

Irrigation

1. **Course number and name:** 020IRRG4 Irrigation
2. **Credits and contact hours:** 2 ECTS credits, 1x1.25 hours
3. **Name(s) of instructor(s) or course coordinator(s):** Ahmad EL HAJJ
4. **Instructional Materials:**
 - a. Course handouts, lab experiments, practical exercises, showing of tools and equipment used in irrigation, demonstration of irrigation systems, using of irrigation software, designing of networks
 - b. AUBRIOT, O. (2000). How to read an irrigation system? An approach for the study of traditional irrigated systems, illustrated by cases taken from Nepal. UCL, Louvain, Belgium, 120 p.
 - c. BROUWER (1994) "Irrigation Methods" Training Manual No. 5 Food and Agriculture Organization of the United Nations.
 - d. CHARLES OLLIER AND MAURICE POIREE 1983 Irrigation networks theory, technique and economy of watering by sixth edition 1983 pages 435, 436 and 469. C.
 - e. C. OLLIER AND M. POIREE (1986). Irrigation. Irrigation networks, theory, technique and economy of watering. Edition Eyrolles. 503p.
 - f. I.D. DONEEN (1972). Irrigation technique and water management. FAO Irrigation and Drainage Bulletin. Food and Agriculture Organization of the United Nations, Rome. 51p.
 - g. Irrigation techniques and water management. FAO Irrigation and Drainage Bulletin No. 1, Rome, 1972. DONEEN I.D
 - h. Elius, E. (2008). Evaluation of the hydraulic performance of the application of water to the plot on the irrigated perimeter of Dlo Piti (1st section, Petit-Goave). Brief, FAMV, Port-au-Prince, Haiti, 52 p.
 - i. Eno, H. (2013). Course notes small irrigated perimeters.
 - j. FAO. (1990). Irrigation water management. Rome, Italy, 74 p.
 - k. FAO. (2002). IRRIGATION SECTOR GUIDE / Socio-economic gender analysis program. Rome, Italy, 111 p.
 - l. Felix, R. (2013). Lecture notes, Irrigation II.

- m. Guillaume, H. (2013). Course notes, Practical irrigation work.
- n. LOUHICHI, K. (1999). Improving irrigation efficiency for water saving: case of an irrigated perimeter in Tunisia. CIHEAM-IAMM, 59 p.
- o. René, C., Alain, G., & Jacques, M. (2014). Irrigation systems. Paris, France, 48 p.
- p. Tiercelin, J.R. (2006). Irrigation Treaty. Paris, France.

5. Specific course information

- a. **Catalog description:** Teach students the importance of irrigation as water consumer, food security, plant and soil behavior, irrigation technics and practices, calculation of plant water needs, designing of irrigation networks.
- b. **Prerequisites or co-requisites:** None
- c. **Required:** Required for Water and Environment Specialty students.

6. Educational objectives for the course

a. Specific outcomes of instruction:

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

- master the basic knowledge of the water needs of the plant
- master the basic knowledge of water supply intake and regulation works in irrigation
- estimate net irrigation water needs and propose an irrigation schedule
- Calculate the pressure losses in the ducts and the powers of the pumps
- size an irrigation system by sprinkling, under drip pressure, gravity according to the need
- describe the principles underlying the different irrigation techniques
- make a proposal for the development of an irrigated perimeter and evaluate its operation
- master the theoretical concepts underlying the flow of water to drains and the techniques for sizing drainage networks;
- Estimate the price-costs of irrigation systems;
- evaluate the interest of draining, on the basis of technical, economic and environmental considerations;
- Optimize irrigation networks based on the use of equations.

b. PI addressed by the course:

PI	1.2	1.3	2.1	2.2
Covered	yes	yes	yes	yes
Assessed				

7. Brief list of topics to be covered:

The course is composed of 9 chapters:

- 1- Irrigation History (0.5 hour)
- 2- Irrigation and food security (1 hour)
- 3- Irrigation in Lebanese context (1 hour)
- 4- Soil and water (1 hour)
- 5- Crop Water Requirements & Evapotranspiration (3 hours)
- 6- Irrigation Efficiency (2 hours)
- 7- Irrigation Methods & Design (3 hours)
- 8- Drainage Design (3 hours)
- 9- Optimization of irrigation water systems (3 hours)