

Rehabilitation and Design of Concrete Bridges

- 1. Course number and name:** 020COCGS5 Rehabilitation and Design of Concrete Bridges
- 2. Credits and contact hours:** 4 ECTS credits, 2x1:15 contact hours
- 3. Name(s) of instructor(s) or course coordinator(s):** Kamal Safa

4. Instructional Materials:

- a. Conception et construction des ponts par Michel Vilogeux (Ecole des Ponts)
- b. Conception et construction des ponts par Jean-Armand Calgaro (Ecole des Ponts)
- c. Projet et construction des ponts – Jean-Armand Calgaro
- d. Conception des ponts – A Bernard – Gely
- e. Maintenance et Réparation des Ponts – Jean-Armand Calgaro et Roger Lacroix

5. Specific course information

- a. **Catalog description:** Provide the necessary information for the design of the various types of bridges.
- b. **Prerequisites or co-requisites:** 020STRGS4 Structures
- c. **Required:** Required major course for Public Works and Transportation Specialty students.

6. Educational objectives for the course

a. Specific outcomes of instruction:

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

- Explain the different elements necessary for bridge design
- Identify the necessary information pertaining to bridge equipment
- Design piers and abutments
- Identify the different types of reinforced concrete bridges (prestressed concrete, steel, etc...) and their field of application
- Describe the methods used for the restoration and strengthening of existing bridges
- Identify the steps required for monitoring existing bridge structures

b. PI addressed by the course:

PI	1.2	1.4	2.2	3.1
Covered	x	x	x	x
Assessed				

7. Brief list of topics to be covered:

- Brief historical overview of bridges (1.5 hours)
 - Generalities (1.5 hours)
 - Functional data (1.5 hours)
 - Bridge equipment (3.5 hours)
 - Traffic load calculations (2.5 hours)
 - Distribution of horizontal forces on supports (1.5 hours)
 - Piers and abutments (3 hours)
 - Steel bridges (3 hours)
 - Reinforced and prestressed concrete bridges (3.5 hours)
 - Precast prestressed concrete bridges (2 hours)
 - Girder bridges
 - Suspension bridges
 - Cantilever bridges
- } (5 hours)
- Rehabilitation and reinforcement of concrete bridges (5.5 hours)
 - Bridge monitoring and maintenance (1.5 hours)