# Course Syllabus

020BAGGS5 - Dams

1. **Course number and name:** 020BAGGS5 - Dams
2. **Credits and contact hours:** 4 Credits – 35 contact hours
3. **Instructor's or course coordinator's name:** Robert BOU NAHED
4. **Textbook and other supplemental material:**
   - **a.** Class notes: Photocopied course
   - **b.** Textbooks:
     - i. Design of Small Dams - Bureau of Reclamation
     - ii. Petits Barrages, CEMAGREF
   - **c.** 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:** None.
   - **c. Required course for Public Works and Transportation and Water and Environment options**
6. **Specific goals 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. KPIs addressed by the course:**

| **KPI** | a1 | a2 | c3 | e3 | g1 | k1 | k3 |
|---|---|---|---|---|---|---|---|
| **Covered** | x | x | x | x | x | x | x |
| **Assessed** | | | | | | | |
| **Give Feedback** | | | | | | | |

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

| Approximate lecture hours | Topics |
|---|---|
| 2 | General overview: Aims, benefits and harmful effects of dams. The environmental impact. Examples of dams worldwide. Statistics. |
| 2 | Lebanon Dams: Master plan of the Ministry of Energy and Water. Overview of dams in Lebanon. Description of the most renowned dams. |
| 4 | Types of dams: Dams types and their advantages, selection criteria. |
| 2 | Dam site and type selection: Topography and Water yield. Morphology. Foundation type. Floods. Economic criteria. |
| 4 | Hydrology: Watershed characteristics. Estimation of water yield and floods. |
| 6 | Geology and Geotechnical engineering of dams: Site Inventory. Topography. Photo-geology. Geological mapping. Trenches. Geophysical and geotechnical investigations. Boreholes drilling. Laboratory testing. |
| 3 | Concrete dams: Design criteria. Calculations of stresses in gravity dams. Construction details. Special problems of foundations and pore water pressure. |
| 6 | Appurtenant structures: Interaction between dam and structures. Type and Hydraulic design of structures (spillways, bottom outlets, intakes, diversions, hydroelectric power plants, etc.). |
| 4 | Hydroelectric power plants: Hydrological data. Flow characteristics. Head. Turbines. Generators. Electrical power and Energy. |
| 2 | Dams monitoring: Monitoring equipment. Security and risk management concepts. |