Universitat de Lleida

DEGREE CURRICULUM

STRUCTURES 1

Academic year 2015-16

Subject's general information

Subject name	Structures 1
Code	101416
Semester	First semester
Typology	compulsory subject
ECTS credits	6
Groups	One large and two medium-sized
Theoretical credits	2
Practical credits	4
Office and hour of attention	1.03 building CREA Schedule previously agreed by email
Department	Enginyeria Agroforestal
Teaching load distribution between lectures and independent student work	60 Master class 90 Homework
Modality	Presencial
Important information on data processing	Consult this link for more information.
Language	Spanish
Degree	Degree in Architectural Technology
Distribution of credits	20 hours of theory 40 hours exercises
Office and hour of attention	1.03 building CREA Schedule previously agreed by email
E-mail addresses	jmiglesias@eagrof.udl.cat

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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

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

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

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

Deflections of beams

Statically indeterminate beams

Plastic Analysis of structures

Competences

University of Lleida strategic competences

- 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

- Ability to apply the technical rules to the building process and generate documents of tecnhical specifications of the construction procedures and methods of the buildings.
- Aptitude for the predimentioning, design, calculation and checking of structures and for the direction of their material execution.
- 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 maintainance.
- Aptitude to apply the specific rules about installations to the building process.

Degree-transversal competences

- Ability to pan and organise the personal work.
- Ability to work in situations where information is lacking or you are under pressure.

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. Unsymmetric 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

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, the Professor proposes some exercises to do at home or in classroom. Randomly, some are collected and scored (in total 0.50). 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
	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
First partial exam	Theory T1-T5	Theory	0.5	Theory	
First partial exam	Problems T1-T5	Problems	1.5	Problems	
	T6.- Pure bending. Unsymmetric 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
	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
Second partial exam	Theory T6-T12	Theory	0.5	Teoría	
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-T5	Theory T1-T5	15	first partial exam	O	I	
T1-T5	Problems T1-T5	35	first partial exam	O	I	Without books

Objectives	Evaluation activities	%	Dates	O/V (1)	I/G (2)	Observations
T6-T12	Theory T6-T12	15	2º Parcial	O	I	
T6-T12	Problems T6-T12	35	second partial exam	O	I	Without books
Recovery	Theory and Problems T1-T12	100	Recovery			Without books
Recovery	For students who have been to all the midterms. Note maximum 5. The note of the examination of recovery, for all the students who submitted, shall be final					

Bibliography

Recommended bibliography

Resistencia de Materiales

M.Cervera, E. Blanco

EdicionesUPC

Timoshenko Resistencia de Materiales

J. M. Gere

Editorial Thomson

Mecánica de Materiales

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

Editorial Mc Graw Hill

Analisis Estructural

A.Kassimali

Editorial Thomson

Software Barras

J. MªIglesias, J. Bradineras

Cuadernos UdL