

Code: 1538 Agronomic and Energetic Valorisation of Wastes**Degree:** 2nd cycle – Environmental Engineering**Stream:** all**Curricular Year:** 2nd**Semester Course:** 1st**Credits:** 6 ECTS**Optional****Language:** Portuguese/English**Responsible:** Henrique Manuel Filipe Ribeiro**Other lecturer(s):** Cláudia Saramago de Carvalho Marques dos Santos Cordovil**Web Site:** <http://www.isa.utl.pt/home/node/3793>**1. Contact hours****Lectures 20 Lecture/Practicals 30 Practical/Laboratory 20 Others 14 Total 84****2. Objectives:**

Provide the students with the necessary tools that allow them to select the best available technologies and to implement integrated solutions for the valorisation of wastes.

3. Programme:**Fundamentals of wastes valorisation in agriculture**

Characterization of organic residues, crop residues, animal manures, urban wastes, agro-industrial and industrial residues, residues produced by the different bioenergy production processes. Fertilizing interest of organic residues and impact on soil fertility and in the environment, Factors conditioning the behaviour of residues in soil, the role of residues in soil remediation, the effect of organic residues in the alteration of natural vegetation.

Brief reference to biodegradable and non biodegradable inorganic residues

Methods of assessing the organic residues potential recycling

Agronomic valorization aspects affect by Reap constraints

Fundamentals of wastes valorisation as energy

- Thermochemical conversion processes, biochemical conversion processes, other processes.

- Emissions, wastes, impacts, minimization and disposal.

Integrated strategies for wastes valorisation as energy and/or agricultural fertilizers**4. Bibliography:****Main Bibliography**

(1) Santos, J. 2001. Fertilização e ambiente. Coleção Euroagro, Publicações Europa-América.
(2) Oliveira, JFS et al., 2009 - Resíduos, gestão, tratamento e sua problemática em Portugal. Lidel, Edições Técnicas Lda. (3) Cordovil, C. 2004. Dinâmica do azoto na reciclagem de resíduos orgânicos aplicados ao solo. Instituto do Ambiente, Lisboa. (4) Ribeiro, H.M 2001. Substratos, In: Produção em Viveiros Florestais, Dir. Geral dos Desenvolvimento Rural, Lisboa. (5) Duarte, E. 2007. Conceitos sobre os Bioprocessos Anaeróbios. ISA, DQAA, Lisboa

Other Bibliography

(1) Power J F e Dick W A (eds.) 2000. Land application of agricultural, industrial and municipal by-products. SSSA Book Series: 6. Madison, WI, USA. 653 p. (2) COM 628 (2005) – Biomass action plan {sec (2005) 1573}. Communication from the Commission of the European Communities, Brussels

5. Assessment:

- oral presentation (20%)
- manuscript on a proposed subject (20%)
- . reports on practical classes (20%)
- exam (40%)

6. Estimated Workload:

168	Hours
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7. Last Update:

20/7/2010
