DEGREE CURRICULUM

ELASTICITY AND STRENGTH OF MATERIALS II

Academic year 2014-15

ELASTICITY AND STRENGTH OF MATERIALS II 2014-15

Subject's general information

Subject name	Elasticity and Strength of Materials II
Code	102306
Semester	1r Q Avaluació Continuada
Typology	Obligatòria
ECTS credits	6
Theoretical credits	2
Practical credits	4
Department	Enginyeria Agroforestal
Modality	Presencial
Important information on data processing	Consult this link for more information.
Language	Castellà
Degree	Degree in Engineering Mechanics
E-mail addresses	bradi@eagrof.udl.cat

ELASTICITY AND STRENGTH OF MATERIALS II 2014-15

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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

Students must achieve a level of knowledge that allows the calculation of structural parts and improve their capacity to select the most appropriate design criteria for optimum performance in each piece. Pupils should be able to learn a principles of calculation that will be needed in other areas like structures, mechanichs, etc..

Learning objectives

Students must achieve a level of knowledge that allows the calculation of structural parts and mechanical level to acquire enough capacity to select the most appropriate design criteria for optimum performance of each piece. It aims to establish a foundation of calculation that will be needed in other areas such as in the case of structural design, mechanical, etc.

See section skills.

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Competences

Degree-specific competences

- Knowledge and ability to apply the principles of elasticity and resistance of materials to the behaviour of real solids.

  Goals

  - Students must be able to address real problems and propose simplifications to them, within the field of strength of materials

- Knowledge and ability for calculus, structural design and industrial constructions.

  Goals

  - Students must be able to calculate a structure and decide what kind of links are the best to the design system selected

Degree-transversal competences

- Ability to gather and interpret relevant data in their field of study, and to emit judgements that include a reflection on relevant themes of a social, scientific or ethical nature

  Goals

  - Students must be able to interpret data of problems and results

- Ability to resolve problems and elaborate and defend arguments inside their field of study

  Goals

  - The student must learn to propose and decide the order to follow for solving problems and real cases

- Ability to analyse and synthesize.

  Goals

  - Students must be able to organize the results of the calculations and choose the relevant ones

Subject contents

1. - STATIC VALUES OF AREAS

2. - THE AXIAL FORCE

- STRESS AND STRAIN

- SOLID OF SAME RESISTANCE

- INTERNAL ENERGY

3. - BENDING THEORY. STRESS ANALYSIS

- PURE BENDING

- COMPOSITE BENDING

- SIMPLE BENDING

4. - BENDING THEORY. DEFLECTION ANALYSIS

- SHEAR DEFLECTIONS.

- ANGULAR DEFLECTION

- MOHR THEOREMS. CALCULATION OF SPIN AND DEFLECTION.

- ELASTIC EQUATION FOR DEFLECTIONS

5. - INDETERMINATE BEAMS. CONTINUOUS BEAMS.

6. - TORQUE

- PROFILES OF CIRCULAR SECTION

- OTHER PROFILES

7. - BUCKLING

- DIFFERENTIAL EQUATIONS OF BUCKLING.

- CRITICAL LOAD

Methodology

First partial:

1. - STATIC VALUES OF AREAS

2. - THE AXIAL FORCE

3. - BENDING THEORY. STRESS ANALYSIS4. - BENDING THEORY. DEFLECTION ANALYSIS5. - INDETERMINATE BEAMS. CONTINUOUS BEAMS.

Second partial:

4. - BENDING THEORY. DEFLECTION ANALYSIS

5. - INDETERMINATE BEAMS. CONTINUOUS BEAMS.

6. - TORQUE

7. - BUCKLING

Development plan

Check regulations subject to the virtual campus.

Evaluation

Exams: 80% (2 partial 40%)

Case Studies: 20% (Report and class exercises)

Bibliography

· ORTIZ BERROCAL. Resistencia de Materiales. Mc Graw Hill.

· ORTIZ BERROCAL. Elasticidad. McGraw Hill.

· RODRIGUEZ-AVIAL. Resistencia de Materiales. ETSII Madrid.

· TIMOSHENKO. Resistencia de Materiales. Thomson

· M.VAZQUEZ. Resistencia de Materiales. Ed. Noela.

· M.ROMERO,P.MUSEROS,M.MARTINEZ Resistencia de Materiales. Ed. Universitat Jaume 1.

· CALCULO DE ESTRUCTURAS. RAMÓN ARGÜELLES ÁLVAREZ. E.T.S.I.M. MADRID.

· ESTRUCTURAS ARQUITECTÓNICAS E INDUSTRIALES, SU CÁLCULO. ENRIQUE NIETO. ED. TEBAR.

· TEORÍA Y CÁLCULO SOBRE ESTRUCTURAS RESISTENTES DE PRISMAS RECTOS. SANTIAGO RICO FERNANDO. BELLISCO