Bionanotechnology is an active multidisciplinary research area at the intersection of nanotechnology and biomedical research. Nanoscopic tools are being developed to enable unique biomedical applications, ranging from medical therapies, over bioimaging and biosensors, to advanced drug delivery. Although it will be impossible within the limited timeframe of this course to cover all aspects of bionanotechnology, the aim is to raise the awareness of the importance and unique possibilities of miniaturization on the nanoscale for biomedical and pharmaceutical applications. The lectures are taught by various experts who actively perform scientific research in the respective domains. In that way not only the general principles will be discussed, but also related cutting-edge scientific research.

- Nanomaterials for intracellular delivery of nucleic acids
- Nanotechnology for enhanced delivery of drugs into biological tissues
- Nano- and microtechnology for cell-based immunotherapy
- Bio-imaging on the nanoscale for investigating the interaction of nanomaterials with biological tissues
- Theranostics: nanotechnology for combined therapy and diagnostics
- Nanotechnology for biosensors and diagnostics

Initial competences
Basic knowledge of biochemistry, biotechnology and cell biology

Final competences
1 Knowledge and understanding of the use of nanotechnology for medical therapies, biosensors and drug delivery.
2 being able to relate different parts of the course to one another.
3 being able to interpret and motivate the importance of relevant experimental data.
4 being able to understand and motivate a relevant scientific text.
5 being able to apply the course material to relevant practical problems.

Conditions for credit contract
Access to this course unit via a credit contract is determined after successful competences assessment.

(Approved)
Conditions for exam contract
   This course unit cannot be taken via an exam contract

Teaching methods
   Demonstration, lecture, self-reliant study activities

Extra information on the teaching methods
   Lectures will be given by a number of specialists in the field. A number of scientific articles will be provided in connection to some lectures which need to be studied for the oral part of the exam. A demonstration will be organized to illustrate some key aspects from the course.

Learning materials and price
   Slides used during the lectures will be made available on Minerva.

References

Course content-related study coaching
   The student has the possibility to ask questions before, during and after the lectures. There is also the possibility for the student to make an appointment with the lecturer to discuss questions on the course in more detail.

Evaluation methods
   end-of-term evaluation and continuous assessment

Examination methods in case of periodic evaluation during the first examination period
   Written examination with open questions

Examination methods in case of periodic evaluation during the second examination period
   Written examination with open questions

Examination methods in case of permanent evaluation
   Oral examination

Possibilities of retake in case of permanent evaluation
   not applicable

Extra information on the examination methods
   Written examination

Calculation of the examination mark
   20% of the final score is determined by the oral evaluation
   80% of the final score is determined by the written exam
   The student passes for the course when a final score of at least 50% is obtained.