CIVIL-414

Advanced design of concrete structures

Fernandez-Ordoñez David

Cursus	Sem.	Type
Civil Engineering	MA2, MA4	Opt.

Language of teaching	English
Credits	3
Session	Summer
Semester	Spring
Exam	During the semester
Workload	90h
Weeks	14
Hours	**3 weekly**
Courses	1 weekly
Project	2 weekly
Number of positions	

Summary

The course deals with the design of precast reinforced concrete structures, both for bridges and for buildings. The course is focused in learning by projects supplemented by some lectures by the teachers.The students will work in groups to design a precast structure.

Content

- Precast bridge
- Industrial building
- Office or commercial building
- Parking garage

The evaluation of the course will be by project.
In the evaluation will be considered the:
- Design notes of the structure, of each element and of the connections
- Drawings. General drawings of the structure, detailed drawings with reinforcement of the elements and detailed drawings of the connections
- Presentation of the project to the rest of the students and the teachers

Given lectures by the teachers:
- General introduction for prefabrication in buildings
- General introduction for prefabrication in bridges
- Connections and detailing in precast structures

Design by project of precast structures:
- Design:
- General dimensioning of the structure
- Detailed design of the elements
- Detailing of reinforcement
- Design of the connections
- Detailing of the connections
- Sketches (simplified drawings)
- General drawing of the structure
- Detailed drawings of the elements
- Detailed drawings of the connections
- Presentation of the project

Keywords

Structural concrete, precast structures, reinforcement's detailing, design, dimensioning methods

Learning Prerequisites

Required courses

CIVIL-234 « Structures en béton » (BA5) or similar

Recommended courses

CIVIL-525 « Structures en béton, chapitres choisis »
CIVIL-430 « Ponts en béton »

Important concepts to start the course

Design and dimensioning of reinforced concrete structures

Learning Outcomes

By the end of the course, the student must be able to:

- Design precast structures
- Dimension connections of precast structures
- Design detailing the reinforcement for typical reinforced or prestressed concrete members
- Produce sketches for precast structures
- Present a project to the audience

Teaching methods

by projects and ex cathedra

Expected student activities

Assessment of a project (conceptual design of a precast structure, dimensioning of some members, detailing of relevant parts and connections),

Assessment methods

continuous assessment during semester

Supervision

Office hours	Yes
Assistants	Yes
Forum	No

Resources

Bibliography

- *fib* Bulletin 29 Precast concrete bridges. State-of-art report (83 pages, ISBN 978-2-88394-069-7, November 2004)
- *fib* Bulletin 43 Structural connections for precast concrete buildings. Guide to good practice (370 pages, ISBN 978-2-88394-083-3, February 2008)
- *fib* Bulletin 74. Planning and design handbook on precast building structures. Manual – textbook (ISBN 978-2-88394-114-4, September 2014)
- *fib* Bulletin 78 Precast-concrete buildings in seismic areas. State-of-the-art report (ISBN 978-2-88394-118-2, March 2016)
- *fib* Bulletin 84 Precast Insulated Sandwich panels. State-of-the-art report (ISBN 978-2-88394-124-3, December 2017)
- PCI Design Handbook MNL-120-10 ISBN 978-0-937040-87-4
- Precast concrete structures. Kim S. Elliot. 2017. ISBN 978-1498-723992

- *fib* bulletin 29
- *fib* bulletin 43

- *fib* bulletin 29
- *fib* bulletin 74
- *fib* bulletin 78
- *fib* bulletin 84

Ressources en bibliothèque

- FiB bulletin 29
- FIB bulletin 74
- FIB bulletin 78
- FIB bulletin 43
- FIB bulletin 84
- PCI Design Handbook MNL-120-10
- Precast concrete structures. Kim S. Elliot. 2017

Prerequisite for

"Le contenu de cette fiche de cours est susceptible d'être modifié en raison du covid-19"