Semmelweis University, Faculty of Medicine
Name of the managing institute (and any contributing institutes):
Heart and Vascular Center
Institute of Translational Medicine

Name of the subject: Az EKG klinikuma
in English: Clinical ECG
in German: Klinische Elektrokardiographie

Credit value: 3

Weeks 1–7: Total number of lessons/week: 4      lecture: 2      practical course: 2      seminar: 0
Weeks 8–14: Total number of lessons/week: 2      lecture: 0      practical course: 2      seminar: 0

Subject type: compulsory course

Academic year: 2021/2022

Subject code: AOKKAR680_1A

Name of the course leader: Zoltán Benyó MD, PhD, DSc (weeks 1-7)
His/her workplace, phone number: Institute of Translational Medicine, 210-0306
Position: director, professor
Date and registration number of their habilitation: 2008, 259

Name of the course leader: Dávid Becker MD, PhD, (weeks 8-14)
His/her workplace, phone number: Heart and Vascular Center, +36-1-458-10
Position: deputy director
Date and registration number of their habilitation: 2020, 02

Objectives of the subject, its place in the medical curriculum:
The aim of the subject is to prepare students for the courses in cardiology and internal medicine. The student should be able to recognize the conditions requiring immediate cardiac intervention and the most important arrhythmias.

Place where the subject is taught (address of the auditorium, seminar room, etc.):
Nagyvárad square Building, 1089 Bp. Nagyvárad tér 4. (weeks 1–7: lectures and practicals)
Heart and Vascular Center, 1122 Budapest, Városmajor u. 68. (weeks 8–14: practicals)

Successful completion of the subject results in the acquisition of the following competencies:
The student will be able to independently record an ECG and give a professionally correct description of a 12-lead ECG at rest. He/she will be able to estimate basic parameters, identify abnormalities and list clinical conditions that may cause the abnormalities described. Of particular importance is the ability to recognize ST-elevation myocardial infarction, atrial fibrillation and arrhythmias requiring acute intervention.

Course prerequisites:
biophysics, physiology

Number of students required for the course (minimum, maximum) and method of selecting students:
Based on the registration in the Neptun system

**How to apply for the course:**
Through the Neptun system

**Detailed curriculum:**

**Weeks 1–7, lectures (2·45 min):**

<table>
<thead>
<tr>
<th>Week</th>
<th>Translational Medicine (45 min)</th>
<th>Cardiovascular Center (45 min)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Classification of conduction disorders, mechanisms of bradyarrhythmias</td>
<td>The practical significance of impulse formation and conduction disorders</td>
</tr>
<tr>
<td>3</td>
<td>Repolarization disorders. ECG signs of different forms of ischaemic heart disease.</td>
<td>The role of ECG in the investigation of chest pain pathologies and its role in risk stratification.</td>
</tr>
<tr>
<td>4</td>
<td>Ventricular arrhythmias</td>
<td>Differential diagnosis of wide QRS tachycardias. Detection of ventricular tachycardias, ECG criteria.</td>
</tr>
<tr>
<td>5</td>
<td>Basics of pacemaker systems</td>
<td>ECG of a patient with pacemaker</td>
</tr>
<tr>
<td>6</td>
<td>Cases with multiple abnormalities</td>
<td>Description of complex ECGs, ECG differential diagnostics.</td>
</tr>
<tr>
<td>7</td>
<td>Cases to learn from</td>
<td>Revision</td>
</tr>
</tbody>
</table>

**Weeks 1-7, practicals:**
1. ECG lead systems, nomenclature. Analysis of normal ECG tracings. Estimation of frequency and heart axis. The ladder diagram.
2. Recognition of nomotopic and heterotopic pacemaker disturbances, supraventricular and ventricular tachycardias on ECG tracings.
4. Angina and NSTEMI. Localization and staging of ST-elevation infarcts.
5. Recognition of electrolyte abnormalities, atrial and ventricular strain and hypertrophy.
7. **Mid term exam**

**Weeks 8-14, practicals:**
During the practicals, theoretical knowledge is correlated with clinical practice at the bedside of the wards of the Heart and Vascular Center, and ECG curves of patients are analyzed.

**From week 14 – end of the exam period: Examination (written)**

**Other subjects concerning the border issues of the given subject (both compulsory and optional courses!). Possible overlaps of themes:**
biophysics, physiology, cardiology
**Special study work required to successfully complete the course:** none

**Requirements for participation in classes and the possibility to make up for absences:**
Students can miss two practices, above that they have to make up. It is not possible to make up lectures, but you can make up the practicals in another group in the same week.

**Methods to assess knowledge acquisition during term time:**
An oral mid term of the material from the basic course (first 6 weeks) in week 7 (analysis of ECG tracings. Attendance is compulsory.

**Requirements for signature:**
Successful (at least satisfactory) oral demonstration (as the subject is taught by two different departments).

**Type of examination:**
Written MCQ test

**Requirements of the examination:**
Recognition of attendance

**Method and type of evaluation:**
Grading is based on performance in the written test.

**How to register for the examination:**
through the Neptun system

**Possibilities for exam retake:**
In accordance with the study and examination regulations

**Printed, electronic and online notes, textbooks, guides and literature (URL address for online material) to aid the acquisition of the material:**
- Thaler, Malcolm S.: Az egyetlen EKG-könyv, amire szükséged lehet, Medicina Kiadó, 2019
- Malcolm S. Thaler: The Only EKG Book You’ll Ever Need, Wolters Kluver, 2019
- Trappe, Hans-Joachim, Schuster Hans-Peter: EKG-Kurs für Isabel, Thieme, 2013
- Simon András–Tornóci László: EKG érthetően (munkafüzet), Semmelweis Kiadó, 2015
- Simon András–Tornóci László: Understanding ECG (workbook), Semmelweis Kiadó, 2016

**Signature of the habilitated instructor (course leader) who announced the subject:**

**Signature of the Director of the Managing Institute:**

**Hand-in date:** June 3, 2021

**Opinion of the competent committee(s):**

**Comments of the Dean’s Office:**

**Dean’s signature:**