



Licenciatura em Ciências da Saúde

Course Title: Biomaterials and Medical Devices



Professor: Ana Bettencourt (asimao@ff.ul.pt)
(Faculdade de Farmácia da Universidade de Lisboa)

Biomaterials and Medical Devices

ECTS: 6

Professor: Ana Bettencourt (FFUL)

Teaching Language: Portuguese

Objectives, Learning Outcomes

To provide the students with an up-to-date knowledge of the development of Biomaterials and of the interactions between host tissues and foreign materials. Also to discuss the different classes of Biomaterials as well as its potential biomedical applications.

Contents

1. Introduction to Biomaterials: History and development of Materials Science; concept of biomaterial and biocompatibility
2. Classes of Materials used in Medicine: metals; ceramics; polymers (biodegradable, hydrogels) and composites
3. Mechanical and Surface properties of biomaterials
4. Interaction aspects between biomaterials and host: degradation of materials in the biological environment and host reaction to biomaterials (biological response to an implant: inflammation, foreign body reaction, angiogenesis, scar formation, toxicology, thrombogenicity, infection)
5. Application of Materials in Medicine: orthopedic applications; ophthalmological applications; sutures, burn dressings and skin substitutes ; dental Applications; cardiovascular medical devices; drug delivery systems
6. Investigation in Biomaterials Science

Teaching Methods

Theoretical classes (2 h per week);

Practical classes (2 h per week): Evaluation of practical examples of application of biomaterials.

Some classes will be given by renowned medicals and pharmaceuticals where biomaterials are applied in various areas of medicine.

Evaluation type

Theoretical: Final Exam (60%)

Practical: Evaluation of student's oral presentation and participation in the classes (40%).

Main Bibliography

[1] Cruz MEM, Almeida AJ, Corvo ML. Biotecnologia Fundamentos e Aplicações. Liedel, 2003, 17, pp 359-375. (Biblioteca da Faculdade de Farmácia, Universidade de Lisboa).

[2] Amaral IF, Barbosa MA, Barrias CC, Cavalheiro J, Ferraz MP, Amaral IF, Barbosa MA, Barrias CC, Cavalheiro J, Ferraz MP, Granja PL, Lopes MA, Martins MCL, Monteiro FJ, Ribeiro CC, Santos JD, Sousa SR, Queiroz AC. Biotecnologia Fundamentos e Aplicações. Liedel. 2003, 18, pp 377-396 (Biblioteca da Faculdade de Farmácia, Universidade de Lisboa).

[3] RW. Cahn, P. Haasen, E.J. Kramer. Materials Science and Technology. A comprehensive treatment. Volume 14. Medical and Dental Materials. (Biblioteca do Departamento de Física, Faculdade de Ciências, Universidade de Lisboa).

[4] Craig, Robert G.; Powers, John M.; Restorative Dental Materials; 12th Edition, Mosby, Elsevier – Dentistry Dental Technology; 2006 (Biblioteca Faculdade de Medicina Dentária, Universidade de Lisboa).

[5] Professor datasheets.

[6] Scientific publications.