

# MASTER DEGREE IN MICROBIOLOGY



## CELL AND TISSUE ENGINEERING – Instituto Superior Técnico

### Objectives:

To give theoretical fundamentals on cell biology and bioreactor technology for animal and human cell culture and Processing

### Program:

1. Cells and Tissues. Tissue Dynamics and Repair. Methods for Cell Study. 2. Morphogenesis. Development and Differentiation. Gene Expression Regulation in Eukaryotes. Cellular Signalling. Apoptosis. Cancer. 3. Stem Cells. Embryonic and Adult Stem Cells. Stem Cell Plasticity. Cellular Therapy. 4. Cell and Tissue Culture. Genetic Engineering of Animal Cells. Antibodies and Hybridomas. Animal Cell Metabolism. 5. Stem Cell Processing. Isolation, Expansion and Differentiation. Bioreactors. Microscale Platforms for High Throughput Screening. Cryopreservation. Biomedical Applications. 6. Biomaterials. Characterization. Applications. Micro & Nanotechnologies.

### Evaluation methodology

35% - Monography on a Cell and Tissue Engineering related topic (review's article format).

40% - Presentation of a seminar with the critical analysis and discussion of a scientific article.

25% - Abstract essay (writing an abstract for a scientific article in the literature)

### Recommended bibliography:

- Lodish, H., Berk, A. et al, Molecular Cell Biology, W.E. Freeman, 2007
- Junqueira, L.C. and Carneiro, J., Basic Histology, McGraw-Hill, 2005
- Palsson, B.Ø. and Bhatia, S.N., Tissue Engineering, Pearson Prentice Hall Bioengineering, 2004
- Vunjak-Novakovic, G. and Freshney, R., Culture of Cells for Tissue Engineering, Wiley, 2006
- Atala, A., Lanza, R., et al, Principles of Regenerative Medicine, Academic Press, 2007