Universidad Zaragoza

Year : 2020/21

30155 - Structures Calculus

Syllabus Information

Academic Year: 2020/21
Subject: 30155 - Structures Calculus
Faculty / School: 179 - Centro Universitario de la Defensa - Zaragoza
Degree: 457 - Bachelor's Degree in Industrial Organisational Engineering
563 - Bachelor's Degree in Industrial Organisational Engineering
ECTS: 6.0
Year: 4
Semester: First semester
Subject Type: Optional
Module: ---

1.General information

1.1.Aims of the course

The subject and its expected results respond to the following approaches and objectives:

After completing the subject Structures calculation the student must be able to establish the sizing situations for a structure to be executed, determine the actions that will request it in each situation and calculate the effects that these actions will produce. You must know how to obtain, in accordance with the Technical Building Code, the effect to be borne in the most unfavorable situation. For this, he must be able to solve structures by methods based on rigidity and flexibility, manually and through computer programs.

1.2.Context and importance of this course in the degree

The subject is part of the specific elective module Structures and Materials of the IOI Defense Profile. It is part of the training received by the student of the Fundamental Engineers Specialty, of the General Corps of the Army. It is a natural continuation of the subject Resistance of materials and is the basis for the calculation of the starting data of the other two theoretical subjects of the module.

1.3.Recommendations to take this course

To be able to approach the study of the subject must have previous knowledge of materials science (properties and behavior), mechanics (static, calculation of reactions), resistance of materials (Efforts, relationship between stresses and deformations). It is also necessary a certain domain of differential and integral calculus, resolution of systems of equations and ease of matrix management.

It is essential to attend classes, the daily study and the realization of the exercises proposed.

At the beginning of the subject the student should have passed most of the degree until the third year, so it is assumed that he / she will be able to successfully complete it.

2.Learning goals

2.1.Competences

C02 - Ability to plan, budget, organise, manage and monitor tasks, people and resources.

C04 - Ability to solve problems and take decisions with initiative, creativity and critical reasoning.

C06 - Ability to communicate knowledge and skills in Spanish.

C09 - Ability to work in a multidisciplinary group and in a multilingual setting.

C11 - Ability to continue learning and develop self-learning strategies.

C60 -Gaining the necessary competence to calculate elementary architectural constructions.

2.2.Learning goals

The student, to pass this subject, must demonstrate the following results ...

-To correctly apply the theoretical structural models to the analysis of real problems.

-Use with rigor and agility the different models and methodologies of structural analysis to apply them to their future professional practice.

2.3.Importance of learning goals

The learning results of this subject provide a deep knowledge of the behavior of the structures, present as a resistant element sustaining any type of machine, building, installation, etc. These learning outcomes are part of the skills that the student must acquire as part of the training of their fundamental specialty.

3.Assessment (1st and 2nd call)

3.1.Assessment tasks (description of tasks, marking system and assessment criteria)

A continuous assessment is proposed (students must follow it) and two official calls. The continuous evaluation will be based fundamentally on partial exams of each part of the subject, besides a test of evaluation of computer practices and one or more public expositions. Each of the two official calls will consist of a single theoretical-practical exam about all the contents of the subject.

The score of the continuous evaluation will be distributed as follows:

-Media of the partial exams of each subject. 60%.

-Score of the practice evaluation test: 25%.

-Public exhibitions and their previous work: 15%.

In order to pass the continuous evaluation, each of the three parts must obtain at least a score of 4 points, and have done all the tests and presentations that it contains. In addition, a minimum score of 3.5 in each partial exam will be required. The student who obtains in the continuous evaluation a score equal to or greater than 5 will have passed the subject and will not have to attend the official exams. A student who has passed the subject by continuous assessment may, voluntarily and after ask to the teacher, concur to the first official call. In the event that this call receives a lower score than the one obtained in continuous evaluation, it will be retained as the final grade of the subject.

The student who does not pass the continuous evaluation must concur the first call. The final grade of the students who pass it will be the one obtained in this call, independently of the qualifications that would have been obtained in the three parts of the continuous evaluation and with no possibility of improvement.

The student who does not pass the continuous evaluation or the first call must attend the second call. The final grade of the students who pass it will be the one obtained in this call.

4.Methodology, learning tasks, syllabus and resources

4.1.Methodological overview

If this teaching could not be done in person for health reasons, it would be done telematically.

The course is planned to facilitate continuous and active student learning. Learning resources to be used to achieve it are:

-Lectures are given by the teacher to the whole group. In these, theoretical concepts of the subject will be illustrated with examples to help understand and in which students are challenged to participate, reasoning about theoretical concepts exposed.

-Practice sessions. The contents of the theory sessions are strengthened by performing carefully selected problems to cover all relevant aspects. They are organized so that students become familiar with spreadsheet programs. Individual realization of problems, jobs and public exhibitions independently.

-Tutorials In which the student will be helped to solve doubts raised during learning.

-Other Learning activities scheduled.

4.2.Learning tasks

The course includes the following learning tasks:
-Classes about computer software.
-Practice sessions.
-Group work sessions.
-Tutorials.
-Conferences given by invited staff.
-Visits to a field work.

4.3.Syllabus

The course will address the following tasks:

- Introduction to the theory of structures. Stability and hyperstaticity.
- Basic theorems and applications.
- Technical Building Code (CTE), Basic Structural Safety Document (DB-SE).
- Technical Building Code (CTE), Basic Structural Safety Document Actions in the building (DB-SE_AE).
- Isostatic structures. Articulated structures.
- Statically indeterminate structures.
- Matrix calculation of bar structures.

4.4.Course planning and calendar

The available class sessions will be distributed in theoretical sessions, taught by the teacher, computer practices and public presentations by students about topics related to contents of the subject. To help achieve the necessary skills in English, these presentations will be held in English.

The assessment of the subject will be based on several examinations, practical exam and public presentations.

In addition, students who don't pass such evaluation, two final exams will be held in examination examinations.

If possible, a visit to fieldwork will be made. This activity is common to the three subjets of the module. L ectures given by invited staff can be scheduled too.

Key dates will be announced by the teacher, both in class and through the platform moodle support.

4.5.Bibliography and recommended resources

http://biblos.unizar.es/br/br_citas.php?codigo=30155&year=2020