28613 - Materials II

Información del Plan Docente

Academic Year	2017/18
Faculty / School	175 - Escuela Universitaria Politécnica de La Almunia
Degree	422 - Bachelor's Degree in Building Engineering
ECTS	6.0
Year	2
Semester	First semester
Subject Type	Compulsory
Module	---

1.General information

1.1.Introduction

1.2.Recommendations to take this course

1.3.Context and importance of this course in the degree

1.4.Activities and key dates

2.Learning goals

2.1.Learning goals

2.2.Importance of learning goals

3.Aims of the course and competences

3.1.Aims of the course

3.2.Competences

4.Assessment (1st and 2nd call)

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

5.Methodology, learning tasks, syllabus and resources

5.1.Methodological overview

The learning process designed for this subject is based on the following

The teaching methodology is based on a strong interaction between the teacher/student. This interaction is made a reality 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.

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The current subject MATERIALS II is conceived as a stand-alone combination of contents, yet organized into three fundamental and complementary ways, which are: the theoretical concepts of each teaching unit, the solving of problems or resolution of questions and laboratory work, supported in turn by other activities.

1. Classroom activities:
    1. **Theory Classes** : the theoretical concepts of the subject will be explained.
    2. **Practical Classes** : Students will develop examples and conduct problems or case studies concerning the theoretical concepts studied.
    3. **Laboratory Workshop** : Students will develop tests to reinforce the theoretical concepts studied.

Reinforcement activities: Through a virtual education portal (Moodle) several activities which strengthen and expand the basic contents of the subject will be addressed. These activities will be personalized and controlled its realization.

Teaching organization:

* **Theory Classes** : Master theoretical and / or practical lessons given mostly by the teacher.

* **Practical Classes** / seminars / workshops: Theoretical or practical activities carried out in the classroom and requiring high student participation.

* Lab / Working site / computer room: Practical activities in laboratories, in the working site, in the computer rooms.
* Group tutorials: Learning tracking scheduled activities in which the teacher meets with a group of students to guide their autonomous learning work that requiring a very high degree of counselling from the teacher.

* **Individual Tutorials** : Face-to-face or online.

5.2.Learning tasks

The programme offered to the student to help them achieve their target results is made up of the following activities:

It involves the active participation of the student, in a way that the results achieved in the learning process are developed. The activities are the following:

— **Face-to-face generic activities** :

● **Theory Classes** : The theoretical concepts of the subject are explained and illustrative examples are developed as support to the theory when necessary.

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● **Practical Classes** : Problems and practical cases are carried out, complementary to the theoretical concepts studied.

● **Laboratory Workshop** : This work is tutored by a teacher, in groups of no more than 20 students.

— **Generic non-class activities** :

● Study and understanding of the theory taught in the lectures.

● Understanding and assimilation of the problems and practical cases solved in the practical classes.

● Preparation of seminars, solutions to proposed problems, etc.

● Preparation of laboratory workshops, preparation of summaries and reports.

● Preparation of the written tests for continuous assessment and final exams.

- Assisted Autonomous activities : Although they will have a strong face-to-face character, they will be focused mainly on seminars and tutorials under the supervision of the teacher.

- Reinforcement activities : With a strong non-class character, through a virtual learning portal (Moodle) several activities that reinforce the basic contents of the subject will be conducted. These activities might be customized or not, but always under control.

The subject has 6 ECTS, which represents 150 hours of student work in the subject during the semester, in other words, 10 hours per week for 15 teaching weeks.

A summary of a weekly timetable guide can be seen in the following table. These figures are obtained from the subject file in the Accreditation Report of the degree, taking into account that the level of experimentation considered for the subject is moderate.

Activity	Weekly school hours

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Lectures	3
Laboratory Workshop	1
Other Activities	6

Nevertheless, the previous table can be shown in greater detail, taking into account the following overall distribution:

— 50 hours of lectures, with 70% theoretical demonstration and 30% solving type problems.

— 6 hours of laboratory workshop, in 2 hours per sessions.

— 2 hours of written assessment tests, 2 hours per test.

— 2 hours of PPT presentations, 1 hour per PPT

— 90 hours of personal study, over the 15 weeks of the 2 nd semester.

There is a tutorial calendar timetable set by the teacher that can be requested by the students who want a tutorial.

5.3.Syllabus

Contents of the subjects essential to achieve learning outcomes

The guidelines followed to develop the contents were as follows:

- The contents proposed in the verification report were respected.

- A syllabus whose chapters are generally consistent with the titles of the specified program was developed. When this was not done it was because, due to its size and / or correlation, it was included in another.

- A large bibliography of current technical, classical and issues was selected

- The best suited units from the bibliography were selected and turned into a single text, with our own design and layout and innovative teaching resources. The teacher didn't mean to be creative in its preparation, but he based his work on renowned prestige texts. Only the goals, organization and presentation of the material and drafting of some sections of the issues are original. The full text is available in the reprographic service of the school, as well as on digital media published in Moodle.

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- The main features of the text layout can be summarized as having nine units, which coincide with the content, completely developed, avoiding summaries.

- The specific goals achieved in the making of the text itself can be summarized as follows:

- Highlight the relationship between conceptual analysis and problem solving, using the number of examples needed to show approaches for their solution, stressing that solving is a process in which the conceptual knowledge is applied, and it is not merely a mechanized solving model. Therefore, in the text and the solved examples, the mind processes for problem solving based on the concepts are stressed, instead of highlighting the mechanical procedures.
- Provide students with practice in the use of analytical techniques presented in the text.
- Show students that the analytical techniques are tools, not goals, allowing in different situations to practice in choosing the analytical method they will use to obtain the solution.
- Encourage student interest in engineering activities, including real application problems.
- Develop problems and exercises using realistic values representing feasible situations.
- Encourage students to evaluate the solution, either with a different method of resolution or by testing to see if it makes sense in terms of the known behavior of the circuit, machine or system.
- Show students how the results of a solution are used to find additional information about the behavior of a circuit, machine or system.
- The resolution of most problems will require the type of analysis to be performed by an engineer to solve real-world problems. Developed examples, where the particular way of thinking of engineering is emphasized, can also be used as a basis for solving real problems.

The course syllabus is divided into two complementary content components:

- Theoretical.

- Practical.

Theoretical Contents

The choice of the content of the different teaching units was made seeking the express clarification of the final goal so that with the addition of incidental knowledge, the student can achieve a structured and understandable knowledge to reach the competences of a Civil Engineering.

The theoretical contents are classified according to five teaching units, attached table, indivisible treatment blocks, taken into account the configuration of the subject under programming. These topics collect the contents needed for the acquisition of predetermined learning outcomes.

Syllabus

Unit 1 **Plasters**
1 BINDING AGENTS - BINDERS
2 GENERALITIES AND HISTORY OF PLASTER
3 NATURE OF PLASTER
4 PRODUCTION OF PLASTER
5 SETTING OT PLASTER
6 PROPERTIES OF PLASTER
7 TYPES OF PLASTER FOR CONSTRUCTION

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8 TESTING AND SAMPLING
9 DESIGNATION OF PLASTER FOR CONSTRUCTION AND BINDERS BASED ON PLASTER FOR CONSTRUCTION
10 OTHER ORIGINS OF PLASTER
11 APPLICATIONS OF PLASTER
12 PLASTER COLOURING

Unit 2 **Limes**
1 HISTORY
2 NATURE OF LIMES
3 NOMENCLATURE
4 LIME MANUFACTURING
5 LIME SLAKING
6 LIME LIFE CYCLE

7 CLASSIFICATION OF LIME
8 PROPERTIES OF LIME
9 LIME TESTING
10 LIME USES

Unit 3 **Cements**
1 HISTORY
2 NATURE OF CEMENT
3 NOMENCLATURE
4 CEMENT MANUFACTURING
5 CEMENT CONSTITUENTS
6 CEMENT HYDRATION
7 CLASSIFICATION OF CEMENT
8 PROPERTIES OF CEMENT
9 CEMENT TESTING
10 USES OF CEMENT

Unit 4 **Metals**
1. INTRODUCTION
2 CRYSTAL STRUCTURE
3 FORMATION AND NATURE OF ALLOYS
4 MECHANICAL PROPERTIES
5 CONCEPTS
6 PHYSICAL PROPERTIES
7 CHEMICAL PROPERTIES
8 METALS IN CONSTRUCTION
9 IRON AND ITS ALLOYS
10 IRON CARBON DIAGRAM
11 UNIONS (BOLTED AND WELDED)
12 NON-FERROUS METALS

P ractical Contents
The theoretical knowledge of the previous section, has associated practice tasks. The Laboratory practice tasks in Materials I are an important complement to the comprehensive training of the student in the Civil Engineering degree.

It is impossible to even try to give a minimal description of the different types of gadgets and commercial devices used for measuring different magnitudes. This is not the purpose of the subject. It is to cover the learning outcomes through a

comprehensive program of laboratory practice activities, including aspects related to the following issues:

* Generically, a clear idea of the importance of the field of material testing as well as the implementation time and their application. * Students must, at least, acquire knowledge about the most common techniques for measuring magnitudes such as: mechanical resistance, chemical resistance, environmental resistance, etc. of the materials used in construction.

5.4.Course planning and calendar

Assessment schedule

It will be fixed depending on the development of the lectures.
The written assessment tests will have a connection with the following topics:
- Test 1: Topic: Metals and Cements

- Test 2: Topic: Limes and plasters.

In the continuous assessment mode a weekly written test of each of the following issues (ceramics, timber, glass and polymers) will be done.

The issues about which the projects will be developed will be proposed in the third week, and they should be handed in and presented before the last two teaching weeks. The exact dates will be specified along the year.

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

Next, the practice tasks to be developed in the laboratory that will be carried out by the students in sessions of two hours are shown below.

Practice 1	Identification of Corrugated bars
Practice 2	Identification of beams
Practice 3	Beginning and end of cement setting
Practice 4	Plaster Flexotraction
Practice 5	Beginning and end of plaster setting
Practice 6	Identification of microspheres in paintings

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Practice 7	Insulation and Waterproofing
Practice 8	Mechanical properties of metals (tensile, hardness, resilience, etc.)
Practice 9	Microstructure of metals (steel)

5.5.Bibliography and recommended resources

Resources
Materials

Materials	**Soporte**
Topic theory notes Topic problems	Paper/repository
Topic theory notes Topic presentations Topic problems Related links	Digital/Moodle E-Mail
Material de ensayos	Pc's laboratorio
Guión de prácticas	Paper/repository
Maquinas multiensayos Tamices Moldes de probetas Bandejas Etc.	

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