

MG2814 Economics and Design of Dams

Professor: Arézou Modaressi

Language of instruction: French – **Number of hours:** 36 – **ECTS:** 3

Prerequisites: Basic notions in Economics, Engineering Geology / Geotechnics, Hydraulics, Statics, Design of structures

Period: S8 Elective 09 February to April IN281E2, SEP81E2

Course Objectives

Give a global vision on the role of dams on water and energy management in the sustainable development framework. Different technologies of dam construction and the basic knowledge of their design will be developed, especially in relation to their safety.

On completion of the course, students should be able to

- ◇ plan the integration process of a dam in its natural and human context, and the decision process for its construction according to environmental, technical, and social criteria
- ◇ design dams in a given site
- ◇ anticipate the requirements for operation and maintenance, and monitoring / control of the safety of a dam in operation

Course Contents

- ◇ Dams: their role and their environment, their integration within the socio-economic background of land reclamation
- ◇ Dams and reservoirs, water resources management and energy production. Global sizing by economic analysis
- ◇ Dams and reservoirs, environmental and social aspects, impact analysis
- ◇ Gravity dams: stability, design, construction technologies
- ◇ Arch dams: principles of behavior, verification and design
- ◇ Exercise of application. Stability of a Roller Compacted Concrete (RCC) Dam
- ◇ Foundations and their treatment. Stability of the supporting base
- ◇ Earth and rockfill-dams: conception, stability, behavior computation
- ◇ Water control organs : flood evacuation, emptying and filling
- ◇ Hydropower plants
- ◇ Monitoring: principles, instruments, interpretation

Course Organization

Tutorials: 21 hr, Labwork: 12 hr, Exam: 3 hr

Teaching Material and Textbooks

- ◇ Case study documents and technical papers
- ◇ French and English textbooks

Resources

Arezou Modaressi CentraleSupélec supervisor

Etienne Frsossard Company's contact (Tractebel- GdF-Suez)

Both are available to answer the students' questions and demands.

No specific materiam needed, only a blackboard and a projector.

Evaluation

3-hr written final exam