

Code: 1693 Functional Genomics**Degree:** 2nd cycle - Functional Biology**Curricular Year:** 1st**Credits:** 6 ECTS**Semester Course:** 2nd**Compulsory****Language:** Portuguese/English**Responsible:** Maria da Glória Calado Inglês Esquível**Other lecture(s):** Maria Wanda Sarujine Viegas, Maria Leonor Mota Morais Cecílio and Sara Barros Queiroz Amâncio**Web Site:** <http://www.isa.utl.pt/home/node/3773>**1. Contact hours:****Lecture/Practicals 70 Others 14 Total 84****2. Objectives:**

It is proposed to the students:

- (1) The understanding of the mechanisms that are correlated with the transmission and regulation of gene expression patterns in plants.
- (2) The comprehension of the most common epigenetic processes.
- (3) The expertise to adjust the techniques of genetic engineering and proteomic to the study of the function of genes and the manipulation of its expression in an applied perspective.

3. Programme:

Presentation of basic concepts.

Organization of the genomes of plants and algae models (examples: *Populus tremuloides*, *Arabidopsis thaliana*, *Oryza sativa*, *Physcomitrella patens*, *Chlamydomonas reinhardtii* and *Synechocystis* sp.).

Experimental methods in Functional Genomics.

Epigenetic processes. Establishment of heterochromatin and control of gene expression by RNAi, 3D

Organization of the nucleus and the gene expression. Gene silencing by epigenetic processes.

Epigenetic reprogramming patterns.

Case study :

- Gene expression of *Saccharomyces cerevisiae* sugar transporters during wine fermentation.
- Functional characterization of the photosynthetic apparatus.
- Genomic of sulfate metabolism.
- Abiotic stress on plants, the role of transcription factors
- Drought Stress response in a proteomics point of view.

4. Bibliography:**Main Bibliography**

- Baulcombe D. et al. (2004) RNA silencing in plants, *Nature* 431: 350-355.
- Leister, D. (Editor) (2005) *Plant Functional Genomics Food Products Press*.1- 677.
- Merchant, S., et al. (2007) The *Chlamydomonas* Genome reveals the evolution of key animal and plant functions *Science* 318: 245-250.

Other Bibliography

- Abdallah, F., Salamini, F., Leister, D (2000). A prediction of the size and evolutionary origin of the proteome of chloroplast of *Arabidopsis*. *Trends Plant Sci.* 5: 141-142.
- Campbell, T.N. and Choy F.Y.N. (2005). RNA interference: past, present and future. *Curr. Issues Mol. Biol.* 7: 1-6.
- Hunter, T.C. ,Andon, N.L., Koller, A.,Yates, JR III, Haynes P.A. (2002) The functional proteomics toolbox: methods and applications. *J. Chromatogr. B* 782: 165-181.

5. Assessment:**Seminar**

Individual presentation of a topic to be agreed (15 min) and included in the respective lecture.

Final evaluation

Research work– 35%

Seminar -30%

Final exam – 35%

6. Estimated Workload:

168	Hours
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7. Last Update:

14/7/2010
