UNIVERSITY OF ZAGREB SCHOOL OF MEDICINE

Plan of the course

Cardiac Imaging

Academic year **2016/2017**

I. COURSE AIMS

With the development of new medical and interventional therapies in Cardiology, the detailed non-invasive diagnosis and follow up is becoming more and more important in clinical practice. Cardiac imaging is not only used to study the morphology of the heart. Its main purpose it to quantify the functioning of the heart muscle.

This course provides an introduction into the current status of the available cardiac imaging modalities. The techniques and equipment as well as the applications in clinical practice and in biomedical research will be discussed.
The first aim is to introduce the different ways of digitally forming images of morphology, blood supply and functional aspects of the heart. Next, we clearly want to describe the dissimilar and complementary nature of the possible image formation techniques, based on their informative content. In addition the contemporary techniques of analysis of such images will be presented to illustrate the possibilities and the use biomedical and clinical research.

II. COURSE STRUCTURE

Course hours:

Lectures: 12

Seminar: 3

Practicum: 3

Total hours: 18

We will start with a general description of what a digital image is and what the effects of a few basic image processing principles are. This will all be illustrated in real time by means of images made with a digital photo camera.
In the following lectures the various cardiac image formation methods, applied in clinical practice or in biomedical research, will be discussed in more detail. The emphasis is not so much on the detailed operation of the modality, but on the informative image content that is collected and what kind of information concerning morphology, blood supply and functioning of the heart can be acquired from this. A clear comparison will be made of the difference in (medical) informational content, based on the differences in physical principles on which the modalities are based. Thus, certain aspects of cardiac morphology and function will be approached from a totally different perspective, depending on the applied techniques.

Next, an overview of image quantification and visualization techniques will be given, focusing on the potential use in clinical practice and for cardiovascular research.

In order to illustrate the integrated use of medical imaging, the study of cardiac deformation will be discussed to show what kind of information we can get from imaging and which possibilities there are to use this for better understanding of cardiac physiology and diagnosis and follow-up of cardiac diseases. Using echocardiographical information, MR and nuclear medicine images we can measure and analyse the local deformation of the heart muscle during the different phases of the heart cycle.

To get a better idea of the clinical use of cardiac imaging, a demonstration of an echocardiographic examination will be organized

III. PLAN OF THE COURSE AND COURSE SCHEDULE

BLOCKS OF THE COURSE

Number of blocks: **1**

Block number	Start	End
1.	3.7.2017	7.7.2017

BLOCKS OF THE COURSE SHEME

Block 1

Date	Time	Group	Course hours type	Theme	Teasching staff
Monday 3.7.2017.	10:00-12:15; KBC, Klinika za bolesti srca i krvnih žila		Lectures	cardiac imaging modalities	Bart Bijnens
	14:00-16:15; KBC, Klinika za bolesti srca i krvnih žila		Lectures	medical image quantification	dr. sc. Srećko Lončarić
Tuesday 4.7.2017.	10:00-12:15; KBC, Klinika za bolesti srca i krvnih žila		Lectures	cardiac deformation	Bart Bijnens
	14:00-15:30; KBC, Klinika za bolesti srca i krvnih žila		Lectures	cardiac deformation	Bart Bijnens
	16:00-17:30; KBC, Klinika za bolesti srca i krvnih žila		Seminar	Echo demonstration, Worksation analysis	doc. dr. sc. Maja Čikeš, Bart Bijnens
Wednesday 5.7.2017.	14:00-14:45; KBC, Klinika za bolesti srca i krvnih žila		Practicum	MRI demonstration	dr. sc. Maja Hrabak Paar, doc. dr. sc. Maja Čikeš, Bart Bijnens
	15:00-16:30; KBC, Klinika za bolesti srca i krvnih žila		Seminar	cardiac modeling	Bart Bijnens
Thursday 6.7.2017.	15:00-16:30; KBC, Klinika za bolesti srca i krvnih žila		Practicum	exam - article presentation	Bart Bijnens

IV. EXAMINATIONS

V./I. LIST OF LECTURERS AND TEACHING STAFF

1. doc. dr. sc. Maja Čikeš

2. dr. sc. Maja Hrabak Paar

V./II EXTERNAL ASSOCIATES:

1. Bart Bijnens

2. dr. sc. Srećko Lončarić

V./III UNTENURED LECTURERS:

VI. LITERATURE

Extracts of ‘Doppler Myocardial Imaging – A Textbook’. Sutherland, Hatle, Claus, D’hooge, Bijnens. BSWK, 2006.
http://www.myocardialimaging.com

Additional:

Fundamentals of Medical Imaging, P. Suetens, Cambridge University Press, 2002