MASTER DEGREE IN MICROBIOLOGY

MOLECULAR BIOTECHNOLOGY – Instituto Superior Técnico

Objectives:
The course focuses on the fundamentals, the approaches and the applications of recombinant DNA technology and other molecular approaches. It is intended to provide a solid background in molecular techniques and to provide the students with the skills to develop an integrated scientific perspective in such a rapidly moving field of research and development.

Program:
1. Recombinant DNA technology
2. Mutant construction, directed mutagenesis and protein engineering
3. DNA sequencing methods
4. Methods to measure gene expression
5. Manipulation of gene expression in prokaryotes
6. Heterologous protein production in prokaryotic and eukaryotic cells
7. Molecular Biotechnology of microbial systems: applications in medicine, industry and agriculture

Lab classes will focus on the following techniques:
1. Methods to introduce recombinant DNA into bacterial cells
2. DNA amplification by polymerase chain reaction
3. Southern hybridization
4. Expression and purification of a recombinant protein
5. Molecular typing methods

Evaluation methodology
Teaching methodologies include lectures and laboratory classes. The final grade results from the balance between the contributions of two evaluation elements:
1 - Final exam - 70% - The exam is mandatory. A minimal grade of 9.5 values is required.
2 - Laboratory works - 30% - Practical sessions will take place throughout the semester and will be evaluated based on five reports, to be delivered by groups of three students. Presence in all lab classes is mandatory.

Recommended bibliography:
* Principles of Gene Manipulation: An Introduction to Genetic Engineering , Primrose SB, Twyman RM, Old RW,
eds, 2006, 6th ed., Blackwell Publishers.
* Gene Cloning & DNA analysis: An introduction , Brown T.A., 2006, 5th ed., Blackwell Publishing.
* Engenharia Genética" In: Biotecnologia: Fundamentos e Aplicações , Mota M, e Lima N, eds, 2003, Lidel-edições
técnicas, Lisboa.