Code: 1643 **Environment, Resources and Society**
Degree: 1st cycle –Environmental Engineering
Curricular Year: 1st **Semester Course: 2nd**
Credits: 6 ECTS **Compulsory**
Language: Portuguese/English
Responsible: Elizabeth d Costa Neves Fernandes d'Almeida Duarte
Other lecturer(s): Olívio Godinho Patrício, Maria Odete Pereira Torres, Ernesto José de Melo Pestana de Vasconcelos, Ana Cristina Ferreira da Cunha Queda, Maria Luísa Louro Martins and Maria Teresa Marques Ferreira da Cunha Cardoso
Web Site: http://www.isa.utl.pt/home/node/4019

1. Contact hours:
Lecture/Praticals 70 **Others** 14 **Total** 84

2. Objectives:

It is intended that students have contact with problems related to the life and activities of plants and animals, including humans which contribute to pollution of the earth. The main themes allow the motivation of the environmental engineering students for the new challenges of future, particularly with regard to the interface water / wastewater / waste / environment and interface energy / environment. It will be given particular emphasis to environmental issues of actual cases where the intervention of Environmental engineers can contribute to solve problems in a sustainable way, integrating the Environmental, Social and Economic components. The discussion of the issues addressed by teachers and by invited experts will develop in students an important critical spirit for its formation in Engineering.

3. Programme:

1 – Applied Ecology
1.1 – Restoration in Environmental Engineering
2 – Efficient use
2.1 – Of water in the industry
2.2 – Of water and energy in the household sector
2.3 – Efficient use in agriculture
2.4 – Efficient use in the urban sector
3 – Water quality
3.1 - Agriculture
4 – Phytoremediation of heavy metal contaminated soils
4.1 – Contamination origins and phytoremediation processes
4.2 – The effect of heavy metals in the organisms and its impact in the food chain.
5 – Solid waste treatment
5.1 – Urban solid wastes
5 2 – Biodegradable organic wastes
5.3 – Presentation of a waste integrated management Project implemented in a pig farm unit.
6 – The sustainable use of nitrogen and phosphorus in agriculture
6.1 – The symbiotic role of Rhizobium - Legume and mycorrhizal associations.
7 – Air pollution scale effect
7.1 – Air pollutants and its environmental effects
7.2 – Atmospheric scales and pollution phenomenon
7.3. – Measurement and evaluation goals
7.4. – Air policies implementation.
8 – Renewable energies
8.1 – Introduction and general aspects
8.2 – Wind energy
8.3 – Solar energy
8.4 – Biomass
8.5 – Biodiesel
8.6 – Biogas

4. Bibliography:

Main Bibliography

Asano T, Burton F L, Tchobanoglous G (2006) Water Reuse: Issues, Technologies and Applications, Metcalf & Eddy, Inc., McGraw-Hill Book Co., New York
- Duarte, E. A., Neto, I. (2001). "Uso Eficiente da água, Casos exemplares e de demonstração do uso eficiente da água na indústria", Vol.3, Ed. LNEC, 123pp.

IPPC (2007) Climate Change Impacts, Adaptation and Vulnerability :Summary for Policymakers -

.http://www.ippc.ch/SPM6avr07.pdf

- Vesilind, P.A., Morgan, S.M. (2004). *Introduction to Environmental Engineering.* 2nd Ed., Thomson, Brooks/Cole
- Willing, J. (1995). *Auditing for environmental quality leadership*. John Wiley & Sons, USA.

Other Bibliography

Hammer, M.J., Hammer Jr., Mark J. (2001). Water and Wastewater Technology. 4th Ed. Prentice-Hall Inc. New Jersey
Khawaji A D, Kutubkhanah I K, Wie J-M (2008) Advances in seawater desalination technologies. Desalination 221: 47-69
Liniger H, Critchley W (eds) (2007) Where the Land is Greener- Case Studies and Analysis of Soil and Water Coservation Initiatives Worldwide. Wocat, Bern. http://www.wocat.org/
UNEP (2007) Global Environment Outlook Geo 4. Environment and Development. UNEP, Nairobi
UNESCO (2006) Water: a Shared Responsibility. The United Nations World Water Development. Report , Paris, and Berghahn Books, New York, UNESCO

5. Assessment:

Continuous evaluation with the realization of mini tests and reports regarding the themes lectured in the classes by technical and scientific experts, as well as, from the field trips. Individual Project elaboration subordinated to the curricular unit theme: environment, resources and society. Final examination.

6. Estimated Workload:	168	Hours
7. Last Update:	12/7/2010	