

Course Syllabus
020INDGS4 Industrial Construction

1. **Course number and name:** 020INDGS4 Industrial Construction
2. **Credits and contact hours:** 2 credits, 17.5 course hours
3. **Instructor's or course coordinator's name:** Marwan NAKFOUR
4. **Textbook and other supplemental material:**
 - a. Instructor's Class Notes, traite de la prefabrication Dr Ing Tihamer Koncz, Architectural Precast concrete by PCI the Prestressed concrete institute, Precast Concrete Connection details (structural Design Manual of STUPRE Society for studies on the use of Precast concrete). Recommendations Veritas – Structures prefabriques des batiments industriels.
 - b. Online references: www.FIB.org Federation internationale du Beton
www.CERIB.com, FIP (Federation Internationale de la Precontrainte) , CPI Canadian precast concrete institute
 - c. International codes: PCI Precast concrete institute, Prestressed concrete institute, French code CPT plancher I-II & III, CEB Recommendations du Comite Europeen du Beton, Eurocode.
5. **Specific course information**
 - a. **Catalog description:** this course will initiate students to industrial construction, mainly precast concrete construction. We will explore the available industrial components in the market as well as their use. We will also detail the manufacturing and installation process of these industrial components. This is an interactive course where participation of students is continuous. It is scarce in theory, rich in practice and well illustrated with pictures, videos, presentations and references from the web. It aims to open new horizons to students by teaching them about the materials offered by the precast concrete industry.
 - b. **Prerequisites:** None.
 - c. **Restricted elective**
6. **Specific goals for the course**
 - a. **Specific outcomes of instruction:**
 - Understand the precast concrete technology and get familiar with this construction method.
 - Conduct a precast concrete structure analysis and component calculations.
 - Design, detail and build construction external cladding.
 - Design, detail and build light partition wall made of gypsum or cement board
 - Ability to think in an industrial way of construction, to use the commercial prefabricated products on the market, to get the best price-performance ratio.
 - Design and think in the frame of a standard for a non conventional component or material
 - Ability to compare the component features and establish a cost comparison
 - Analyse data to come up with a better construction solution, more economical and shorter execution period.

- Acknowledge the importance of life-long learning through research on the internet.
- Ability to clearly write a report, a method statement, minutes of meeting and a cost breakdown, for better communication.
- Learning how to think like an architect, a structural engineer, a mechanical engineer, an electrical engineer and a contractor, in order to better prepare you for professional scenarios.

b. KPIs addressed by the course:

KPI	a2	c1	e1
Covered	x	x	x
Assessed			
Give Feedback			

7. Brief list of topics to be covered and approximate number of lectures:

Chapter 1 : Introduction to Construction industry and examples of concrete industry: the Precast concrete systems, the precast prestressed slab components, the precast concrete wall and column, the Prefabricated and pre-engineered steel, the gypsum board partitions and cement board wall, the facing panel material and components (Reinforced Concrete, UHPC, ACP Aluminum composite panel, marble and artificial marble...) (2x1.5h)

Chapter 2 : Architectural design of precast concrete constructions. (1x1.5h)

Chapter 3 : Structural design of precast concrete constructions (2x1.5h)

Annexes to chapter 3

Annex 1 : How to avoid a progressive and general collapse, following to an explosion, an accident or a seismic activity. (1/2x1.5h)

Annex 2 : Structural Joints in precast concrete large panel constructions (1/2x1.5h)

Annex 3 : the drawing schedule for a precast concrete project (1x1.5h)

Chapter 4 : Precast concrete processes (1x1.5h)

Chapter 5 : Precast concrete connections design and code (2x1.5h).

Chapter 6 : Transportation of precast concrete elements. (0.5x1.5h)

Chapter 7 : Handling and Erection of precast concrete elements. (0.5x1.5h)

Chapter 8 : External precast concrete wall cladding (façades or facing panels) and external wall cladding made of other material, Architectural and structural design, protection and maintenance, Aging and weathering (1x1.5h)

Chapter 9 : Introduction to prefabricated steel construction or pre-engineered steel construction. (1x1.5h)

Chapter 10 : the light partition wall: the revolution of the gypsum board, the cement board, the aerated autoclaved concrete, the polystyrene concrete... (1x1.5h)

Chapter 11: visit of a precast concrete factory (4 hours) and job sites (another 2 to 4 hours depending on the site location(s)). A report on this visit is requested to be submitted by all the students, to be counted for the finals.