

Course guide 240ICE32 - 240ICE32 - Steel and Composite Structures

Unit in charge: Teaching unit:	Barcelona School of Indus 737 - RMEE - Department	strial Engineering t of Strength of Materials and Structural Engineering.	Last modified:	16/05/2023
Degree:	MASTER'S DEGREE IN INI	DUSTRIAL ENGINEERING (Syllabus 2014). (Optional s	subject).	
Academic year: 2023	ECTS Credits: 4.5	Languages: Catalan, Spanish		

LECTURER

Coordinating lecturer: Frederic Marimon Carvajal

Others:

TEACHING METHODOLOGY

Lectures
Exercises
Case Study

LEARNING OBJECTIVES OF THE SUBJECT

STUDY LOAD

Туре	Hours	Percentage
Hours large group	27,0	24.00
Self study	72,0	64.00
Hours small group	13,5	12.00

Total learning time: 112.5 h



CONTENTS

COURSE DESCRIPTION

Description:

1- Introduction. Steelworks structural systems. Rules Eurocode-3 UNE EN1993-1-1 and Spanish Technical Code CTE DB-SE A. Materials. Global Analysis. Global initial sway imperfections. Ultimate Limit State ULS; partial security factors. Serviceability Limit States SLS; defections and dynamics effects in steel structures.

2- Connection devices. Design for bolts: shear, bearing, slip and tension resistance. Welded connections. Formulae for fillet welds. Complex cases.

3- Types of connections. Design and verify of joints; the components method. Nominally pinned joints. Rigid and semi-rigid joints. Curve moment-rotation. Columns plates. Hollow sections joints.

4- Cross-section resistance. Plastic bending. Classification of cross-sections. N-V-M interaction formulae

5- Local buckling. Class 4 sections. Effective cross-section properties.

6- Flexural buckling of ideal members. Buckling length. Elastic critical buckling load of structure. Wood diagrams. Member with imperfections. European buckling curves. Uniform built-up members.

7- Lateral torsional buckling. Torsional and flexural-torsional buckling. The general interaction formulae for beams-columns.

8- Composite structures. Stubs behaviour. Composite beams. Composite slabs. Composite columns.

9- Fatigue. Fracture toughness versus temperature.

10- Steel and composite structures under fire. The thermal problem. The mechanical problem. Simplified verification member by member.

Full-or-part-time: 1h 30m

Theory classes: 1h 30m

GRADING SYSTEM

Case Study I - 25% Case Study II - 25% Final Exam - 50% IMPORTANT REMARK: Only reevaluation of final exam

EXAMINATION RULES.

Final Exam

- Theory (without documentation support)
- Exercise 1 (full documentation + ATENEA access)
- Exercise 2 (full documentation + ATENEA access)

RESOURCES

Hyperlink: - Campus Atenea. Campus Atenea