 978–84–939196–6–5.
- ZHAO, Peisheng y DI, Liping. Geospatial Web Services, Advances in Information Interoperability. 2011. ISBN: 978-1-60960-194-2.
- TANG, Winnie y SEKLWOOD, Jan. Connecting our World. GIS Web Services. ESRI, 2003. ISBN: 1-58948-075-9.

Internet links:

The following Internet addresses will be used as the primary source.

https://www.w3.org/standards/techs/wsarch#w3c_all
https://www.w3.org/TR/2004/NOTE-ws-arch-20040211/
https://www.w3.org/standards/semanticweb/
www.w3c.org

OGC, WMS Technical Specification:
URL: http://www.opengeospatial.org/standards/wms

OGC, WFS Technical Specification:
URL: http://www.opengeospatial.org/standards/wfs

OGC, WCS Technical Specification:
URL: http://www.opengeospatial.org/standards/wcs

OGC, CSW Technical Specification:
URL: http://www.opengeospatial.org/standards/cat

OGC, WPS Technical Specification:
URL: http://www.opengeospatial.org/standards/wps

OGC, SOS Technical Specification:
URL: http://www.opengeospatial.org/standards/sos

OGC, SLD Technical Specification:
URL: http://www.opengeospatial.org/standards/sld

Databases available at the university:
URL: https://revistas.udistrital.edu.co/

Course Schedule

Week /Thematic unit	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1. Introduction to web services																
2. WMS/WMTS Services																
3. WFS Services																
4. WCS Services																
5. CSW Services																
6. WPS Services																

Evaluation

The evaluation shall be carried out considering:

	TIPO DE EVALUACIÓN	**FECHA**	**PORCENTAJE**
FIRST NOTE	Workshops for the application of theoretical concepts	Primer corte	20%
SECOND NOTE	Workshops for the application of theoretical concepts	Segundo corte	20%
THIRD NOTA	Course project (three deliveries)		30% (5%,10%,15%)
FORUT NOTA	Oral presentation		30%