

Course Specifications

From the academic year 2018-2019 up to and including the

Biomedical Imaging (E010370)

Due to Covid 19, the education and evaluation methods may vary from the information displayed in the schedules and course details. Any changes will be communicated on Ufora.

Course size (nominal values; actual values may depend on programme)
Credits 3.0 Study time 90 h Contact hrs 25.0 h

Course offerings and teaching methods in academic year 2020-2021

Offering	Language	Location	Teaching Methods	Hours
A (semester 1)	English	Gent	seminar: practical PC room classes	5.0 h
			lecture	20.0 h
B (semester 1)	Dutch		seminar: practical PC room classes	5.0 h
			guided self-study	20.0 h

Lecturers in academic year 2020-2021

Vandenberghe, Stefaan	TW06	lecturer-in-charge
Vandemeulebroucke, Jef	VUB	co-lecturer

Offered in the following programmes in 2020-2021

Programme	crdts	offering
Master of Science in Biomedical Engineering	3	A
Master of Science in Biomedical Engineering	3	A, B

Teaching languages

Dutch, English

Keywords

CT, SPECT, PET, Ultrasound, image processing.

Position of the course

The goal of this course is to make the students familiar with medical imaging and image processing techniques. An overview will be given of the working mechanisms of the most important medical imaging techniques, their advantages and disadvantages, their applications and recent technical developments.

Contents

Introduction to images and image processing: sampling, filters convolution theorem X-rays radiography and principle of computed tomography and analytical reconstruction SPECT imaging: collimation, detection and image degrading effects PET imaging: principle, image degrading effects and iterative reconstruction Ultrasonic imaging MRI: basic principles of magnetic resonance and image formation Image processing and segmentation techniques

Initial competences

Basic knowledge of physics and signal processing.

Final competences

- 1 Understand physical principles of different medical imaging techniques
- 2 Define components of medical imaging systems
- 3 Have insight in advantages and disadvantages of existing image reconstruction techniques
- 4 Being able to judge the advantages and disadvantages of different medical imaging techniques
- 5 Understand relationship between different image processing techniques

Conditions for credit contract

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

Conditions for exam contract

This course unit cannot be taken via an exam contract

Teaching methods

Guided self-study, lecture, seminar: practical PC room classes

Learning materials and price

Slides + cursus via VTK

References

Course content-related study coaching

Evaluation methods

end-of-term evaluation and continuous assessment

Examination methods in case of periodic evaluation during the first examination period

Oral examination

Examination methods in case of periodic evaluation during the second examination period

Oral examination

Examination methods in case of permanent evaluation

Report

Possibilities of retake in case of permanent evaluation

not applicable

Extra information on the examination methods

Oral examination (written preparation).

Calculation of the examination mark

Periodical evaluation (75%) + non-periodical evaluation (25%)

Second exam: only periodical evaluation