



Course guides

290633 - ESTRUSING1 - Prominent Structures

Last modified: 06/10/2020

Unit in charge: Vallès School of Architecture
Teaching unit: 753 - TA - Department of Architectural Technology.
Degree: DEGREE IN ARCHITECTURE STUDIES (Syllabus 2014). (Compulsory subject).
Academic year: 2020 **ECTS Credits:** 3.0 **Languages:** Spanish

LECTURER

Coordinating lecturer: JOSE GOMEZ SERRANO

Others:

Primer quadrimestre:
IGNACIO COSTALES CALVO - 1
JOSE GOMEZ SERRANO - 1

Segon quadrimestre:
IGNACIO COSTALES CALVO
JOSE GOMEZ SERRANO

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:

ET8G. The ability to conceive, calculate, design and erect enclosures, roofs and other structural work and integrate them into existing buildings and urban areas (T).

ET2G. An aptitude for applying technical and building standards.

Generical:

CE8. An understanding of structural, construction and engineering design problems related to building design.

CE1. An aptitude for creating architectural projects that meet both aesthetic and technical demands.

TEACHING METHODOLOGY

LEARNING OBJECTIVES OF THE SUBJECT

Analyze a large-span structure.

Evaluate the capabilities of all the elements that make up the structure.

Analyze the stresses of an arc.

Design and calculation in steel, reinforced concrete and post-laying.

To know tools and processes to apply sustainability criteria in the structural design.

STUDY LOAD

Type	Hours	Percentage
Hours large group	16,5	22.00
Hours medium group	16,5	22.00
Self study	42,0	56.00

Total learning time: 75 h



CONTENTS

Theme

Description:

Peculiar structures

Specific objectives:

- A1 Choose a large-span structure.
 - A2 Cite descriptive information on that structure, indicating the sources.
 - A3 Recognize and locate the structural elements that make up the reference structure.
 - A4 Examine the different elements that make up a large span structure, indicating its function.
 - A5 Classify the connections between the elements evaluating their capacity.
 - A6 Interpret the general bracing of the structure evaluating global translationality.
 - A7 Calculate the buckling lengths of the columns based on the overall translationality of the structure.
 - A8 Define the actions to which the structure is subjected, according to its location.
 - B9 Calculate the pre-dimensioning of the elements according to the requests received.
 - B10 Calculate the defined frames with a 2d bar matrix calculation program.
 - A11 Evaluate the diagrams obtained in order to interpret their correction.
 - B12 Calculate the capacities of the metal sections, under given conditions.
 - B13 Compare the capacity of each element with the efforts obtained for that section.
 - B14 Calculate the elements to meet resistances.
 - B15 Interpret a welded joint based on the supported stresses.
 - B16 Calculate the welds of a standard joint, based on the efforts obtained.
 - A17 Judge and debate the structural solution of the course work in an individual way.
 - C18 Choose a structure formed by a stone arch.
 - C19 Cite descriptive information about the stone arch, indicating the sources.
 - C20 Recognize and locate the structural elements that make up the stone arch.
 - C21 Define the actions to which the stone arch is subjected.
 - C22 Vector calculation of the stone arch.
 - P1 Test 1
 - P2 Test 2
 - M1 Work layout
- F1 Post-tensioned concrete.

Full-or-part-time: 33h

Theory classes: 16h 30m

Practical classes: 16h 30m

GRADING SYSTEM

The evaluation system will consist of:

- 1 Work that will represent 50% of the final qualification
- 1 Final test that will represent 50% of the final qualification

BIBLIOGRAPHY

Basic:

- Brufau Niubó, R., & Arguijo, M.. La Estación de Bellaterra : motivo para un curso de estructura metálica [on line]. Barcelona, 1985 Available on: https://discovery.upc.edu/iii/encore/record/C__Rb1125862__Sla_estaci%F3n_de_bellaterra__Orightresult__U__X7?lang=cat.
- Ministerio de Fomento. EHE-08: instrucción de Hormigón Estructural : con comentarios de los miembros de la Comisión Permanente del Hormigón [on line]. Madrid: Ministerio de Fomento, Secretaría General Técnica, 2010 [Consultation: 01/07/2020]. Available on: https://discovery.upc.edu/iii/encore/record/C__Rb1393143__SEHE-08__Orightresult__U__X7?lang=cat. ISBN 9788449808999.
- Ministerio de Fomento. AE-88 : acciones en la edificación [on line]. 2a reimpr. Madrid: Ministerio de Fomento, 2000 [Consultation: 01/07/2020]. Available on: https://discovery.upc.edu/iii/encore/record/C__Rb1200782__SAE-88__Orightresult__U__X7?lang=cat. ISBN 8449801745.
- Ministerio de Fomento. EA-95: estructuras de acero en edificación [on line]. Madrid: Dirección General de la Vivienda, la Arquitectura y el Urbanismo. Secretaría General Técnica. Centro de Publicaciones., 2000 [Consultation: 01/07/2020]. Available on: https://discovery.upc.edu/iii/encore/record/C__Rb1189319__Sea-95__Orightresult__U__X7?lang=cat. ISBN 8449819830.
- Estructuras de acero. 2ª ed. ampl. y act.. Madrid: Bellisco, 2005. ISBN 8495279975.
- Espanya. Comisión Permanente de Estructuras de Acero. EAE : instrucción de acero estructural : con comentarios de los miembros de la Comisión Permanente de Estructuras de Acero. Madrid: Ministerio de Fomento, Secretaría General Técnica, 2011. ISBN 9788449809040.
- Documento básico SE-AE : seguridad estructural, acciones en la edificación [on line]. 2009 [Consultation: 21/10/2020]. Available on: <http://www.codigotecnico.org/images/stories/pdf/seguridadEstructural/DBSE-AE.pdf>.
- Espanya. Dirección General de la Vivienda, la Arquitectura y el Urbanismo. Documento básico SE-A : seguridad estructural, acero [on line]. Madrid: Dirección General de la Vivienda, la ArquitectuMinisterio de Fomento. Dirección General de la Vivienda, la Arquitectura y el Urbanismora y el Urbanismo, 2008 [Consultation: 21/10/2020]. Available on: http://www.afme.es/phocadownload/Codigo_Tecnico_de_la_Edificacion/CTE-DB_SE-A.pdf.
- Argüelles Álvarez, Ramón. La Estructura metálica hoy. 2. Madrid: Bellisco, 1975-1993. ISBN 8460056724.

Complementary:

- Manual para el cálculo de estructuras metálicas : prontuario Ensidesa. 4. Madrid: ENSIDESA, 1977. ISBN 8450021154.
- Manual para el cálculo de estructuras metálicas : prontuario Ensidesa. 6a. Madrid: ENSIDESA, 1982. ISBN 8450078849.
- Buxadé Ribot, Carles, 1942-. Cálculo de estructuras con pórticos y pantallas [on line]. Barcelona: Blume, 1977 Available on: https://discovery.upc.edu/iii/encore/record/C__Rb1030597__SC%C3%A1lculo%20de%20estructuras%20con%20p%C3%B3rticos%20y%20pantallas__Orightresult__U__X7?lang=cat&suite=def.
- Margarit, Joan, 1938-. Las Mallas espaciales en arquitectura. Barcelona: G. Gili, 1972.
- Norma básica de la edificación NBE QB-90 : cubiertas con materiales bituminosos. Madrid: Secretaría General Técnica. Centro de Publicaciones, 1997. ISBN 8449803349.
- Lyall, Sutherland. Maestros de la estructura : la ingeniería en las edificaciones innovadoras. Barcelona: Blume, 2002. ISBN 8495939126.
- Araujo, Ramón (Araujo Armero). Construir con acero : arquitectura en España. ENSIDESA, 1994. ISBN 848740510X.
- ENSIDESA. Bases de cálculo : dimensionamiento de elementos estructurales. 2a. Madrid: Ensidesa, 1990. ISBN 848740507X.
- Araujo, Ramón (Araujo Armero). Construir con acero : arquitectura en España 1993-2007. Madrid: Asociación para la Promoción Técnica del Acero, 2009. ISBN 9788469230589.

RESOURCES

Computer material:

- WinEva. WinEva <http://wineva.upc.edu/cat/Download.php>
- Robot Autodesk. Robot <https://www.autodesk.com/products/robot-structural-analysis/overview?plc=AECOL&term=1-YEAR&support=ADVANCED&quantity=1>
- Microsoft Office. Microsoft Office Word+Excel