

Course Package

BET Bionanotechnology and Advanced Biomanufacturing - 1B

Name module	BET - Bionanotechnology and Advanced Biomanufacturing – 1B
Educational programme	MSc Biomedical Engineering
Period	Second quartile of the first semester (Block 1B)
Study load	15 ECTS
Coordinator	J. Huttenhuis

BET - Bionanotechnology and Advanced Biomanufacturing			
block 1A	block 1B	block 2A	block 2B
	Biomedical Materials Engineering* 201400283 (5 EC)		
	Nanomedicine 201200220 (5 EC)		
	Lab on a Chip** 191211120 (5 EC)		

Required preliminary knowledge: You have followed the course 201800288 *Introduction to Bioengineering Technologies (1A)*. Proven knowledge of Organic chemistry, polymer chemistry, Biomaterials, and Cell-Material Interactions, Biomedical Signal Acquisition, Micro Electro Mechanical Systems Design, Technology.

* Mandatory master tracks: BME and CHE.

* Mandatory preliminary knowledge: General physics at bachelor level.

201400283 - Biomedical Materials Engineering

This course deals with the basic principles of regulation, processing, surface modification, and analysis of biomaterials as well as of tissue-biomaterial interactions in regenerative medicine.

201200220 - Nanomedicine

Nanomedicine is one of the most dynamic fields, which holds a high potential to make a huge impact on the medical science. Nanomedicine is in general defined as medical applications of nanotechnology. In recent years, nanotechnologies have been applied for drug delivery, imaging/diagnostics, biosensing, in vitro diagnostics, and tissue engineering. One of the largest areas for nanomedicine is the drug delivery/targeting.

The modules are tentative and subject to change. Please check [the website](#) regularly.

Conventional medicine, which are either administered orally or with injections, are not always successful for achieving the desired therapeutic effects but rather show high side effects. Therefore, novel drug delivery systems are highly crucial to develop, using which the drugs can be specially delivered at the targeted site or even to the specific cell types. Using these novel approaches, high therapeutic effects and low/no side effects can be achieved. A large part of the course will be devoted to the drug delivery. Besides drug delivery, nanomedicine includes applications of nanomaterials for imaging and diagnostics as well as theranostics (therapeutics + diagnostics), which will be covered up during this course. Applications to drug delivery and imaging are mostly related to applications of nanotechnologies in vivo. In addition, nanomedicine also covers up in vitro applications such as diagnostics using biosensing techniques and microfluidics. Students will also write a research proposal during this course on an assigned topic of nanomedicine, which allows them to further develop their knowledge on this subject. Altogether this course provides a broader and in depth understanding of the emerging field of nanomedicine.

191211120 - Lab on a Chip

Principles of fluidics and molecular transport at the micro- and nanoscale; Microfabrication; Chip-based systems for cell studies; On-chip detection methods; On-chip separation methods.

Students who already followed the module Lab on a Chip (201500054) in the bachelor phase are not allowed to follow this course, since there is extensive overlap between the two courses.