

Construction Materials

- 1. Course number and name:** 020MACGS1 Construction Materials
- 2. Credits and contact hours:** 6 ECTS credits, 3x1:15 contact hours
- 3. Name(s) of instructor(s) or course coordinator(s):** Farah Homs
- 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:**
 - Define the utility of materials for direct application or for transformation into artificial material
 - Introduce the students how to select materials (Origin, quality, price, type of use ...)
 - Application of materials

b. PI addressed by the course:

PI	1.2	6.3	6.4
Covered	x	x	x
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