Code: - Engineering in Landscape Architecture
Degree: Landscape Architecture **Curricular Year:** 1st, 2nd cycle
Annual Course [ ] Semester Course: 1st [ ] 2nd [X] Trimester Course: 1st [ ] 2nd [ ] 3rd [ ]
Credits: 6 **ECTS** **Level:** **Compulsory [X] Optional [ ]**
Language: Portuguese
Prerequisites:
Lecturer(s): Pedro Leão de Sousa and José Luís Teixeira
Web Site:

1. Contact hours:

Lectures	Praticals	Lecture/Practicals	75	Laboratory	Others	Total	75

2. Objectives:

It's intended to endow the Landscape Architecture student with the basic essential knowledge, enabling him to integrate actively multidisciplinary project teams and to execute some of the engineering components of projects.

3. Programme:

1. Hydraulic basis: hydrostatic, hydrodynamic, under pressure flow, pumps and pumping stations. Open channel flow. Water flow through orifices and weirs.
2. Soil-crop-atmosphere relations. The soil water. Main concepts. Field Capacity, wetting point, soil water capacity. Water use by plants. Notion of evapotranspiration. Reference, Crop, Real, Actual and Maximum evapotranspiration. Irrigation amount. Useful and real irrigation amount. Notion of efficiency.Soil water balance. FAO method. Exercise of application in Excel. Simulation models. Use of ISAREG model. Irrigation management strategies. Methods of irrigation scheduling based on soil moisture control, on the plant hydric status, on meteorological information and simulation models based on soil water balance.
3. Project in irrigation and drainage.
Irrigation Systems. Classification of the irrigation systems. Notions of application efficiency and distribution uniformity.
Sprinkling irrigation systems: constitutive elements, type of installations and dimensioning.
Localized irrigation systems: equipments, type of installations and dimensioning. Filtering, fertigation, measuring devices, automatic devices and security elements.
Brief principles of drainage. Surface and sub-surface drainage. Project of a drainage network.

4. Bibliography:

Main Bibliography

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Lencastre, A. 1996. Hidráulica geral. Ed autor. Lisboa, ISBN 972-95859-0-3, 651 p. (Cota BISA: N01-180)
Pira, E.S. 1997. A guide to golf course irrigation system design and drainage. Library of Congress, U.S.A., ISBN 1-57504-030-1, 434 p.
Tarjuelo, J.M. 1999. El riego por aspersión. Ediciones Mundi-Prensa, Madrid, ISBN 84-7114-736-X: 475-530.
Teixeira, J.L. Manual do Programa ISAREG. http://www.isa.utl.pt/der/SoftWare/ISAREG/index.htm.

Other Bibliography

Hendrix, H. & S. Straw. 1998. Reliable rain: a practical guide to landscape irrigation. Library of Congress Cataloging-in-Publication Data, U.S.A., ISBN 1-56158-202-6, 139 p.
Medina San Juan, J.2000. Riego por goteo. Teoria y pratica (Cota BISA: F06-382).
Melby, P. 1995. Simplified irrigation design. Library of Congress, U.S.A., ISBN 0-442-01822-3, 230 p.

5. Assessment:

It is based particularly in the realization of two tests, with equal weight. The minimum quotation in each one is 7,0 values / 20 values.
The frequency is achieved by attendance to 70 % of the lessons.

6. Estimated Workload: 168 Hours

7. Last Update: 28/2/2012