CIVIL-709

New Concretes for Structures

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Cursus	Sem.	Type
Civil & Environmental Engineering		Opt.

Language of teaching	English
Credits	2
Session	
Exam	Oral
Workload	60h
Hours	**28**
Courses	21
Exercises	7
Number of positions	

Frequency

Every year

Remark

Next and last time: Fall 2027

Summary

This course provides an in-depth coverage of mechanical and physical properties of Ultra High Performance Fiber Reinforced Concretes (UHPFRC), in the framework of new concretes for sustainable structures. It provides an extended and comprehensive insight on these materials.

Content

- Basic components,binders,admixtures and adjunctions. - Rheology of fresh cementitious materials. - Bases of Fibre Reinforced Concretes. - Formulation of UHPFRC. - Hydration, heat transport, moisture transport. - Mechanics of strain hardening fibre reinforced concretes and combination with rebars. - Time dependent behaviour of UHPFRC - creep and shrinkage, response under restraint. - Applications on new and existing structures - case studies. - Ways towards conceptual design of innovative structures with UHPFRC.

Keywords

Cementitious Composites, Fibres, UHPFRC, Strain hardening, Creep, Shrinkage, Formulation, Rheology. Modelling

Learning Prerequisites

Recommended courses

Basic course on Building Materials, Continuum Mechanics, Structural Mechanics, Physics and Chemistry

Learning Outcomes

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

- design UHPFRC mixes, characterize and model their physical, chemical and mechanical properties; to use UHPFRC to create new structures or maintain existing ones in a sustainable way.

Resources

Moodle Link

- https://go.epfl.ch/CIVIL-709