DEGREE CURRICULUM
STRUCTURES 1

Coordination: BRADINERAS ESCO, FRANCISCO JAVIER

Academic year 2023-24

Subject's general information

Subject name	STRUCTURES 1
Code	101416
Semester	1st Q(SEMESTER) CONTINUED EVALUATION

Typology	Degree	Course	Character	Modality
	Bachelor's Degree in Architectural Technology and Building Construction	2	COMPULSORY	Attendance-based

Course number of credits (ECTS)	6

Type of activity, credits, and groups	Activity type	PRAULA	TEORIA
	Number of credits	3	3
	Number of groups	1	1

Coordination	BRADINERAS ESCO, FRANCISCO JAVIER
Department	AGRICULTURAL AND FOREST SCIENCES AND ENGINEERING
Teaching load distribution between lectures and independent student work	60 Master class 90 Homework
Important information on data processing	Consult this link for more information.
Language	Spanish
Distribution of credits	20 hours of theory 40 hours exercises

STRUCTURES 1 2023-24

Teaching staff	E-mail addresses	Credits taught by teacher	Office and hour of attention
BRADINERAS ESCO, FRANCISCO JAVIER	javier.bradineras@udl.cat	6	

Subject's extra information

Theoretical and practical course. Work using the recommended bibliography is very important.

The subject is studied in the 1st semester of the 2nd year of the degree.

We recommend attendance and resolution of proposed problems.

Case studies should be solved as soon as possible, it is not advisable to leave them to the last minute.

Students must achieve a level of knowledge that allows the calculation of structural and mechanical parts to achieve capacity enough to select the most appropriate design criteria for optimum performance of each piece.

It aims to establish a foundation of calculation knowledge that will be needed in other areas.

Learning objectives

Calculation of the efforts in a section of a linear structural element. Axil. Shear and bending.

Calculation of statically determinate beams. Reactions. Determination of stress in a linear structural element.

Calculation from Stress & Strain: Axial tension, compressive forces, shear and bending

Calculation of deflections of beams

Calculation of statically indeterminate beams

Competences

University of Lleida strategic competences

- **UdL3**.- Master Information and Communication Technologies.

Degree-specific competences

- **GEE21**.- Ability to apply the technical rules to the building process and generate documents of technical specifications of the construction procedures and methods of the buildings.
- **GEE22**.- Aptitude to apply the specific rules about installations to the building process.
- **GEE23**.- Aptitude for the predimentioning, design, calculation and checking of structures and for the direction of their material execution.
- **GEE24**.- Ability to constructively develop the installations of a building, control and plan their execution and verify the service and reception trials as well as those regarding maintenance.

Degree-transversal competences

- **EPS7**.- Ability to work in situations where information is lacking or you are under pressure.

- **EPS8**.- Ability to pan and organise the personal work.

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Subject contents

1. - Strength of materials. Introduction and internal forces

2. - The axial force
3. - Static values of areas

4. - Bending theory. Stress analysis. Pure bending

5. - Bending theory. Stress analysis. Composite bending

6. - Bending theory. Stress analysis. Simple bending

7. - Bending theory. Deflection analysis

8. - Indeterminate beams. Continuous beams.

9. - Introduction to buckling/instability.

Methodology

* Lectures: Before beginning with the problems a theoretical introduction to each chapter of the course will take place.

* Problems: The main focus of the course is to learn to solve problems of strength of materials and structural design. After the theoretical introduction will arise and solve different kind of problems. Problems are conducted in small groups.

* Exercises to deliver: Students also have to solve problems individually or in groups. The problems solved and delivered in class will be used in the calculation of the final mark for the subject. These exercises will be conducted in small groups.

* Case Studies: At the end of each chapter, a case studie will be required. Students will submit a final report with all of them. This case is different for each student as data depends on the student identification number. This report will also have an important weight in the mark of the subject.

Development plan

Week	Chapters	Classroom working hours	Freelance working hours
1-2	Chapter 1	8	12
3-5	Chapter 2	12	18
6	Chapter 3	4	6
7-9	Chapter 4	12	18
10-11	Chapter 5	8	12
12-13	Chapter 6-7	8	12
14-15	Chapter 8-9	8	12

STRUCTURES 1 2023-24

Evaluation

Exams: 80% (2 partial 40%)

Case Studies: 10%

Teory and problems test: 10%

Máximum mark in second chance exam: 6

Alternative evaluation: 80% two partial exams + 20% one exercise from each chapter with the tool of the virtual campus.

Bibliography

* Luis Ortiz Berrocal. Resistencia de Materiales. Mc Graw Hill

* Fernando Rodriguez-Avial. Resistencia de Materiales. ETSII Madrid.

* James M. Gere. Timoshenko. Resistencia de Materiales. Paraninfo

* Manuel Vázquez. Resistencia de Materiales. Ed. Noela.

* Manuel Romero, Pedro Museros, María D. Martínez, Ana Poy. Resistencia de Materiales. Ed. Universitat Jaume I

* Miguel Cervera, Elena Blanco. Resistencia de Materiales. CIMNE-UPC