Code: 1717 **Functional Microbiology**
Degree: 1st cycle - Biology
Curricular Year: 2nd **Semester Course: 2nd**
Credits: **8 ECTS** **Compulsory**
Language: Portuguese/English
Responsible: Maria da Conceição da Silva Loureiro Dias
Other lecturer(s): Manuel José de Carvalho Pimenta Malfeito Ferreira
Web Site: http://www.isa.utl.pt/home/node/3960

1. Contact hours:
Lectures 28 **Lecture/Praticals** 28 **Praticals/Laboratory** 28 **Others** 28 **Total** 112

2. Objectives:

- To learn the forms of energy obtention by microrganisms
- To learn the aspects of metabolic regulation
- To understand the stress resistance mechanisms

3. Programme:

Bioenergetics
Chemiosotic theory. Different types of active secondary transporters. Uses of he proton motive force, in particular the movements of flagella. Electron transport chains and ATP synthase. Analysis of bacterial energetics under different environmental conditions. Immobilization of biocatalysts: kinetics effects. Inactivation kinetics.
Metabolism
Degradation of polymers by exoenzymes. Mechanisms of hydrolysis for cellulose and starch. Crabtree effect and other aspects of fermentation regulation.
Growth and Microbial Stress
Kinetic and energetic growth parameters: specific exponential growth rate, duplication time, yield coefficient, specific consumption rate, ATP yield. Analysis of numeric results and appreciation of their accuracy. Different stress factors. Effects of NaCl. Effects of extreme temperatures. Extremophyles.

4. Bibliography:

Main Bibliography

Physiology of the Bacterial Cell, A molecular Approach
F. Neidhardt, J. Ingraham, M. Schaechter
Sinauer Associates, Inc. Publishers
Sunderland, Massachusetts, 1990
ISBN 0-87893-608-4

The Physiology and Biochemistry of Prokaryotes
D. White
Oxford University Press. Inc.
Oxford, 1995
ISBN 0-19-508439-X

Applied Microbial Physiology. A practical approach
P. Rhodes, P. Stanbury (eds.)
Oxford University Press, Inc.
Oxford, 1997

5. Assessment:

Final exam and an oral presentation.

6. Estimated Workload: 224 Hours

7. Last Update: 8/7/2010