Universitat de Lleida

DEGREE CURRICULUM

STRUCTURES 1

Coordination: IGLESIAS RODRIGUEZ, JOSE M.

Academic year 2018-19

STRUCTURES 1 2018-19

Subject's general information

<table>
<tr><td>Subject name</td><td>STRUCTURES 1</td></tr>
<tr><td>Code</td><td>101416</td></tr>
<tr><td>Semester</td><td>1st 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>2</td><td>COMPULSORY</td><td>Attendance-based</td></tr>
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<tr><td>Course number of credits (ECTS)</td><td>6</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>3</td></tr>
<tr><th>Number of groups</th><td>1</td><td>1</td></tr>
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<tr><td>Coordination</td><td>IGLESIAS RODRIGUEZ, JOSE M.</td></tr>
<tr><td>Department</td><td>AGRICULTURAL AND FOREST ENGINEERING</td></tr>
<tr><td>Teaching load distribution between lectures and independent student work</td><td>60 Master class
90 Homework</td></tr>
<tr><td>Important information on data processing</td><td>Consult this link for more information.</td></tr>
<tr><td>Language</td><td>Spanish</td></tr>
<tr><td>Distribution of credits</td><td>20 hours of theory
40 hours exercises</td></tr>
<tr><td>Office and hour of attention</td><td>1.03 building CREA
Schedule previously agreed by email</td></tr>
</table>

STRUCTURES 1 2018-19

Teaching staff	E-mail addresses	Credits taught by teacher	Office and hour of attention
IGLESIAS RODRIGUEZ, JOSE M.	jmiglesias@eagrof.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.

This is included to the "Specific training module", specifically to the "Structures and facilities of the building" matter

Learning objectives

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

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

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

Calculate of deflections of beams

Calculate of statically indeterminate beams

Calculate plastically structures

Competences

University of Lleida strategic competences

- **UdL3**.- Master Information and Communication Technologies.
- Capacity of analysis and synthesis.
- To have the skills required to undertake new studies or improve the training with self-direction.
- Capacity of abstraction and of critical, logical and mathematical thinking.

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.

Subject contents

T1.- Mechanics of Materials. Introduction

T2.- Equilibrium and support reactions. Statically determinate beams

T3.- Internal forces. Axil force, shear and bending moment. Shear and bending moment diagrams

T4.- Stress & Strain: Axial tension, compressive forces. Shear

T5.- Axial loading. Normal Stress.

T6.- Pure bending. Unsymmetrical Bending

T7.- General case of eccentric axial loading

T8.- Normal and shearing stresses in transverse sections of beams

T9.- Deflections of beams

T10.- Statically indeterminate beams

T11.- Influence lines

T12.- Plastic Analysis

Methodology

Lectures. Explanations and PowerPoint presentations made in class.

Debate directed. About the most important points developed in the theoretical part of the course.

Problems. The most significant and relevant exercises of the subject are solved in class.

It is a theoretical and practical subject. The homework using the recommended bibliography is very important.

The course develops theoretical concepts of each theme and then exercises that complement and facilitate the understanding of matter are done.

Throughout the explanations of the work that is being done, in each session, student must make questions required for complete understanding of the theoretical and practical developed content.

Professor will deliver, at the beginning of each theme, a summary. In any case this material replaces the books recommended for the study of the subject. The student needs a much more comprehensive understanding which can develop in class during an academic course.

This subject must be done when the student have the Physics basic required concepts.

When the student have the necessary knowledge, partial evaluations are done in class and are collected and scored. This note is added at the end of the course. This allows the student self-assessment, and the constant personal work is awarded.

During the sessions in the classroom, teacher raises questions to which every student can answer. The result of this activity is a clear indicator of the level of study and understanding of the matter. It is a valuation of the subject that is very useful, both for the teacher and for the student.

All the issues are interlinked together. This makes impossible that the study of the subject can be done at the end, not serving, in this case, all the class attendance during the course.

Development plan

Dates	Description:	Classroom activity	HTP (2) (hours)	Personal activity	HTNP (3) (hours)
	T1.- Mechanics of materials. Introduction	Theory	1	Theory	1.5
	T2.- Equilibrium and support reactions. Statically determinate beams	Theory (1) Problems (3)	4	Theory and problems	6
	T3.-Internal forces. Axil force, shear and bending moment. Shear and Bending Moment Diagrams	Theory (1) Problems (6)	7	Theory and problems	10,5
	T1-T3 Classroom assessment	Theory and problems	1	Theory and problems	1,5
	T4.- Stress & Strain: Axial tension, compressive forces. Shear	Theory (2) Problems (3)	5	Theory and problems	7.5
	T5.-Axial loading. Normal Stress.	Theory (2) Problems (3)	5	Theory and problems	7,5
	T4-T5 Classroom assessment	Theory and problems			
First partial exam	Theory T1-T5	Theory	0.5	Theory	
First partial exam	Problems T1-T5	Problems	1.5	Problems	
	T6.- Pure bending. Unsymmetrical Bending	Theory (3) Problems (4)	7	Theory and problems	10.5
	T7.-General case of eccentric axial loading	Theory (1) Problems (4)	5	Theory and problems	7.5
	T8.-Normal and shearing stresses in transverse sections of beams	Theory (1) Problems (2)	3	Theory and problems	4.5
	T6-T8 Classroom assessment	Theory and problems	1		
	T9.-Deflections of beams	Theory (1) Problems (5)	6	Theory and problems	9
	T10.- Statically indeterminate beams	Theory (2) Problems (4)	6	Theory and problems	9
	T11.-Influence lines	Theory (2) Problems (4)	6	Theory and problems	9
	T12.- Plastic Analysis	Theory (3) Problems(2)	5	Theory and problems	7.5
	T9-T12 Classroom assessment	Theory and problems	1	Theory and problems	1,5

Second partial exam	Theory T6-T12	Theory	0.5	Theory	
Second partial exam	Problems T6-T12	Problems	1.5	Problems	
Recovery	Recovery T1-T12	Theory and problems	2	Theory and problems	

Evaluation

Objectives	Evaluation activities	%	Dates	O/V (1)	I/G (2)	Observations
T1-T3 T4-T5	Theory and Problems	10	Classroom assessment	O	I	Classroom. Without books
T1-T5	Theory T1-T5	15	First partial exam	O	I	
T1-T5	Problems T1-T5	25	First partial exam	O	I	Without books
T6-T8 T9-T12	Theory and Problems	10	Classroom assessment	O	I	Classroom. Without books
T6-T12	Theory T6-T12	15	Second partial exam	O	I	
T6-T12	Problems T6-T12	25	Second partial exam	O	I	Without books
Recovery	Theory and Problems T1-T12	30 50	Recovery			Without books
Recovery	The notes of the continuous evaluation during the course are not counted. Maximum recovery notes 5. The recovery test score for all students appearing will be the final					

(1) Mandatory / Voluntary

(2) Individual / Group

Bibliography

Recommended bibliography

Timoshenko Resistencia de Materiales

J. M. Gere

Editorial Thomson

Mecánica de Materiales

R.C. Hibbeler

Editorial Pearson

Applied Strength of Materials SI 6ed

R. Mott

CRC Press

Mecánica de Materiales

F.P.Beer, E. Rusell JohnstonJr, J.T. Dewolf

Editorial Mc Graw Hill

Estática de Estructuras. Problemas Resueltos

M. Chiumenti; M.Cervera

CINME UPC

Analisis Estructural

A.Kassimali

Editorial Thomson

Resistencia de Materiales

M.Cervera, E. Blanco

EdicionesUPC