Level: PhD

Course title: Nanomaterials in biomedicine (DSB619)

Status: elective

ECTS: 15

Requirements:

Learning objectives

The main objective of the course is to enable the PhD students to acquire knowledge and skills about the application of nanomaterials (NMs) in medicine. This course provides knowledge about the methodology applied in biological systems for the NMs research (nano-sensors, nanotubes and nanoparticles) and about the application of NMs in regenerative medicine, NM-mediated controlled drug delivery and therapy of diseases, application of nanosensors and diagnostic imaging with molecular nanoprobes.

Learning outcomes

PhD students will acquire the comprehensive knowledge about the biomedical application of NMs, their application in diagnostics and therapy of human diseases, and about the biological distribution and compatibility of NMs.

Syllabus

Theoretical instruction

1. Nanomedicine (the role of NMs in biomedicine, diagnostics and therapy of diseases, imaging)
2. Materials effects in biological systems
3. Toxicity studies of NMs *in vitro* and *in vivo*
4. Nanomaterials effects on human organism and other biological systems
5. Nanomaterials effects on environment and ecological systems
6. Ethical aspects of nanomaterials research in nanomedicine
7. Nanomaterials application in regenerative medicine
8. Nanomaterials-mediated controlled drug delivery
9. Application of nanosensors in nanomedicine
10. Diagnostic imaging with molecular nanoprobes

Practical instruction

1. Methodology of nanomaterials research in biomedicine
2. Methods of nanomaterials toxicity assessment in biological systems
3. Analysis of efficiency of nanomaterials-mediated controlled drug delivery
4. Methodology of assessment of nanomaterials delivery and entry into the biological systems and structures
5. Interpretation of experimental data and clinical relevance

Weekly teaching load: <u>10 (150)</u>				Other:
Lectures: 5 (75)	Exercises:	Other forms of teaching:	Student research: 5 (75)	