

COURSE NAME

Name: **STRUCTURE CALCULATION**

Code: 101140

Curriculum: **DEGREE IN CIVIL ENGINEERING**

Year: 3

Name of the module to which it belongs: SPECIFIC CIVIL CONSTRUCTION TECHNOLOGY MODULE

Subject: BUILDING AND PREFABRICATION

Nature: OBRIGATORY Duration: FIRST SEMESTER

ECTS Credits: 4.5

Classroom hours: 45

Face-to-face classroom percentage: 40%

Non-contact hours: 67.5

FACULTY DETAILS

Name: FERNÁNDEZ LEDESMA, ENRIQUE (Coordinator)

Department: MECHANICS

Area: MECHANICS OF CONTINUOUS MEDIA AND STRUCTURAL ENGINEERING

Location of the office: Main building (Top floor)

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SKILLS

- CB1 Have and understand specific knowledge of the study area of the Degree that gives skills for the exercise of the profession of Technical Civil Engineering.
- CB2 Have and understand updated and cutting-edge knowledge related to the field of study of the degree of Technical Civil Engineering.
- CB3 Be able to apply the knowledge acquired to their work or vocation in a professional manner. Prepare and defend arguments in the relevant knowledge area.
- CB4 Solve problems within the study area of Civil Engineering.
- CB7 Possess the learning skills necessary to undertake studies with a high degree of autonomy.
- CU2 Know and refine the user level of ITs.
- CECC2 Knowledge of how to calculate building works in terms of structure.

OBJECTIVES

- Elegir el método estructural de cálculo adecuado según la tipología estructural
- Conocer y aplicar el método de flexibilidad en el cálculo de estructuras
- Conocer y aplicar el cálculo matricial para resolver cálculos estructurales
- Calcular matrices de estructuras a partir de las elementales según las condiciones de apoyo y uniones en nudos
- Trasladar cargas en nudos equivalentes para diferentes hipótesis de cargas en barras

CONTENTS:

1. Theoretical contents

I. CALCULATING STRUCTURES USING THE FLEXIBILITY METHOD

TOPIC 1. BASIC CONCEPTS. ENERGY THEOREMS

TOPIC 2. CALCULATING FORCES AND MOVEMENTS IN ISOSTATIC AND HYPERSTATIC STRUCTURES.

II. CALCULATING STRUCTURES USING THE STIFFNESS METHOD

TOPIC 3. BASIC CONCEPTS

TOPIC 4. COORDINATES AND ELEMENTARY MATRICES FOR ARTICULATED NODE STRUCTURES.

TOPIC 5. ELEMENTARY COORDINATES AND MATRICES FOR STIFF NODE STRUCTURES.

TOPIC 6. THE DIRECT STIFFNESS METHOD. DSM.

TOPIC 7. COMPUTATIONALLY IMPLEMENTING THE METHOD.

TOPIC 8. MATRIX CALCULATION FOR SPATIAL STRUCTURES.

TOPIC 9. GRID STRUCTURES.

2. Practical contents.

Practical exercises on the above topics.