Universitat de Lleida

DEGREE CURRICULUM

MATERIALS 1

Coordination: CASTRO CHICOT, JOSE RAMON

Academic year 2023-24

MATERIALS 1 2023-24

Subject's general information

<table>
<tr><td>Subject name</td><td>MATERIALS 1</td></tr>
<tr><td>Code</td><td>101405</td></tr>
<tr><td>Semester</td><td>2nd Q(SEMESTER) CONTINUED EVALUATION</td></tr>
<tr><td>Typology</td><td>
<table>
<tr><th>Degree</th><th>Course</th><th>Character</th><th>Modality</th></tr>
<tr><td>Bachelor's Degree in Architectural Technology and Building Construction</td><td>1</td><td>COMMON/CORE</td><td>Attendance-based</td></tr>
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<tr><td>Course number of credits (ECTS)</td><td>7.5</td></tr>
<tr><td>Type of activity, credits, and groups</td><td>
<table>
<tr><th>Activity type</th><td>PRAULA</td><td>TEORIA</td></tr>
<tr><th>Number of credits</th><td>3</td><td>4.5</td></tr>
<tr><th>Number of groups</th><td>1</td><td>1</td></tr>
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<tr><td>Coordination</td><td>CASTRO CHICOT, JOSE RAMON</td></tr>
<tr><td>Department</td><td>AGRICULTURAL AND FOREST SCIENCES AND ENGINEERING</td></tr>
<tr><td>Teaching load distribution between lectures and independent student work</td><td>75 hours of lectures plus 105 hours of autonomous work</td></tr>
<tr><td>Important information on data processing</td><td>Consult this link for more information.</td></tr>
<tr><td>Language</td><td>Catalan / Spanish</td></tr>
</table>

Teaching staff	E-mail addresses	Credits taught by teacher	Office and hour of attention
CASTRO CHICOT, JOSE RAMON	joseramon.castro@udl.cat	3	Prior appointment to the indicated mail. CREA Building. Campus Cappont. Department 1.09. 1st floor.
FERNANDEZ SERRANO, ALVARO	alvaro.fernandezserrano@udl.cat	3	Prior appointment to the indicated mail.
VILLASANTE PLAGARO, ANTONIO M.	antonio.villasante@udl.cat	1,5	Prior appointment to the indicated mail.

Subject's extra information

Suggestions

Attendance and the resolution of the proposed problems is highly recommended. Case studies should be solved as soon as possible after its request. It is not advisable to leave work till last minute. See bibliography is a good support for the subject.

The course as part of the academic plan

Introduce new methods of structural design, including the matrix method and its adaptation to the calculation of second order, as required in the CTE. Give the students the basic knowledge and necessary information on construction technology so they have enough resources to schedule, manage and execute an industrial construction project with the help of other professionals. Provide the future engineer, criteria for choosing among the possible functional solutions, architectural and construtive, and also provide the technical criteria necessary to plan and manage the construction of a small industrial plant.

It is **COMPULSORY** that the students bring the following elements of individual protection (EPI) to the practices at the laboratory.

- Blue laboratory gown from UdL (unisex)
- Protection glasses
- Mechanical protection gloves

They can be purchased through the shop Údels of the UdL:

C/ Jaume II, 67 baixos
Centre the Cultures i Cooperació Transfronterera .http://www.publicacions.udl.cat/

The use of other elements of protection (for example caps, masks, gloves of chemical or electrical risk, etc.) will depend on the type of practice to be done. In that case, the teacher will inform of the necessity of specific EPI.

Not bringing the EPI's described or not fulfilling the norms of general security that are detailed below imply that the student can not access to the laboratories or have to go out of them. The no realisation of the practices for this reason imply the **consequences in the evaluation** of the subject that are described in this course guide.

GENERAL NORMS OF SECURITY IN LABORATORY PRACTICES

- Keep the place of realisation of the practices clean and tidy. The table of work has to be free from backpacks, folders, coats...
- No short trousers or short skirts are allowed in the laboratory.

- Closed and covered footwear is compulsory in the laboratory.
- Long hair needs to be tied.
- Keep the laboratoy gown laced in order to be protected from spills of chemicals.
- Bangles, pendants or wide sleeves are not allowed as they can be trapped.
- Avoid the use of contact lenses, since the effect of the chemical products is much bigger if they enter between the contact lense and the cornea. Protection over-glasses can be purchased.
- No food or drink is allowed in the laboratory.
- It is forbidden to smoke in the laboratories.
- Wash your hands whenever you have contact with a chemical product and before going out of the laboratory.
- Follow the instructions of the teacher and of the laboratory technicians and ask for any doubt on security.

For further information, you can check the following document of the *Servei de Prevenció de Riscos Laborals de la UdL*: http://www.sprl.udl.cat/alumnes/index.html

Learning objectives

- Introduce the students to the construction materials used in the building.

- Provide information regarding the transformation processes from raw materials to the final finished material.

- Understand the purpose, scope and analysis systems of materials.

- Interpret the results of laboratory tests of construction materials.

- Evaluate the suitability of materials for various construction solutions.

- Know the most important properties of each construction material and the standard that protects it.

Competences

Strategic competences of UdL

UdL3 Mastering ICT's.

Cross-disciplinary competences

EPS5. Capacity for abstraction and critical, logical and mathematical reasoning.

Specific competences

GEE4. Knowledge of the chemical characteristics of the materials used in construction, their manufacturing processes, the methodology of tests to determine their characteristics, their geological origin, their environmental impact, recycling and waste management.

Competences of the subject

EPS5. Capacity of abstraction and of critical, logical and mathematical thinking.

GEE4. Knowledge of the chemical characteristics of the materials used in construction, their manufacturing processes, the methodology of tests to determine their characteristics, their geological origin, their environmental impact, recycling and waste management.

Subject contents

UNITS

1. Profession evolution.

2. The materials and the construction.
3. Properties and characteristics of construction materials.
4. Legal framework
5. The rocks
6. The soil as the bearing material for foundations. Geotechnics
7. The wood
8. The aggregates
9. The conglomerates
10. The gypsum
11. The lime
12. The cement
13. Bituminous materials

Methodology

Lectures. Explanations and presentations in Power Point, made in the classroom.

Training videos. Manufacturing and processing of buiding materials.

Visits to companies in the construction materials manufacturing sector. The visits are guided by company staff who explain to the students the different processes that the materials go through until they are a finished product and ready to be placed on site.

- The visits wil be held just if the health restrictions allow them.

Work in group. After the visit to the factory, students will have to work in groups of 2 or 3 people.

Laboratory activities. Students will have to carry out laboratory practices in groups of 2 or 3 people.

Development plan

Week	Methodology	Syllabus	Classroom hours	Hours of autonomous work
1	Lectures	Evolving profession	2	0
1	Lectures	Regulatory framework. LOE	2	3
1	Lectures	Introduction to building materials	1	4
2	Lectures	Properties of building materials	4	3
2	Lectures	Rocks. The Earth as a factory	1	4
3	Lectures	Eruptive, metamorphic and sedimentary rocks	3	7
3	Materials Laboratory. CREA	Volumes of rocks using: hydrostatic balance, pycnometer and volumeometer. Real and apparent density	2	0
4	Lectures	The soil according to DB-SE-C. The geotechnical study. Suitable soils and unfavorable soils.	5	7
5	Lectures	Standard penetration tests (SPT) and application in the calculation of shallow foundations	2	2

5	Lectures	Geotechnics applied to footings. Confinement force. Active and passive push.	3	5
6	Lectures	Allowable stress and thrusts. Angle of internal friction.Cohesion.	2	3
6	Lectures	Trinomic formula. Effect of footing size.Thrusts on the walls.	1	4
6	Lectures	Macroscopic structure of timber. Phisycal properties.	2	3
7	Lectures	Mechanical properties of timber. Timber classification.	5	7.5
8	Lectures	Timber products for building. Timber conservation.	5	7.5
9	**Exam 1**		2	
10	Lectures	Earthworks. Aggregates general information. Manufacturing. Classification.	5	7.5
11	Lectures	Aggregates for mortars. Aggregates for roads.	5	7.5
12	Lectures	Binders. Raw materials. Manufacturing. Binders in the building process.	3	4.5
13	Lectures	Gypsum plaster	5	7.5
14	Lectures	Lime	5	7.5
15	Lectures	Cement	5	7.5
17	**Exam 2**		2	
19	**Final exam**		2	

Evaluation

CONTINUOUS ASSESSMENT

- Exam 1
  - Block 1: units 1 to 6 (prof. Castro)
  - Block 2: unit 7 (prof. Villasante)
- Exam 2
  - Block 3: units 8 to 13 (prof. Fernández)

Pass criteria:

- mark of block 1 ≥ 4.0
- mark of block 2 ≥ 4.0
- mark of block 3 ≥ 4.0
- (mark of block 1)·0,40 + (mark of block)·0,20 + (mark of block 3)·0,40 ≥ 5,0.

If the subject is not passed, make-up exams must be taken for those blocks with a mark lower than 4.

Those students who pass de final exam will get a final mark of 5.0 in the subject.

The evaluation will be done just with the exams included here.

Marks of single blocks won't be kept for the next year.

ALTERNATIVE ASSESSMENT

- The alternative assessment will consist of a single exam that will take place on the date set for the last exam of the continuous assessment. This exam will include the entire syllabus of the subject and will have a weighting of 100% in the total grade of the subject: (0.4*Block1 + 0.2*Block2 + 0.4*Block3)
- Students will have the right to retake the subject under the same conditions as those taking the continuous assessment. The maximum mark for the recovery will be 5.0

Bibliography

Recommended bibliography:

- CTE

- Código Estructural

- Normas UNE EN

- NLT

- Manual del yeso. Autors varis. Editorial Dossat 2000

- Materiales de construcción. Autor, Antonio Camuñas. Editorial, Guadiana de publicaciones

- Materiales de construcción. Autor, F. Orús. Editorial Dossat SA

- Como debo construir. Autor, Pedro Benavent. Editorial; Bosch, casa editorial

- Elementos de resistencia de materiales. Autor, S. Tomoshenko –D. H. Young. Editorial, Montaner y Simón SA editores

- Tecnologia de la construcción. Autor, G. Baud. Editorial, Blume

- Estudio de materiales. Autor, F. Arredondo. Editorial, Instituto Eduardo Torroja

- Tratamiento y conservación de la piedra, el ladrillo y los morteros en monumentos y construcciones. Autor, José María García de Miguel. Consejo General de la Arquitectura Técnica de España. 2009

- Geotecnia y cimientos I y II. Autor, J. A. Jimenez Salas y J. L. De Justo Alpañes.Editorial, Rueda

- Excavaciones urbanas y estructuras de contención. Autor, Juan B. Pérez Valcárcel.Editorial, Colegio de Arquitectos de Galicia

- Tecnologia y terapéutica del hormigón armado. Autor, Ismael Sirvent Casanova.Editorial, Instituto Técnico de Alicante

- Hormigón armado. Autor, Jimenez Montoya, A. Garcia Meseguer, F. Moran Carre.Editorial, Gustavo Gili Grau