

Course Package

Imaging & Diagnostics

Name module	Imaging & Dagnostics
Educational programme	MSc Biomedical Engineering
Period	Second quartile of the second semester (Quarter 2B)
Study load	15 ECTS

Imaging & Dagnostics			
Quarter 1A	Quarter 1B	Quarter 2A	Quarter 2B
			Biomedical Optics (5 EC)
			Clinical Chemistry (5 EC)
			Capita Selecta BME (5 EC)

Required preliminary knowledge: Knowledge of Optics, Wave Optics, Electrodynamics, Fourier Transform, Calculus, Differential and Integral Equations.

193500000 **Biomedical Optics**

Skin and other biological tissues scatter light, making it impossible to look directly inside the body. Still, there are many optical methods that can image structures deep under the skin e. g. by cleverly using interactions between light and tissue, by exploiting the properties of light propagation in scattering materials, or by combining light with ultrasound. In this course, you will get to know the basic theoretical models for light propagation in biological tissue, and you will learn the working principle of a large range of optical imaging methods, ranging from highly experimental approaches to devices widely used in the clinic on a daily basis. Topics include: light scattering on small particles, light diffusion and radiative transport, optical coherence tomography, photoacoustic tomography, speckle-based blood flow monitoring, optical wavefront shaping, and more. In addition to the lectures, you will perform a series of light-scattering experiments. Written examination (weight factor 0.5). Reports on experiments (weight factor 0.5).

193640050 **Clinical Chemistry**

The course clinical chemistry includes the basics of laboratory medicine in chemistry and pathology. Various concepts of clinical chemistry and laboratory medicine will be discussed such as; different measuring principles, sensitivity and specificity. What qualities are required of a laboratory test when it is used for

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screening purposes, like the current national screen for colorectal cancer. The aim is to explore the principles, techniques and instrumentation involved in quantitative analysis, with special emphasis on their clinical applications.

The start of this course will involve the basic concepts followed by a lab tour. During the remainder of the course you will address a current problem within the field of clinical chemistry. Together with one or more fellow students you will be challenged to make this problem 'your own', by writing a project description and a more extensive paper on your vision and ideas on the problem. During this time you will be supervised by a clinical chemist. Furthermore you will teach your fellow students about a subject regarding the project, like lab on a chip, diabetes etc.

2014002.. Capita Selecta BME

This course aims 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 Membrane Technology group. The duration of the assignment is 140 hours.