

Course Package

Biomedical Membranes & Artificial Organs

Name module	BNT - Biomedical Membranes & Artificial Organs
Educational programme	MSc Biomedical Engineering
Period	First quartile of the second semester (Quarter 2A)
Study load	15 ECTS

BNT - Biomedical Membranes & Artificial Organs			
Quarter 1A	Quarter 1B	Quarter 2A	Quarter 2B
		Biomedical Membranes & Artificial Organs (5 EC)	
		Bionanotechnology (5 EC)	
		Capita Selecta BME (5 EC)	

Required preliminary knowledge: Fundamental knowledge and concepts from molecular biology, cell biology, biochemistry, organic chemistry, physical chemistry especially thermodynamics.

201400284 **Biomedical Membranes & Artificial Organs**

The course covers biomedical applications where the artificial membrane plays a crucial role. Main topics are: membrane preparation and characterization, drug delivery, blood purification-dialysis, blood oxygenation, bio-artificial kidney, bio-artificial pancreas, bio-artificial liver and tissue engineering. The course combines theory, assignments as well as experiments.

193400111 **Bionanotechnology**

This module provides you with (I) an introduction into this field, (II) some basics in nanobiology, (III) the methods and techniques used, (IV) some applications in the field of bionanotechnology.

A. Biological nano-objects (2-3 weeks) is an introduction into the objects this field is concerned with (biomolecules nanoparticles). It contains some molecular biology, biochemistry etc.

Chapters are: (1) Structure and function of DNA,

(2) Proteolipid assemblies and biomimetic nanostructures,

(3) Supramolecular complexes of DNA,

(4) Functionalized mineral nanoparticles for biomedical applications,

(5) Nanomachines of life,

(6) Structure and motion on the nanoscale.

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

B. Nanobiotechnology methods and techniques (3 weeks) is an overview of the techniques and methods used in nanobiotechnology to study the nano-objects.

Chapters are: (7) Optical techniques, including fluorescence,
(8) Nanoforces and imaging: atomic force microscopy and spectroscopy,
(9) Nanoforces and imaging: optical and magnetic tweezers.

C. Nanobiotechnology applications (1-2 weeks) are applications of nanobiotechnologies to show the potential in the direction of nanobiology and nanomedicine. This part is done in an assignment form.

2014002.. **Capita Selecta BME**

To provide the opportunity to explore a specific topic within the field of Biomedical Engineering in depth, which is not available as a regular course.

Selected Topics in Biomedical Engineering concern a specific assignment to investigate, explore or research a specific topic in the field of Biomedical Engineering. The assignment has to be concluded by a written report. The topic will be selected and tutored by a scientific staff member of the Biomaterials Science and Technology group (course code 201400266) or the Developmental Bioengineering group (course code 201400272). The duration of the assignment is 140 hours.