Introduction to FEM Analysis with Patran & MSC Nastran

1. Program overview

Title: Introduction to FEM with Patran & MSC Nastran – online course.

Director: Professor Juan José Benito Muñoz.

Department: Construction & Manufacturing Engineering (UNED University).

2. Eligibility and requirements

A degree is required, although university students in the last year of their course may be admitted with proof of their academic status.

3. Presentation and objectives

The objective of this course is to introduce attendees to the use of *Finite Element* analysis software, allowing them to acquire the basic skills to enable them to work with this type of analysis in their professional practice.

This course originated as a collaboration project between UNED and Ingeciber, S.A., a company specializing in Computer-Aided Engineering (CAE).

4. Content

The course consists of three subjects:

a. Introduction to the use of the application software I
b. Introduction to the use of the application software II
c. Practical Application Exercises with Patran & MSC Nastran

The content of each subject is detailed below:

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

1. Overview
2. Introduction to the Finite Element Method
3. Basics of MD Nastran & Patran
4. MD Nastran elements overview

5. Units

Sections:

1. Space station truss
2. Case study: traffic signal pole
3. Case study: aircraft wing rib
4. Case study: intercooler structure

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

5. Case study: scuba tank
6. Case study: car design
7. Case study: communications tower
8. Case study: slender column buckling
9. Linear contact

Appendix:

1. Parasolid modeling
2. Results post-processing
3. Model checkout

- **Practical Application Exercises with Patran & MSC Nastran.**

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 Patran & MSC Nastran. The exercises represent a review of the concepts introduced in the subjects taken till now, as well as the orderly use of Patran & MSC Nastran.
These exercises will be delivered to the tutor in order to get feedback and recommendations.

The exercises will be similar to the following ones:

- Advanced analysis of a warehouse with temperature jump
- 3D truss bridge structural analysis
- Offshore platform design for different structural loads
- Structural analysis and validation of a Space Satellite
- Structural analysis of a steam condenser

- Pre-stress bolt design of a union

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 the course.

Furthermore, in order to complete the practical exercises and training, the educational version of Patran & MSC Nastran will be provided by the course.

Additional training material for the course developed by ICAEEC.

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.

8. Attendee services

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

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

9. Evaluation and qualification 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.

Mr. Rubén Establés (tutor).

12. Fees

Tuition fees are 450,00 €.

Current and former attendees of the UNED *Master's in Theoretical and Practical Application of the Finite Element Method and CAE Simulation* are eligible for a 33% discount.

13. Validation

Attendees who pass this course can request validation of the application and practical course subjects of the mechanical branch of the Patran & MSC Nastran expert module from the academic board of UNED *Master's in Theoretical and Practical Application of the Finite Element Method and CAE Simulation*.