

Introduction to FEM Analysis with CivilFEM powered by Marc

1. Program overview

Title: Introduction to FEM with CivilFEM *powered by Marc* – online course.

Director: Professor Juan José Benito Muñoz.

Department: Construction & Manufacturing Engineering (UNED University).

2. Eligibility and requirements

An academic degree is required although students in the last year of their course may be admitted with documentary evidence.

3. Goals

This program provides students with professional training in the Finite Element Method, with a focus on civil engineering. The goal of this course is to give students a complete understanding of the Finite Element Method and to provide the necessary knowledge to use it, which can then be applied directly at engineering and manufacturing companies, scientific research institutes and other advanced studies.

With this objective in mind, the course is completely structured into several application and practical subjects that include professional software currently used in the market, such as CivilFEM *powered by Marc*.

Ingeciber and UNED, the partners to this course, are determined to invest in the internationalization of students and collaborators and want to offer participants the maximum number of options, such as this course, with the goal of sharing experiences in the world of CAE at a global level.

4. Contents

The course is divided into three subjects:

- a. Introduction to the use of practical software I
- b. Introduction to the use of practical software II
- c. Practical Application Exercises with CivilFEM *powered by Marc*.

The contents of each subject are detailed below:

- **Introduction to the use of practical software I**

1. Overview
2. Introduction to the Finite Element Method
3. CivilFEM graphical user interface
4. Setup data
5. Geometry modeling
6. View & display
7. Materials & sections
8. Meshing

- **Introduction to the use of practical software II**

1. Loading
2. Solution
3. Post-processing results
4. Utilities

- **Practice Application Exercises with CivilFEM *powered by Marc***

The objective of this subject is to complete the concepts explained previously in the first two subjects through a number of exercises that must be completed using CivilFEM *powered by Marc*.

The exercises represent a review of the concepts introduced in the subjects taken till now, as well as the orderly use of the CivilFEM *powered by Marc*.

These exercises will be delivered to the tutor in order to get feedback and

recommendations. The exercises will be similar to the following ones:

1. Beam analysis
2. Cantilever plate
3. Bridge truss
4. Circular concrete slab
5. Plane truss
6. Warehouse
7. Dam analysis
8. Linear buckling of a column
9. Analysis of a frame
10. Linear springs

5. Schedule

50 hours of study. The course lasts from 1 to 6 weeks with full flexibility since no specific delivery date is indicated.

6. Methodology

Distance learning methodology, including pre-prepared study materials and bibliography, tutorials, audiovisual resources and practical application exercises.

7. Teaching Materials

Attendees will receive the teaching guide and the corresponding materials for each module, which will basically consist of the subject texts.

Furthermore, in order to complete the practical exercises and training, the educational version of CivilFEM *powered by* Marc will be provided by the course.

The course uses a virtual classroom as a training facility where study tools can be found and also as the main communication channel with the attendees.

Other tools will also be used, including audiovisual resources as well as other supplementary documentation.

The teaching materials for this subject consist of:

- The introduction to CivilFEM *powered by* Marc training material and related

workbook exercises.

- Additional training material for the course developed by ICAEEC.
- Software: CivilFEM *powered by* Marc.

Students will have access to a permanent educational software license of CivilFEM *powered by* Marc. All the software included is 3D based and has all the elements needed to complete the various types of analysis throughout the course.

8. Tutorships

The teaching staff will respond to attendee inquiries via telephone, email, or in person. Phone tutorships will be available within the following hours:

Monday to Friday during office hours and always subject to tutor's availability.

9. Evaluation and grading criteria

Attendee evaluation will be performed through the practical application exercises.

10. Certification

Certification will consist of a diploma from ICAEEC & Ingeciber indicating successful completion of the subject by the attendee as well as the grade obtained in the practical application exercises.

11. Teaching Staff

Professor J. J. Benito (director). Construction & Manufacturing Engineering Department (UNED).

Mr. Ronald Siat (coordinator & tutor). Ingeciber, S.A.

Mrs. M^a Cruz Argüeso (tutor). Ingeciber, S.A.

Mr. Luis Valdivia (tutor). Ingeciber, S.A.

12. Fees

Tuition fees are 450,00 €.

Current students and former students of the UNED *International Master's in*

Theoretical and Practical Application of Finite Element Method and CAE Simulation will be eligible for a 33% discount.

Universities with CivilFEM *powered by* Marc licenses will have a 50% discount.

13. Validation

Students who have completed this course can validate the application and practice portion of the *International Master's in Theoretical and Practical Application of Finite Element Method and CAE Simulation* for Expert Module Construction Branch using CivilFEM *powered by* Marc software.