

POSMAT | Programa de Pós-graduação em Engenharia de Materiais



Course: Instrumentation in Biological Laboratory

Code: EM.006

Credits: 03

Module: optional subject

Research area: Biomaterials

Contents:

Present the physical structure, equipment and methods routinely used in Biological Laboratory, focusing on structure and laboratory procedures used in the characterization and development of biomaterials. Topics related to the preparation of solutions and biosafety in the use of equipment will also be discussed, in addition to the design of experiments, applied in research aimed at biological results as a response arising from the use of different biomaterials in hosts. The main techniques and characterization tests performed for the biocompatible or biocidal evaluation of a biomaterial will also be studied.

PROGRAM CONTENT

- 1- The Biological Laboratory
- 2- General laboratory equipment
- 3- Equipment handling: calibration, tracking and sample interference.
- 4- Laboratory calculations and preparation of reagents
- 5- Disinfection and sterilization processes
- 6- Glassware and disposables
- 7- Pipetting process (pipettes and micropipettes)
- 8- Laboratory quality control
- 9- Laminar Flow Cabinets and Biological Safety
- 10- Use of optical microscope (normal and inverted)
- 11- Experimental planning involving biomaterials from a biological perspective (including main statistical tests)
- 12- Main tests performed in the laboratory routine to evaluate the activity of biomaterials
 - Cytotoxicity Tests
 - Cell viability tests
 - Antimicrobial activity tests

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References:

1. MASTROENI, Marco Fábio. Biossegurança aplicada a laboratórios. 2. ed. São Paulo: Atheneu, 2005. 338 p. ISBN 978-85-7379-753-4.
2. ORÉFICE, R. L., PEREIRA, M. M., MANSUR, H. S. Biomateriais: fundamentos e aplicações. Rio de Janeiro: Cultura Medica, 2006. 518p.
3. VRANA, N. E., GHAEMMAGHMI, A. M., ZORLUTUNA, P. Adverse reactions to biomaterials: State of the Art in Biomaterial Risk Assessment, Immunomodulation and In Vitro Models for Biomaterial Testing. *Frontiers Bioeng. Biotechnol.* 2019.