Dams

1. **Course number and name:** 020BAGGS5 Dams

2. **Credits and contact hours:** 4 ECTS credits, 2x1.25 hours

3. **Name(s) of instructor(s) or course coordinator(s):** Muhsin Elie RAHHAL

4. **Instructional Materials:**
   - **a.** Instructor's Class notes
   - **b.** Textbooks:
     i. Petits Barrages, CEMAGREF
     ii. **Geotechnical Engineering of Dams** 2nd edition Fell, R. MacGregor, P. Stapledon, D., Bell, G. et Foster, M. 2015. CRC Press/Balkema, Leiden, Pays-Bas.
     iii. **USBR-Small Dams** (the red book)-
     iv. Recommandations de sécurité des barrages Association canadienne des barrages. 2007.
     v. Introduction à la géotechnique Holtz, R.D. et Kovacs, W.D. (tranduit par J. Lafleur). 1981. Presses Internationales Polytechnique.
     vi. Manuel Canadien d'Ingénierie des Fondations, 4eedition-2013
     vii. International codes: ICOLD Publications

5. **Specific course information**
   - **a. Catalog description:** Criteria for site selection – Impact of water pressure on the foundations and structures – Safety and imperviousness of dam foundations and body – Design and stability of embankment – Appurtenant structures – Concrete rigid dams – Mobile dams on water courses.

   - **b. Prerequisites or co-requisites:** None

   - **c. Required**: Required course for Public Works and Transportation and Water and Environment options

6. **Educational objectives for the course**
   - **a. Specific outcomes of instruction:**
     The student will be able to analyze the elements to be considered for selection and sizing of different types of dams and their appurtenant structures and to compare different solutions technically, economically and environmentally.

   - **b. PI addressed by the course:**

PI	1.1	1.2	1.3	1.4	2.1	2.2	3.1	3.2	5.1	6.1	6.2	6.3	6.4
Covered	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Assessed													

7. **Brief list of topics to be covered:**

Chapter 1: General introduction and dams in Lebanon (2 lectures)
Chapter 2: Types of dams: Gravity dams, buttress dams, arch dams, embankment dams. Choice of site and type (4 lectures)
Chapter 3: Static Stability of Dams (3 lectures)
Chapter 4: Notions of hydrology for dams (2 lectures)
Chapter 5: Study of Flows (2 lectures)
Chapter 6: Hydropower Plants (2 lectures)
Chapter 7: The Supporting Structures (2 lectures)
Chapter 8: Geological and Geotechnical Studies (3 lectures)
Chapter 9: Embankments and Embankment Dams (4 lectures)
Chapter 10: Behavior under earthquakes (2 lectures)
Chapter 11: Earth Works: Foundation and Earthwork Problems (2 lectures)