INFORMATION ABOUT THE COURSE

Internal Medicine – Cardiology

1. Basic information

Field of studies field of medical and health sciences, discipline: medical sciences **Unit responsible for the field of studies** Faculty of Medicine Bydgoszcz University of Science and Technology **Level of studies** Uniform master's studies **Profile of studies** General academic **Form of studies** Full-time	**Studies cycle** 2026/27 **Course code** 17MEDS.JM10.4167.25 **Language** English **Obligatory** Yes
Prerequisites	A student starting the "Cardiology" course should have knowledge of anatomy, physiology, pathophysiology and pathomorphology of the cardiovascular system, be able to perform medical history taking and physical examination, and know the basic drugs used in cardiology. Passing the subjects defined as introductory is equivalent to fulfilling the entry requirements for the "Cardiology" course within the Internal Medicine module.
Introductory courses	Anatomy, Physiology, Pathophysiology, Physical Examination, Pharmacology with Toxicology, Propaedeutics of Internal Medicine
Coordinator	Dr n. med. Mirosław Jabłoński

Study period	Form of assessment / Form and hours of classes	ECTS credits
Winter/Summer	Graded credit Lecture: 15 h Practical classes (exercise): 35 h Simulation classes: 10 h	3.0

2. Learning outcomes

Code	Description of learning outcomes	Reference to programme learning outcomes	Reference to PRK characteristics
Knowledge (student knows and understands):			
W1	Student knows and understands the symptoms and course of diseases of the cardiovascular system.	O.W2.	P7S_WG

Code	Description of learning outcomes	Reference to programme learning outcomes	Reference to PRK characteristics
W2	Student knows and understands the development, structure and functions of the human body under normal and pathological conditions.	O.W1.	P7S_WG
W3	Student knows and understands the environmental and epidemiological factors, causes, symptoms, principles of diagnosis and therapeutic management of the most common diseases occurring in children and their complications: heart defects, myocarditis, endocarditis and pericarditis, cardiomyopathies, cardiac arrhythmias, heart failure, arterial hypertension, pulmonary hypertension and syncope.	E.W3.	P7S_WG
W4	Student knows and understands the environmental and epidemiological factors, causes, symptoms, principles of diagnosis and therapeutic management of the most common internal diseases occurring in adults and their complications: cardiovascular diseases including ischaemic heart disease, valvular heart disease, diseases of the endocardium, myocardium and pericardium, acute and chronic heart failure, arterial and venous diseases, primary and secondary arterial hypertension, pulmonary hypertension.	E.W7.	P7S_WG
W5	Student knows and understands the etiology, mechanisms and consequences of haemodynamic disorders.	C.W24.	P7S_WG
W6	Student knows and understands the pathomechanism and clinical forms of the most common diseases of individual systems and organs, metabolic diseases and disturbances of water-electrolyte, hormonal and acid-base balance.	C.W27.	P7S_WG
W7	Student knows and understands the individual groups of medicinal products, their mechanisms and effects of action, basic indications and contraindications as well as basic pharmacokinetic and pharmacodynamic parameters.	C.W28.	P7S_WG
W8	Student knows and understands basic classical and minimally invasive cardiological procedural techniques.	F.W3.	P7S_WG
W9	Student knows and understands the principles of qualification for basic surgical procedures and invasive diagnostic and therapeutic procedures as well as the most common complications.	F.W4.	P7S_WG

Code	Description of learning outcomes	Reference to programme learning outcomes	Reference to PRK characteristics
W10	Student knows and understands the guidelines for cardiopulmonary resuscitation in neonates, children and adults.	F.W9.	P7S_WG
W11	Student knows and understands the most common life-threatening states in cardiology and the principles of management of acute cardiovascular disorders.	F.W10.	P7S_WG
W12	Student knows and understands the principles of using imaging studies in the diagnosis and treatment of cardiovascular diseases.	F.W17.	P7S_WG, P7S_WK
Abilities (student can do/perform):			
U1	Student can recognise medical problems and set priorities for medical management.	O.U1.	P7S_UW
U2	Student can plan diagnostic management and interpret its results.	O.U3.	P7S_UW
U3	Student can implement appropriate and safe therapeutic management and predict its effects.	O.U4.	P7S_UW
U4	Student can communicate with team co-workers and share knowledge.	O.U8.	P7S_UO
U5	Student can critically appraise the results of scientific research and justify their position appropriately.	O.U9.	P7S_UW
U6	Student can take a medical history from an adult patient.	E.U1.	P7S_UW, P7S_UK
U7	Student can recognise the most common symptoms of disease in adults, apply diagnostic tests and interpret their results, perform differential diagnosis, implement therapy, monitor the effects of treatment and assess indications for specialist consultation, in particular in the case of symptoms such as cardiac arrest, chest pain and palpitations.	E.U9.	P7S_UW, P7S_UU
U8	Student can perform medical procedures, including the measurement and assessment of basic vital signs (temperature, pulse, arterial blood pressure), their monitoring using a cardiac monitor and pulse oximeter, a standard resting electrocardiogram with interpretation, defibrillation, electrical cardioversion and external electrostimulation.	E.U14.	P7S_UW, P7S_UU

Code	Description of learning outcomes	Reference to programme learning outcomes	Reference to PRK characteristics
U9	Student can take a history in a life- or health-threatening situation using the SAMPLE scheme.	E.U3.	P7S_UW, P7S_UK
U10	Student can carry out a complete and focused physical examination of an adult patient.	E.U5.	P7S_UW, P7S_UK
U11	Student can provide health services using available IT systems or communication systems used in healthcare.	E.U20.	P7S_UW, P7S_UK, P7S_UU
U12	Student can correlate images of tissue and organ damage with clinical symptoms of disease, history and laboratory findings in order to establish a diagnosis in the most common diseases of adults and children.	C.U7.	P7S_UW
U13	Student can prepare prescription forms for selected medicinal substances and issue prescriptions, including e-prescriptions, in accordance with legal regulations.	C.U11.	P7S_UW
U14	Student can identify conditions requiring in-hospital treatment.	E.U12.	P7S_UW, P7S_UU
U15	Student can apply personal protective equipment adequate to the clinical situation.	E.U15.	P7S_UW, P7S_UU
U16	Student can pronounce the death of a patient.	E.U16.	P7S_UW, P7S_UU
U17	Student can maintain patient medical records, including in electronic form, in accordance with legal regulations.	E.U18.	P7S_UW, P7S_UU
U18	Student can provide health education to the patient, including nutritional education tailored to individual needs.	E.U21.	P7S_UW, P7S_UU
U19	Student can conduct a conversation with a patient taking into account the scheme of the conversation (opening, gathering information, explaining and planning, closing) and structuring such a conversation, as well as building a relationship with the patient using a selected model (e.g. Calgary-Cambridge, SEGUE, Kalamazoo Consensus, Maastricht Maas Global guidelines), including by means of electronic communication.	E.U23.	P7S_UW, P7S_UK, P7S_UU
U20	Student can make diagnostic and therapeutic decisions jointly with the patient (assessing the patient's degree of involvement, needs and possibilities in this respect, encouraging the patient to take an active part in the	E.U26.	P7S_UW, P7S_UK, P7S_UO, P7S_UU

Code	Description of learning outcomes	Reference to programme learning outcomes	Reference to PRK characteristics
	decision-making process, discussing advantages, disadvantages, expected results and consequences of the decision) and obtain informed consent.		
U21	Student can accept, explain and analyse their own role and scope of responsibility in the team, and recognise their role as a physician in the team.	E.U31.	P7S_UW, P7S_UK, P7S_UO, P7S_UU
U22	Student can obtain information from team members with respect for their diverse opinions and specialist competences and incorporate this information into the patient's diagnostic and therapeutic plan.	E.U32.	P7S_UW, P7S_UK, P7S_UO, P7S_UU
U23	Student can discuss the patient's situation within the team without subjective judgements and with respect for the patient's dignity.	E.U33.	P7S_UW, P7S_UK, P7S_UU
U24	Student can perform basic life support (BLS) in adults, including using an automated external defibrillator, in accordance with ERC guidelines.	F.U11.	P7S_UW
U25	Student can perform advanced life support (ALS) in adults in accordance with ERC guidelines.	F.U12.	P7S_UW
U26	Student can select drugs in appropriate doses in order to correct pathological phenomena in the human body and in individual organs.	C.U9.	P7S_UW
Social skills (the student is ready to):			
K1	Student is ready to establish and maintain a deep and respectful contact with the patient and to show understanding for worldview and cultural differences.	O.K1.	P7S_KO, P7S_KR
K2	Student respects medical confidentiality and patients' rights.	O.K3.	P7S_KO, P7S_KR
K3	Student is ready to take action towards the patient on the basis of ethical principles, with awareness of the social conditions and limitations resulting from illness.	O.K4.	P7S_KK, P7S_KO, P7S_KR
K4	Student perceives and recognises their own limitations and performs self-assessment of educational deficits and needs.	O.K5.	P7S_KK, P7S_KO, P7S_KR
K5	Student is ready to promote health-oriented behaviour.	O.K6.	P7S_KO, P7S_KR

Code	Description of learning outcomes	Reference to programme learning outcomes	Reference to PRK characteristics
K6	Student is ready to use objective sources of information.	O.K7.	P7S_KK, P7S_KO, P7S_KR
K7	Student is ready to formulate conclusions based on their own measurements or observations.	O.K8.	P7S_KK, P7S_KO, P7S_KR
K8	Student is ready to formulate opinions concerning various aspects of professional activity.	O.K10.	P7S_KK, P7S_KO, P7S_KR
K9	Student is ready to take responsibility for decisions made as part of professional activity, including in terms of the safety of themselves and other persons.	O.K11.	P7S_KK, P7S_KO, P7S_KR

3. Programme contents

No.	Programme contents	Form of studies	Learning outcomes covered
1	• Ischaemic heart disease – Part I: risk factors, clinical forms, diagnostics (exercise ECG test, coronary angiography). Pharmacotherapy – drug groups. Invasive treatment of ischaemic heart disease – myocardial revascularisation methods, percutaneous coronary intervention (PCI), stents. Primary and secondary prevention of ischaemic heart disease. • Ischaemic heart disease – Part II: angina pectoris – forms (exertional and spontaneous, stable and unstable), CCS and Braunwald classifications. Indications for urgent and elective coronary angiography. Classification of patients into low- and high-risk groups. Pharmacological treatment – relief of coronary pain and long-term therapy. • Ischaemic heart disease – Part III: acute coronary syndromes, myocardial infarction – clinical forms, electrocardiographic and biochemical diagnostics, troponins. Principles of management of the patient with myocardial infarction in the pre-hospital period and in the ICCU – fibrinolytic and interventional (PCI) treatment. Post-hospital rehabilitation. Early and late complications of myocardial infarction. Usefulness of echocardiographic assessment in evaluating post-infarction left ventricular dysfunction. • Cardiological emergencies: sudden cardiac arrest – causes, mechanisms, clinical symptoms, resuscitation management. Pulmonary oedema – cardiac and non-	Lecture	W1, W2, W3, W4, W5, W6, W7, W8, W9, W10, W11, W12

No.	Programme contents	Form of studies	Learning outcomes covered
	cardiac causes – clinical symptoms and treatment (assisted ventilation). Cardiogenic shock – causes, symptoms, treatment. Circulatory support – intra-aortic balloon counterpulsation (IABP) and others. Pulmonary embolism – causes, clinical symptoms, treatment, prevention of thromboembolism. Cardiac tamponade – causes, clinical symptoms, treatment. • Cardiac arrhythmias – Part I: extrasystoles and tachyarrhythmias. Supraventricular premature beats, paroxysmal supraventricular tachycardia, atrial flutter and atrial fibrillation. Clinical and electrocardiographic features and management of supraventricular arrhythmias. Ventricular premature beats (Lown classification), paroxysmal ventricular tachycardia – non-sustained and sustained, monomorphic and polymorphic, ventricular flutter and fibrillation. Causes, clinical and electrocardiographic features and principles of management of ventricular arrhythmias. Antiarrhythmic drugs, cardioversion and electrical defibrillation. Ablation. Implantable cardioverter-defibrillator. Long QT syndrome (LQTS), QT-prolonging drugs. • Cardiac arrhythmias – Part II: bradyarrhythmias – sinus bradycardia, sinoatrial block, sinus arrest, first- to third-degree atrioventricular blocks – causes, clinical and electrocardiographic features, diagnostic and therapeutic management. Syncope – differential diagnosis: MAS (Morgagni–Adams–Stokes) syndrome, vasovagal syndrome, carotid sinus syndrome, orthostatic syncope. Diagnostic management – Holter ECG monitoring, tilt test, electrophysiological study (diagnostic cardiac stimulation), pharmacological tests. Use of ablation in the treatment of supraventricular and ventricular arrhythmias. Heart failure – acute and chronic, left-, right- and biventricular. Congestive heart failure. Causes, pathophysiological mechanisms. Clinical symptoms. NYHA classification. Pharmacotherapy of heart failure – drug groups: inotropes, vasodilators, ACE inhibitors, diuretics, beta-blockers. ECG diagnostics – bundle branch blocks. • Acquired valvular heart disease I: mitral stenosis and mitral regurgitation – aetiology, clinical symptoms, auscultation, ECG, radiological and echocardiographic findings. Complications of mitral valve disease. Pharmacotherapy. Indications for and methods of surgical treatment, percutaneous mitral valvuloplasty. NYHA functional classes. • Acquired valvular heart disease II: aortic stenosis and aortic regurgitation – clinical symptoms, auscultation, ECG, radiological and echocardiographic findings. Pharmacotherapy and indications for surgical treatment.		

No.	Programme contents	Form of studies	Learning outcomes covered
	• Congenital heart defects: classification, auscultatory findings, echocardiographic and haemodynamic diagnostics. Indications for surgical treatment. Clinical applications of echocardiography. Haemodynamic diagnostics of acquired and congenital heart defects (cardiac catheterisation and angiocardiography). • Indications for surgical treatment in cardiology: management of acquired valvular heart disease – the patient with a prosthetic heart valve – principles of anticoagulant therapy. • Cardiac electrical stimulation: permanent and temporary. Indications for implantation of a pacemaker. Types of stimulation, antiarrhythmic stimulation. Management of the patient with an implanted pacemaker. ECG diagnostics – pacing patterns on the electrocardiogram. Cor pulmonale – aetiology, clinical symptoms and treatment. • Inflammatory and degenerative heart diseases: myocarditis, endocarditis and pericarditis (rheumatic, infectious). Infective endocarditis – subacute (lenta) and acute: aetiology, predisposing factors, clinical symptoms, diagnosis and principles of treatment. Prevention of infective endocarditis – antibiotic prophylaxis schedules. Rheumatic endocarditis, myocarditis and pericarditis – clinical and electrocardiographic features. • Primary cardiomyopathies: dilated, hypertrophic and restrictive. • Arterial hypertension: blood pressure norms, classification of hypertension (mild, moderate, severe), aetiology – primary and secondary hypertension. Epidemiology of hypertension. Clinical symptoms accompanying elevated blood pressure. Target-organ damage in arterial hypertension. Principles of diagnostic management in hypertension. Pharmacotherapy of hypertension – groups of antihypertensive drugs. Hypertensive crisis, methods of rapid blood pressure reduction. ECG diagnostics – atrial and ventricular hypertrophy and overload.		
2	• Inflammatory diseases of the heart. Cardiomyopathies. Cardiac arrhythmias. Acquired and selected congenital heart defects. • Introduction to heart failure. Acute coronary syndromes. Invasive diagnostics. Selected life-threatening conditions. • Arterial hypertension. Prevention of coronary artery disease. Stable coronary artery disease. • Clinical analysis of patients with cardiomyopathy and inflammatory heart diseases in clinical practice. • Clinical analysis of patients with cardiac arrhythmias in practice. Cardiological care for patients with arrhythmias.	Practical classes (exercise), Simulation classes	W1, W3, W4, W8, W9, W10, W11, W12, U1, U2, U3, U4, U5, U6, U7, U8, U9, U10, U11, U12, U13, U14, U15, U16, U17, U18, U19, U20,

No.	Programme contents	Form of studies	Learning outcomes covered
	• Clinical analysis of selected patients with congenital and acquired heart defects. • Diagnosis of chronic heart failure and establishing a therapeutic intervention plan: pharmacological and non-pharmacological. Comprehensive analysis and verification of pharmacotherapy of the patient with heart failure. Practical principles of combining disease-modifying drugs. • Differential diagnosis of coronary heart disease based on selected cases. Planning diagnostic and therapeutic management in individual cases. • Differential diagnosis of acute coronary syndromes based on selected cases. Planning diagnostic and therapeutic management in individual cases. • Differential diagnosis of primary and secondary arterial hypertension based on selected cases. Planning diagnostic and therapeutic management in individual cases. • Diagnosis of congenital heart defects based on clinical cases of patients.		U21, U22, U23, U24, U25, U26, K1, K2, K3, K4, K5, K6, K7, K8, K9

4. Methods of verifying and assessing the learning outcomes achieved by the student

Winter semester (Semester 5)

Form of studies		
Lecture	**Methods of studies form:**	
	Lecture, Discussion	
	Methods of verification:	**Involvement:**
	Written test	100%
	Conditions for passing the course:	
Passing the course requires: (a) passing a written test in the form of a single-choice test consisting of 50 questions; (b) passing an oral examination in the form of short structured questions; (c) passing a practical examination. The final course grade is the arithmetic mean of the grades obtained from the written test and the practical examination. In the case of a justified absence, the form and date for making up classes is determined by the course coordinator. After obtaining positive grades from all subjects included in the Internal Medicine module, the student takes the module examination in the form of a single-choice test comprising 120 questions. The pass threshold and grading criteria for the module examination comply with the Study Regulations of Bydgoszcz University of Science and Technology.		
Practical classes (exercise)	**Methods of studies form:**	
	Case study, Master-apprentice method, Clinical classes	

Form of studies		
	Methods of verification:	**Involvement:**
	Oral examination	90%
	Observation	10%
	Conditions for passing the course:	
Credit is awarded on the basis of an oral examination and a practical examination. The oral examination consists of 5 short structured questions, each scored from 0 to 5 points (maximum 25 points). The practical examination takes place on the last day of the exercise block and assesses the practical approach to the patient, examination technique, clinical reasoning, differential diagnosis and treatment. Each element is scored from 0 to 5 points (maximum 25 points). The final grade is the arithmetic mean of the grades obtained from the oral examination and the practical examination. In the case of justified absences, the form and date for making up classes is determined by the course coordinator.		
Simulation classes	**Methods of studies form:**	
	Simulation exercises	
	Methods of verification:	**Involvement:**
	Observation	20%
	Case study	80%
	Conditions for passing the course:	
A practical examination takes place on the last day of the exercise block and consists of elements assessing the practical approach to the patient, examination technique, clinical reasoning, differential diagnosis and treatment. Each element is scored from 0 to 5 points (maximum 25 points). In the case of justified absences, the form and date for making up classes is determined by the course coordinator.		

Learning outcomes	**Methods of verification**			
	Written test	**Oral examination**	**Observation**	**Case study**
W1	X	X	X	X
W2	X	X	X	X
W3	X	X	X	X
W4	X	X	X	X

Learning outcomes	Methods of verification			
	Written test	Oral examination	Observation	Case study
W5	X	X		
W6	X	X		
W7	X	X		
W8	X	X		
W9	X	X		
W10	X			
W11	X			
W12	X	X		X
U1	X	X		X
U2	X	X		X
U3	X	X		
U4	X	X		X
U5	X	X		X
U6	X	X		X
U7	X	X		X
U8	X	X		X
U9	X	X		
U10	X	X		
U11	X	X		
U12	X	X		X
U13	X	X		
U14	X	X		
U15		X		
U16		X		
U17		X		
U18	X	X		

Learning outcomes	Methods of verification			
	Written test	Oral examination	Observation	Case study
U19	X	X		X
U20	X	X		X
U21		X		X
U22		X		X
U23		X		X
U24				X
U25				X
U26	X	X		
K1			X	
K2			X	
K3			X	
K4			X	
K5			X	
K6			X	
K7	X		X	X
K8			X	
K9			X	

5. Literature

Obligatory literature

1. David Laflamme, Cardiology, PZWL Publishing House, Warsaw 2023.
2. E. Braunwald, Heart Diseases, vols. 1–4, Urban & Partner 2007.
3. Paweł Balsam, Atrial Fibrillation, PZWL Publishing House, Warsaw 2022.
4. Ewa Straburzyńska-Migaj, Maciej Lesiak, Cardiology in the Primary Care Physician's Office, PZWL Publishing House, Warsaw 2023.
5. Tomasz Hryniewiecki, Piotr Pruszczyk, Great Internal Cardiology, vols. 1–2, Medical Tribune 2023.

Supplementary literature

1. Mariusz Tomaniak, Paweł Balsam, Janusz Kochman, Interventional Coronary Cardiology – A Contemporary Approach, PZWL Publishing House, Warsaw 2022.
2. Andrzej Wysokiński, News in Electrophysiology and Electrotherapy, PZWL Publishing House, Warsaw 2022.

3. Robert Kowalik, Anna Fojt, Krzysztof Ozieriański, Renata Główczyńska, Cardiological Intensive Care, PZWL Publishing House, Warsaw 2021.
4. Agnieszka Kołodzińska, Renata Główczyńska, Marcin Grabowski, Electrocardiology, PZWL Publishing House, Warsaw 2022.
5. Current ESC (European Society of Cardiology) Clinical Practice Guidelines – www.escardio.org.

6. Student workload – balance of hours and ECTS credits

Student's activity		**Student workload – number of hours**
Classes conducted with the direct participation of an academic teacher or other persons conducting classes	Lecture	15
	Practical classes (exercise)	35
	Simulation classes	10
Student's own work	Preparing for classes	10
	Studying literature	10
	Preparing for credit	10
Total student workload		**90**
ECTS		**3**

One (teaching) hour is 45 minutes.