**GENERAL MICROBIOLOGY**

*CU characterization:*

*CU name:*
General Microbiology

*Scientific area acronym:*
BM

*Duration:*
Semiannual

*Working hours:*
135

*Contact hours:*
37

*ECTS:*
5

*Observations:*
Mandatory CU

*Teacher in charge and respective teaching load in the CU:*
Celso Cunha

*Other teachers and respective teaching load in the CU:*
Isabel Couto - 2 hours
João Piedade – 10.5 hours
Liliana Rodrigues - 14 hours
Maria Luísa Vieira - 3 hours
Miguel Viveiros - 2 hours
Ricardo Parreira – 4.5 hours
Sofia Santos Costa - 9 hours
Teresa Carreira - 1 hour

**GENERAL MICROBIOLOGY**

***Intended learning outcomes (knowledge, skills and competences to be developed by the students):***

To obtain basic knowledge in bacteriology, virology and mycology. To understand pathogenic mechanism, clinical and laboratory diagnosis of the most relevant agents of bacterial, viral and fungal infections.

***Syllabus:***

**I.** Structure, metabolism and physiology of bacterial cells. Gram-negative and Gram-positive bacteria- Anaerobic bacteria. Spirochetes. Epidemiological, microbiological, clinical. Identification of the Gram-negative bacilli: Enterobacteriaceae and Pseudomonas sp. and of the Gram positive cocci: Staphylococcus sp and Streptococcus

**II.** Introduction to Virology. Important Virology milestones. General properties of viruses. The relative size of viruses. Structure and symmetry (helical and icosahedral). Complex and mixed morphologies. Classification (main criteria), taxonomy and nomenclature of viruses. Types and structures of viral genomes. Strategies for viral mRNA synthesis: the Baltimore classification. Steps of the viral replication cycle. Isolation and production of animal viruses: susceptible and permissive cellular systems. Animals, embryonated chicken eggs and cell culture. Titration of infectious viruses. Origin and evolution of viruses. Evolution under the effect of natural selection or as a result of stochastic effects. Bootleneck effect and its consequences on the fitness of viral populations. Mutation rates in RNA and DNA viruses, recombination and redistribution of genomic segments. Analysis of virus stability to physicochemical agents by determining the title of a viral suspension using plaque assays.

**III.** Introduction to Medical Mycology. Fungi definition. Characteristics of the fungi, somatic structure, reproduction of the fungal cell. Clinical classification of fungal infections: superficial mycoses, subcutaneous and systemic invasive. Opportunistic mycoses.

***Teaching methodologies (including assessment):***

Theoretical and theory/practical classes, in which the basic concepts to be taught, will be passed with the support of the methods type presentations (PowerPoint). Practical lessons where methods and practical techniques presented in lectures and theoretical-practical will be applied.

Students with at least 2/3 of frequency are evaluated by final exam. Rating scale of 0 to 20. Approval rating equal to or greater than 10.

**GENERAL MICROBIOLOGY**

***References for consultation / mandatory existence:***


- Color Atlas and Textbook of Diagnostic Microbiology. (1997) Koneman EW et al - 5th ed.
- Barroso H., Meliço-Silvestre A., Taveira N. (2014). (Eds.), Microbiologia Médica Volume 1 - Edições Lidel, Lisboa.
- Barroso H., Meliço-Silvestre A., Taveira N. (2014). (Eds.), Microbiologia Médica Volume 2 - Edições Lidel, Lisboa.
- Microbiologia - Canas Ferreira WF, Sousa JCF Lima N (Eds.) 2010 Edições Lidel, Lisboa.
- Cann AJ (2012). Principles of Molecular Virology. Elsevier Academic Press, Burlington, MA, 5ª Ed.
- Parreira R, Piedade J (2010). Vírus, pp. 110-129. In Microbiologia. Canas-Ferreira WF, de Sousa JCF, Lima N (Eds.), Edições Lidel, Lisboa.
- Microbiology, Concepts and Applications. Michael J. Pelczar, Jr. ECS Chan, Noel R Krieg, ed. McGraw-Hill, Inc., 2003.
- Kauffman C.A., Pappas P.G., Sobel J.D., Dismukes WE (Eds). (2011). Essencial of Clinical Mycology. Springer- Verlag, New York.
- Reiss E., Shadomy H.J., Lyon G.M., (2012) Fundamental Medical Mycology. Wiley-Blacwell.