

DESCRIPTION FOR THE MODULE OF THE DOCTORAL STUDIES AT VILNIUS UNIVERSITY

Scientific Area/eas, Field/ds of Science	Medical and Health Sciences (M 000): Medicine (M 001)			
Faculty, Institute, Department/Clinic	Faculty of Medicine Institute for Clinical Medicine Clinics of the Cardiovascular Diseases			
Course unit title (ECTS credits, hours)	Cardiac Arrhythmia 8 credits (212 hours)			
Study method	Lectures	Seminars	Consultations	Self-study
Number of ECTS credits	-	-	3	5
Method of the assessment (in 10 point system)	Introduction and assessment of the presentation. The presentation to be delivered on a topic that is being coordinated with the lecturers (a PhD student has to analyse, review and present the most recent research publications related with the topic in question by providing examples of clinical cases). Assessment criteria of the presentation: a reflected topic in question (0,3 x an assessment in a 10-point grading scale), reviewed the most recent literature (0,3 x an assessment in a 10-point grading scale), illustrated by quality and proper examples (0,4 x an assessment in a 10-point grading scale). A An arithmetic sum of all three grades constitutes a final grade.			
PURPOSE OF THE COURSE UNIT				
To provide thorough knowledge on anatomical, functional peculiarities of heart rhythm disorders as well as physiological mechanisms, diagnostic methods along with treatment possibilities.				
THE MAIN TOPICS OF COURSE UNIT				
<ul style="list-style-type: none"> • Mechanisms of heart rhythm disorders: automaticity, triggered activity, and reentry. • The key examination methods of arrhythmias: Holter ECG 24 hour monitoring, long term ECG monitoring, implanted ECG monitoring devices, transthoracic atrial stimulation, an orthostatic test, an intracardiac electrophysiological procedure (methodics, indications, contraindications). • Treatment methods of arrhythmias: antiarrhythmic drugs (classification, action mechanisms, side effects, new III class agents – dronedarone, vernakalant), temporary heart electric stimulation (methodics, indications, complications), constant heart electric stimulation (types of electric cardiac stimulators - ECS, indications, complications), heart resynchronisation therapy (a definition, indications), a catheter ablation (radiofrequency energy, cryoablation: methodics, indications, contraindications, complications), surgical treatment of heart rhythm disorders (maze procedure, minimally invasive surgery), external cardiac electric defibrillation (methodics, types of defibrillators, indications, complications), implantable automatic cardioverters defibrillators (types, indications, complications, contraindications). • Heart conduction disorders: sinus node dysfunction (etiology, classification, diagnostics, treatment methods, prognosis, indications for implantation of ECS), atrioventricular conduction disorders (etiology, classification, degrees, prognosis, indications for implantation of ECS), intraventricular conduction disorders (bundle 				

branch block, etiology, trifascicular and bifascicular blocks, prognosis, indications for implantation of ECS).

- Heart failure and arrhythmias. Impact on ventricle function of intraventricular conduction disorders. Selection of patients with heart failure for resynchronization therapy. Effect assessment of resynchronization therapy: ECG, echocardiography.
- Extrasystole (classification, etiology, drug treatment, indications for interventional treatment).
- Supraventricular rhythm disorders. Atrial fibrillation: epidemiology, etiology, mechanisms, classification, prognosis, treatment methods (cardioversion – electric and drug-related, to prevent disease recurrence, frequency control of ventricular contractions, prevention of thromboembolic complications by using warfarin, thrombin inhibitor, choice of interventional treatment method). Atrial flutter (epidemiology, mechanism, classification, drug-related or interventional treatment, prevention of thromboembolic complications).
- Arrhythmia after cardiac surgeries (coronary artery diseases, valve procedures, corrections of congenital heart defects).
- Sinus arrhythmias (physiological sinus tachycardia, inappropriate sinus tachycardia, sinus nodal reentrant tachycardia, diagnostics and treatment methods of the arrhythmia).
- Atrioventricular nodal paroxysmal reciprocating tachycardia (epidemiology, classification, mechanisms, treatment methods).
- Atrioventricular reciprocating tachycardia (related with additional conduction of bundle branches): types of additional conduction bundle branches (their anatomy and physiology), tachycardia types and mechanisms, WPW syndrome and risk of sudden death, drug-related treatment (used medication for cardioversion), catheter ablation (indications, WPW phenomenon and catheter ablation).
- Focal atrioventricular tachycardia (definition, treatment methods). Non-paroxysmal atrioventricular tachycardia (definition, diagnostics and treatment ways).
- Focal atrial tachycardia (definition, diagnostics and treatment ways).
- Heart rhythm and conduction disorders as well as congenital heart defects.
- Heart rhythm and conduction disorders and pregnancy.
- Ventricular tachyarrhythmias: classification, ventricular tachycardia related with structural heart diseases, idiopathic ventricular tachycardia (classification according to the mechanisms and drug effectiveness, treatment ways), epidemiology, etiology, prognosis and treatment.
- Genetic anomalies of cardiomyocyte membrane channels: long QT interval syndrome (types of congenital long QT interval syndrome, drugs extending QT, treatment ways), a syndrome of a short QT interval, catecholaminergic ventricular tachycardia (mutations of ryanodine receptors, calsequestrin), Brugada syndrome (diagnostics and treatment).
- Arrhythmias with cardiomyopathies (hypertrophic, dilatational, arrhythmogenic right ventricular. Mutational effects of myosine, desmoplakin, laminin, collagen, etc). Risk of ventricular tachycardia and sudden death.
- Supraventricular and ventricular tachycardia differential diagnostics.
- Syncope: definition, classification, diagnostic algorithms, treatment ways.
- Sudden cardiac death: epidemiology, causes, primary and secondary prophylactics.
- Sports and arrhythmia: recommendations for sports, physical activity or driving in presence of various conduction and rhythm disorders (sinus bradycardia, AV conduction disorders, supraventricular and ventricular arrhythmia with implanted ESCs and cardioverters defibrillators).

RECOMMENDED LITERATURE SOURCES

1. Clinical Arrhythmology and Electrophysiology: A Companion to Braunwald's Heart Disease/ Ziad Issa, John M. Miller, and Douglas P. Zipes. - Philadelphia: Saunders, Elsevier Inc., 2018.
2. Cardiac Electrophysiology: From Cell to Bedside by Douglas Zipes, Jose Jalife. - Philadelphia: Saunders, Elsevier Inc., 2021.
3. 2018 ESC Guidelines for the diagnosis and management of syncope. Eur Heart J 2018;39(21):1883-1948.
4. 2019 HRS/EHRA/APHRS/LAHRS expert consensus statement on catheter ablation of ventricular arrhythmias. Europace 2019;21(8):1143-1144.
5. Electrophysiology and Pacing Through Case studies/ Kenneth A. Ellenbogen. - Minneapolis: Cardiotext Publishing LLC. 2014.
6. Cardiac Pacing and ICDs 7th Edition/ Kenneth A. Ellenbogen. - Atrium, Southern Gate, Chichester, West Sussex: Wiley Blackwell 2020.
7. EP-Europace - an official Journal of the European Society of Cardiology and the European Heart Rhythm Association. <https://academic.oup.com/europace>
8. 2020 ESC Guidelines for the diagnosis and management of atrial fibrillation developed in collaboration with the European Association for Cardio-Thoracic Surgery (EACTS): The Task Force for the diagnosis and management of atrial fibrillation of the European Society of Cardiology (ESC) Developed with the special contribution of the European Heart Rhythm Association (EHRA) of the ESC. Eur Heart J 2021;42(5):373-498.
9. Josephson's Clinical Cardiac Electrophysiology. Lippincott Williams & Wilkins; 6th ed. 2021.
10. European Heart Rhythm Association (EHRA) international consensus document on how to prevent, diagnose, and treat cardiac implantable electronic device infections. 2020;22(4):515-549.
11. European Heart Rhythm Association (EHRA)/Heart Rhythm Society (HRS)/Asia Pacific Heart Rhythm Society (APHRS)/Latin American Heart Rhythm Society (LAHRS) Expert Consensus Statement on the state of genetic testing for cardiac diseases. EP Europace 2022, euac030, <https://doi.org/10.1093/europace/euac030>

CONSULTING LECTURERS

1. Coordinating lecturer: Audrius Aidietis (Prof. Dr. HP).
2. Germanas Marinskis (Prof. Dr. HP).
3. Gediminas Račkauskas (Dr.).

APPROVED:

By Council of Doctoral School of Medicine and Health Sciences at Vilnius University:
29th of September 2022

Chairperson of the Board: Prof. Janina Tutkuvienė