

Title: Innovative and sustainable structural concrete

Language: English

Summary: This course covers the physical, chemical, mechanical and durability properties of new kind of concretes, with recycled or manufactured aggregates, supplementary-cementing materials, chemical admixtures and fibers, in the framework of new cementitious composites for structures. The structural applications and environmental assessment of construction systems with such concretes is also addressed.

Content:

- Basic components, binders, supplementary cementing materials, chemical admixtures and adjunctions.
- Rheology of fresh cementitious materials.
- Bases of Fiber Reinforced Concretes.
- Hydration, heat transport, moisture transport.
- Recycled and manufactured aggregate concretes: design methods.
- Mechanics of recycled reinforced concretes and combination with rebars.
- Concrete durability: chloride ingress, carbonation, corrosion, frost action, alkali-silica reaction, sulphate attack.
- Design of novel concretes under severe conditions: high temperature, radiation damage, concreting at low/high temperatures.
- Applications on new structures - case studies and environmental impacts assessment.
- Laboratory experience / visit to a plant.