Construction Materials

1. **Course number and name:** 020MACGS1 Construction Materials

2. **Credits and contact hours:** 6 ECTS credits, 3x1.25 hours

3. **Name(s) of instructor(s) or course coordinator(s):** Farah HOMSI

4. **Instructional Materials:**

   a. Mise en œuvre et emploi des matériaux de construction, Christian Le Maître, Edition Eyrolles, 2012.

   b. Design and Control of Concrete Mixtures, 14th edition, Portland Cement Association, 2003.

   c. Concrete technology, second edition, Pearson Education, 2010.

   d. Construction Materials, Methods and Techniques 4th Edition, by William P. Spence, Eva Kultermann

   e. Materials for Civil and Construction Engineers (4th Edition) 4th Edition, by Michael S. Mamlouk, John P. Zaniewski

5. **Specific course information**
   a. **Catalog description:** This course introduces themes that give a general view of the different categories of engineering materials and their behavior; Teach the students the properties and the fields of use of materials in civil engineering. Topics include: Chemical bonds between atoms and molecules and periodic table - Elements of crystallography and defects in crystals - Diagrams of equilibrium and transfer and movement of atoms (diffusion of atoms, Fick's law, etc.) - Mechanical properties and modifications of mechanical properties (softening, hardening, refining, etc.) - Degradation of materials and anti-degradation procedures - Composite materials (wood is one of them) - Ceramics (this theme also includes concrete and glass) - Plastics and polymers. Particular attention will be given to Construction materials: Stony materials - Bonding materials - Artificial cements - Mortars - Concrete - Masonry - Metals - Glass – Wood

   b. **Prerequisites or co-requisites:** 020CHGCI1 or 020GHGNI1 General Chemistry

   c. **Required:** Required for all Civil Engineering students.

6. **Educational objectives for the course**
   a. **Specific outcomes of instruction:**
   1. Define the utility of materials for direct application or for transformation into artificial material

2. Introduce the students how to select materials (Origin, quality, price, type of use …)
3. Application of materials

b. PI addressed by the course:

PI	1.2	6.3	6.4
Covered	yes	yes	yes
Assessed			

7. Brief list of topics to be covered:

Topics	**Number of lectures**
Chapter 1- Introduction – Properties and Classification of Construction Materials	2
Chapter 2- Bindings and Materials Structures	1
Chapter 3- The soils	3
Chapter 4-The rocks	3
Chapter 5- Terracotta	5
Chapter 6- Water-Based Binder	5
Chapter 7- Concrete	13
Chapter 8- Metals and Metal Alloys	3
Chapter 9- Wood and its derivatives	5
Chapter 10- Glass	2
Chapter 11- Materials Over Time and Societal Concerns	1