ENV-549

Irrigation and drainage engineering

Perona Paolo

Cursus	Sem.	Type
Environmental Sciences and Engineering	MA1, MA3	Opt.

Language of teaching	English
Credits	4
Session	Winter
Semester	Fall
Exam	Oral
Workload	120h
Weeks	14
Hours	**4 weekly**
Lecture	2 weekly
Exercises	2 weekly
Number of positions	

Summary

The course aims at teaching the fundamentals of both irrigation and drainage techniques with particular attention to the soil water balance and related management, the materials, the construction methods as well as the environmental impacts and sustainability criteria of both practices.

Content

Irrigation
- history of irrigation and fundamental notions
- technical aspects and design procedures of surface, sprinkler and trickle irrigation systems
- design of the conveyance and distribution systems
- impacts of irrigation systems and sustainable approaches

Drainage of agricultural lands
- surface drainage
- subsurface drainage : estimation of drain spacing, geometrical characteristics of drainage systems, planning and design of drainage systems
- construction and maintenance of drainage systems
- environmental impacts of drainage systems and sustainability
- buffer zones

Keywords

soil-water balance, irrigation, drainage, sustainable water management, crop efficiency

Learning Prerequisites

Recommended courses

Fluids mechanics, Hydraulic structures and schemes I or similar, Soil science or similar, Hydrology.

Learning Outcomes

By the end of the course, the student must be able to:

- Judge the problematics following water both scarcity and excess
- Elaborate adequate solutions
- Sketch both irrigation and drainage setups
- Model basic physical aspects of irrigation and drainage schemes

Transversal skills

- Set objectives and design an action plan to reach those objectives.
- Use a work methodology appropriate to the task.
- Take feedback (critique) and respond in an appropriate manner.
- Demonstrate a capacity for creativity.

Teaching methods

Lecture (ex-catedra), practical exercises and small course project (in groups of 4-6 students) based on a current research project in Mauritania

Assessment methods

- 40 % continuous control during the semester (exercises and course project). Exercises will be important to ensure the students work in pace with the lectures; both the exercises and the course project will be assessed (Exercises 20%; Project group presentation and short report, 20%) and count to the final note
- 60 % oral exam (30 min) during the exam session

Supervision

Office hours	Yes
Assistants	Yes
Forum	No
Others	Besides standard office hours, students are welcome to contact the instructor at any time and short meeting will be planned according to his availability

Resources

Bibliography

Yes, indications provided during the lectures

Notes/Handbook

Part of the course is for the time being available as syllabus in French. The whole course is however built on two reference books, whose details will be provided during the lectures

Moodle Link

- https://go.epfl.ch/ENV-549