Universidad Zaragoza

Year : 2019/20

28779 -

Syllabus Information

Academic Year: 2019/20
Subject: 28779 -
Faculty / School: 175 -

Degree: 423 - Bachelor's Degree in Civil Engineering

ECTS: 5.0
Year: 4
Semester: Second semester
Subject Type: Optional
Module: ---

1.General information

1.1.Aims of the course

The subject and its expected results respond to the following approaches and objectives:

- The general objective is for the student to acquire the necessary knowledge and skills about information technology and communication, associated with construction.
- Training in the installation, configuration, customization and efficient use of specific computer tools / applications.
- Provide students with the ability to make decisions in changing contexts, since the BIM is transforming the business models related to the sector, and in an autonomous and collaborative way

1.2.Context and importance of this course in the degree

This subject has a fundamental objective that students develop a series of capacities for the use of information and communication technologies, associated with construction.

One of the computer technologies that revolutionized the architecture and construction sector was the CAD technology, widely used until today, which, while reducing the time of traditional drawing to pencil and paper, is a translation of the same work with another tool more powerful, the computer, and that leads to inconsistencies and unforeseen problems when executing the project. Currently, we are witnessing the second major revolution in the sector, the BIM (Building Information Modeling) methodology, which is being implemented by the European Parliament to member countries to modernize procurement regulations and public tenders. It has been proven that, with a good implementation of the BIM methodology and the use of its associated technologies, it is possible to have a better control of the complete project in each one of its stages, having a good access and handling of the amount of necessary information to the desired level. In BIM, we work based on a virtual model with the project information of each specialty, managing to improve the way it is designed.

In order to understand the new professional panorama that is currently underpinning and that will henceforth mark the new activity framework of the Architecture and Construction work, the subject will be developed within the BIM environment described below:

"BIM is the acronym for Building Information Modeling (modeling of building information) and refers to the set of work methodologies and tools characterized by the use of information in a coordinated, coherent, computable and continuous manner, using one or more bases of compatible data that contain all the information regarding the building that is intended to be designed, built or used.This information may be of a formal nature, but it may also refer to aspects such as the materials used and their physical qualities, the uses of each space, the energy efficiency of the enclosures, etc. "

This subject aims to teach the student the main features of this methodology, as well as others that accompany it, and its associated technologies so that it is able to understand the meaning and scope of it and can decide its use in technical projects that rush

1.3.Recommendations to take this course

It is a subject taught in the second semester of the fourth year, of the studies of Degree in Civil Engineering, with an allocation of 5 ECTS.

It is necessary that the student has basic knowledge in the use of a computer and its most common peripherals; of office applications; of management of files and directories; and Internet browsing.

It is recommended that the student have basic knowledge in the use of software: Autocad, Revit, Archicad, Allplan, Cype, Tekla, Bentley, Navisworks and Presto.

2.Learning goals

2.1.Competences

Upon passing the subject, the student will be more competent to ...

? Capacity for organization and planning. Roles Management (G01)

? Capacity to solve problems. (G02)

? Ability to make decisions (G03)

? Oral and written communication of the native language (G04)

? Analyze and synthesize (G05)

? Manage information (G06)

? Teamwork. Collaboration. (G07)

? Critical reasoning (G08)

? Work in an interdisciplinary team. Use of the BEP (BIM execution Plan) (G09)

? Work in an international context (G10)

? Improvise and adapt to face new situations (G11)

? Develop a leadership aptitude (G12)

? Maintain a positive social attitude towards social and technological innovations (G13)

? Reason, discuss and present their own ideas (G14)

? Communicate through the word and the image (G15)

? Search, analyze and select information (G16)

? Autonomous learning (G17)

? Apply your software knowledge to your work or vocation in a professional manner

? Collect and interpret relevant data (normally within their study area) to make judgments that include a reflection on relevant social, scientific or ethical issues (G20)

? Transmit information, ideas, problems and solutions to a specialized and non-specialized public (G21)

? Develop those learning skills necessary to undertake further studies with a high degree of autonomy (G22)

? Encourage entrepreneurship (G24)

? Ability to apply computer tools in the resolution of the parts involved in a Technical Project, its execution and its life cycle (CEP103)

2.2.Learning goals

The student, to pass this course, must demonstrate that he has acquired sufficient knowledge for the use and application of computer tools that allow the practical resolution of the parts of a Technical Project, its execution and life cycle of the construction carried out.

2.3.Importance of learning goals

In the current technological situation it is necessary that the student knows, uses and understands the Information and Communication Technologies associated with construction from a global perspective, in which it is not exclusively the simple writing of a project, but integrates the aspects related to its subsequent realization, allowing to integrate a more rigorous control during the execution of the works and of the final result for its later exploitation and maintenance of the building / construction during its useful life.

The acquired learning in this subject will help the student in the optimization of the use of the TIC, obtaining greater performance in the use of the computer applications involved, a considerable improvement in the management of information and with it, the improvement of the aspects previously indicated around the Technical Projects.

It will also try to bring the student closer to the philosophy of the software, with the ultimate goal of making more direct, simple and effective the tasks developed from the exercise of the professional activity in relation to the BIM.

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3.Assessment (1st and 2nd call)

3.1.Assessment tasks (description of tasks, marking system and assessment criteria)

Type of tests, evaluation criteria and levels of demand

Evaluation is a basic element in the whole teaching-learning process, since it is the only mechanism that allows at any moment of an educational period, to detect the degree of achievement of the proposed learning results and, if applicable, to apply the precise corrections

The evaluation should be understood as a continuous and individualized process throughout the entire teaching-learning period, prioritizing the abilities and abilities of each student, as well as their performance.

During the course different tests will be carried out:

? For formative evaluation, which will allow the teacher and the student to guide, correct, improve and regulate the learning process, in no case will they be used for qualifying evaluation in themselves, although they will be considered as a whole, for the evaluation of the attitude and active participation of the student.

These tests may be varied, in terms of format and method of realization, being able to carry out surveys, to know the level of knowledge that the student has on the subject; direct observation about the development of individual activities; the collection of the work carried out in the practical sessions for its subsequent revision; etc.

? Qualifying evaluation, which will allow the teacher to assess the knowledge acquired by the student. Within this evaluation model, the systems of continuous evaluation and global evaluation must be highlighted.

Continuous Evaluation Model:

In this evaluation modality, a continuous attendance of the students is required in the face-to-face activities of the subject, where the following criteria and tests will be applied:

o Active participation in class (face-to-face or virtual): The active participation of the student in daily activities will be taken into account, participating in questionnaires,

forums, etc. of the virtual classroom, answering the questions posed by the teacher in the daily course of the class, the realization of the exercises proposed in situ, etc.

o Evaluation tests, which will be "test" type and whose contents will correspond to what was exposed in the classes and / or documented in the notes. The valuation will be between 0 and 10 points and can never be less than 5, in which case it will be considered suspended.

? Test evaluation I (week 3)

? Test evaluation II (week 6)

? Test evaluation III (week 9)

? Test evaluation IV (week 12)

Final Work: Its approach, management and correct development will be valued, as well as the achievement of results. A work will be proposed to be developed individually or in a group within the deadlines established in its statement, whose valuation will be between 0 and 10 points.

The weights in the continuous evaluation system are:

or (10%) Active participation in the classroom (it will only contribute to the final grade in case the subject is previously approved)

? (80%) Evaluation tests (20% each)

? (10%) Final Work

In order to pass the subject by continuous assessment, the student will have to complete all the tests indicated, as well as the final work.

Students who have passed the subject through this dynamic, may also opt for the global evaluation system, first call, to raise the grade but never to download.

Global Evaluation Model:

The student must opt ??for this modality when, due to his / her personal situation, he / she can not adapt to the rhythm of work required in the continuous assessment system, he / she has suspended or would like to raise the grade obtained in continuous assessment. The following criteria and tests will be applied:

? Final / Global Test: Written exam of theoretical and / or theoretical-practical development

? Final Project, Information Management

The weights in the global evaluation system are:

? (50%) Final-Global Test

? (50%) Final Work

The subject will have been passed on the basis of the weighted sum of the scores obtained in the different activities and tests developed, each contributing with a minimum of 50%, that is, all the tests must have been approved separately.

The organization of the teaching will be carried out following the following guidelines:

? Theoretical classes: Theoretical activities taught in a fundamentally expository way by the teacher, in such a way that the theoretical supports of the subject are exposed, highlighting the fundamental, structuring them in topics and / or sections and relating them to each other.

? Practical classes: The teacher solves problems or practical cases for illustrative purposes. This type of teaching complements the theory presented in the lectures with practical aspects.

? Seminars: The total group of theoretical classes or practical classes may or may not be divided into smaller groups, as appropriate. They will be used for the study of computer utilities complementary to those studied in the rest of the subject.

? Laboratory practices: The total group of students will be divided, according to the number of students enrolled, in order to form smaller groups. The students will individually carry out the activities proposed in the practical classes in the presence of the teacher.

? Group tutorials: Programmed learning follow-up activities in which the teacher meets with a group of students to guide their autonomous learning tasks and guardianship of work directed or requiring a very high degree of advice from the teacher.

? Individual tutorials: These are those carried out through personalized attention, individually. They aim to help solve the doubts that students find, especially those who for various reasons can not attend group tutorials or need more personalized attention punctual. These tutorials may be face-to-face or virtual through Moodle.

4.Methodology, learning tasks, syllabus and resources

4.1.Methodological overview

Strong interaction between the teacher/student. This interaction is brought into being through a division of work and responsibilities between the students and the teacher. Nevertheless, it must be taken into account that, to a certain degree, students can set their learning pace based on their own needs and availability, following the guidelines set by the teacher.

The current subject (Information and Communication Technologies related to Construction) is conceived as a stand-alone combination of contents, yet organized into three fundamental and complementary forms, which are: the theoretical concepts of each teaching unit, the solving of problems or resolution of questions and laboratory work, at the same time supported by other activities

The organization of teaching will be carried out using the following steps:

- **Theory Classes**: Theoretical activities carried out mainly through exposition by the teacher, where the theoretical supports of the subject are displayed, highlighting the fundamental, structuring them in topics and or sections, interrelating them.

- **Practical Classes**: The teacher resolves practical problems or cases for demonstrative purposes. This type of teaching complements the theory shown in the lectures with practical aspects.
- **Individual Tutorials**: Those carried out giving individual, personalized attention with a teacher from the department. Said tutorials may be in person or online.

4.2.Learning tasks

The program offered to the student to help him achieve the expected results includes the following activities ...

- Oral explanation by the teacher of the fundamentals of information technology and communications associated with construction
- Oral explanation by the teacher, of the characteristics of the computer tools and the practical utility related to the subject.
- Systematic reviews by the teacher on the development of students' individual work.
- Preparation of laboratory practices, preparation of scripts and corresponding reports.
- Preparation of the final work.
- Non-contact reinforcement activities, through the virtual classroom (Moodle). Various activities will be directed to reinforce the basic contents of the subject.
  Autonomous supervised activities: they will be mainly focused on tutorials with the teacher both in person and online.

The subject consists of 5 ECTS credits, which represents 125 hours of student work in the subject during the semester, approximately 12 hours per week whose orientation time distribution is as follows:

- 2 hours - Master classes
- 2 hours - Software practices
- 8 hours - Other activities

4.3.Syllabus

Theoretical contents

- Introduction to information management. BIM Methodology
- Specialized information sources in the construction sector.
- UBIM guides - Regulations and standards.
- PAS 1192
- BIM Forum 2017
- Building Smart
- esBIM.es
- Advanced information management

Practical contents.

- Information management tools. You learn the installation, configuration and use of computer tools and procedures for the management and editing of Information.
- BIM specific tools. You learn to correctly select the right tool for each process or project phase.

Seminars

- Seminar 1 BIM design tools
- Seminar 2 BIM management tools
- Seminar 3 Programming and parameterization tool

The content of the seminars may change depending on other needs raised during the course.

4.4.Course planning and calendar

Calendar of face-to-face sessions and presentation of works

The annual calendar consists of 12.5 weeks. Four hours per week are taught, which makes a total of 50 teaching hours for each student. All sessions are face-to-face.

The weekly programming of theoretical and practical contents will be published in Moodle at the beginning of the semester.

The dates on which the continuous assessment tests of the subject will be carried out, together with the dates on which their grades will be published, will be published in Moodle at the beginning of the semester.

The dates of the final exams will be published officially at http://www.eupla.es/secretaria/academica/examenes.html

In the global evaluation system, the deadlines for the delivery of the required tests or works will be published in Moodle, being prior to the date of the official call.

4.5.Bibliography and recommended resources

THE CURRENT BIBLIOGRAPHY OF THE COURSE IS CONSULTED THROUGH THE LIBRARY WEB PAGE http://psfunizar7.unizar.es/br13/eBuscar.php?tipo=a

Material resources

- Notes: Web / Repository
- Complementary material Web / Repository

Software: Computer Applications.

- Web Office
- Web Web Browser
- Software manuals
- Autodesk Revit
- Autodesk Navisworks
- Autodesk Civil 3D
- Dynamo
- Cype
- PC hardware in computer rooms.
    - Dynamo
    - Cype Engineers

Hardware: PC in computer rooms.