

СИЛАБУС НАВЧАЛЬНОЇ ДИСЦИПЛІНИ

1. General information on the course

Full course name	Interventional methods of diagnostics and treatment in cardiology
Full official name of a higher education institution	Sumy State University
Full name of a structural unit	Medical Institute. Department of Internal Medicine with a Center of respiratory medicine
Authors	Pogorielova Oksana
Cycle/higher education level	The Second Level Of Higher Education, National Qualifications Framework Of Ukraine – The 7th Level, QF-LLL – The 7th Level, FQ-EHEA – The Second Cycle
Semester	18 weeks during the 5-th semester
Workload	5 ECTS credits, 150 hours, which include 36 hours of contact work with the teacher (36 hours of practical classes), and 114 hours of self-work
Language	English

2. Place in the study programme

Relation to curriculum	Elective course available for study programme "Medicine"
Prerequisites	There are no specific prerequisites
Additional requirements	There are no specific requirements
Restrictions	There are no specific restrictions

3. The purpose of the discipline

To master the technique of coronary angiography (CAG), the principles of obtaining and interpreting coronary angiograms, the principles and methods of percutaneous coronary interventions (PCI), management of patients after coronary artery stenting depending on the clinical situation.

4. The content of the discipline

Topic 1 Anatomy of the heart. Clinical anatomy of large vessels. Providing information on the relevance of the topic. Introduction to the main stages and events in the formation of interventional cardiology and reperfusion therapy. X-ray anatomy of coronary vessels. Angiographic projections. How to identify the main branches of the left coronary artery, right coronary artery. Anomalies in the development of coronary arteries.
Тема 2 Topic 2 Pathogenesis of coronary atherosclerosis. Methods of visualization of atherosclerotic plaques. Classification of vascular remodeling.

<p>Topic 3 Vascular accesses (femoral, transradial). Understand the technical features of interventions using femoral and transradial approaches, the advantages and disadvantages of each.</p>
<p>Topic 4 Infrastructure of the catheterization laboratory. Disassemble the tools for conducting PCI. Types of coronary stents.</p>
<p>Topic 5 Purpose and objectives of CAG and PCI. Indications and contraindications for their conduct. Required medical documentation.</p>
<p>Topic 6 Preparing the patient for PCI. Allen test. Features of preparation of the patient for carrying out planned KAG, PCI. The technique of conducting the Allan test.</p>
<p>Topic 7 Medical support of PCI. Understand the mechanisms of action, doses, means of monitoring the effectiveness of antiplatelet agents, anticoagulants, vasodilators used in patients when conducting PCI. Infusion therapy.</p>
<p>Topic 8. Possible complications during PCI (restenosis, thrombosis, arrhythmias), prevention of their development. Contrast-induced nephropathy.</p>
<p>Topic 9. Multivascular lesions of the coronary arteries. Evaluation of lesions on the Syntax scale. Choice of revascularization method in multivascular lesions. Comparative analysis of PCI and cardiac surgery.</p>
<p>Topic 10. Conducting PCI in patients with chronic CAD. Classification of chronic coronary syndrome (CCS). Indications for interventional interventions in patients with stable angina.</p>
<p>Topic 11. Study of the functional reserve of coronary blood flow. The choice of treatment for patients with stable angina.</p>
<p>Topic 12. Classification of myocardial infarction. Pathogenesis of different variants of acute coronary syndrome (ACS). ECG analysis of patients with ACS. Determination of infarct-related artery.</p>
<p>Topic 13. Conducting PCI in patients with acute coronary syndrome with ST segment elevation. Analysis of the clinical protocol of management of a patient with acute coronary syndrome without ST-segment elevation.</p>
<p>Topic 14. Conducting PCI in patients with acute coronary syndrome without persistent ST segment elevation. Analysis of the clinical protocol of management of a patient with acute coronary syndrome without ST segment elevation.</p>
<p>Topic 15. Coronary artery bypass graft surgery. Ventriculography. Indications, tools for examination of grafts.</p>
<p>Topic 16. Heart valve disease. Features of hemodynamic disorders. Indications for surgical treatment.</p>
<p>Topic 17. Cardiac valve replacement. Differentiated approach in the choice of patients. Methods of conducting TAVI. Postoperative management of patients.</p>
<p>Topic 18. Practice-oriented graded test The test will include theoretical questions, practical task, coronary angiogram description and assessment.</p>

5. Intended learning outcomes of the course

After successful study of the course, the student will be able to:

LO1	Be able to collect medical information about the patient and analyze clinical data (patient survey skills), to conduct risk stratification and determine the time for PCI in patients with ACS without ST-segment elevation.
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LO2	Master the skills of interpreting the data of coronary angiography.
LO3	Be able to use rating scales to determine the degree of coronary artery disease and choose a method of revascularization
LO4	Interpret, analyze and summarize the data obtained using diagnostic methods such as CAG and ECG in patients with various forms of coronary heart disease.
LO5	Demonstrate mastery of ethical and deontological principles of a medical specialist and the principles of professional subordination, be able to work in a team, use professional vocabulary in practice.

7. Types of training sessions and educational activities

7.1 Types of training sessions

<p>Topic 1. Anatomy of the heart. Clinical anatomy of large vessels.</p> <p>Pr1 "Anatomy of the heart. Clinical anatomy of large vessels "(full-time). Providing information on the relevance of the topic. Introduction to the main stages and events in the formation of interventional cardiology and reperfusion therapy. X-ray anatomy of coronary vessels. Angiographic projections. How to identify the main branches of the left coronary artery, right coronary artery. Anomalies in the development of coronary arteries.</p>
<p>Topic 2 Pathogenesis of coronary atherosclerosis. Methods of visualization of atherosclerotic plaques.</p> <p>Pr2 "Pathogenesis of coronary atherosclerosis. Methods of visualization of atherosclerotic plaques" (full-time) Classification of vascular remodeling. Possibilities of intravascular ultrasound examination of vessels.</p>
<p>Topic 3 Vascular access (femoral, transradial).</p> <p>Pr3 "Vascular accesses" (femoral, transradial) (full-time). Consider the technique of femoral and transradial access. Evaluate the advantages and disadvantages of each.</p>
<p>Topic 4 Infrastructure of the catheterization laboratory.</p> <p>Pr4 "Infrastructure of the catheterization laboratory" (full-time). To know the technical aspects of conducting PCI. Tools for conducting PCI. Types of coronary stents.</p>
<p>Topic 5 Purpose and objectives of CAG and PCI.</p> <p>Pr5 "Purpose and objectives of CAG and PCI" (full-time). Indications and contraindications for conduction of CAG and PCI</p>
<p>Topic 6 Preparing the patient for PCI. Allen's test.</p> <p>Pr6 "Preparation of the patient for PCI" (full-time). The purpose and methods of the Allen's test.</p>
<p>Topic 7 Medical support of PCI.</p> <p>Pr7 "Medical support of PCI" (full-time). Antiplatelets, anticoagulants, vasodilators - doses, indications; infusion therapy.</p>
<p>Topic 8. Complications when conducting PCI.</p> <p>Pr8 "Possible complications during PCI" (full-time). Discuss possible complications during PCI (restenosis, thrombosis, arrhythmias), prevention of their development. Contrast-induced nephropathy.</p>

Topic 9. Multivascular lesions of the coronary arteries. Assessment of lesions on a Syntax Score.
Pr9 «Multivascular lesions of the coronary arteries» (full-time). Mastering the method of assessing lesions on the Syntax scale. The choice of revascularization method for multivascular lesions. Comparative analysis of PCI and cardiac surgery.
Topic 10. Performing PCI in patients with chronic coronary syndrome.
Pr10 "Performing PCI in patients with chronic coronary syndrome" (full-time). Indications, features of preparation of the patient for planned PCI.
Topic 11. Study of the functional reserve of coronary blood flow.
Pr11 "Study of the functional reserve of coronary blood flow" (full-time). The choice of treatment for patients with stable angina.
Topic 12. Classification of myocardial infarction.
Pr12 "Classification of myocardial infarction" (full-time). Pathogenesis of different variants of acute coronary syndrome. ECG analysis of ACS patients. Determination of infarct-related artery.
Topic 13. Performing PCI in patients with acute coronary syndrome with ST segment elevation.
Pr13 "Performing PCI in patients with acute coronary syndrome with ST-segment elevation" (full-time) To consider tactics of management of the patient with an acute coronary syndrome with ST-segment rise, consideration of recommendations.
Topic 14. Performing PCI in patients with acute coronary syndrome without ST segment elevation.
Pr14 "Performing PCI in patients with acute coronary syndrome without ST-segment elevation" (full-time). Consideration of guidelines for management in patients with acute coronary syndrome without ST-segment elevation. GRASE Score.
Topic 15. Coronary artery bypass graft surgery. Ventriculography.
Pr15 "Coronary artery bypass graft surgery" (full-time). Ventriculography. Indications, tools for examination of grafts.
Topic 16. Heart valve diseases
Pr16 "Heart valve disease" (full-time). Features of hemodynamic disorders. Indications for surgical treatment.
Topic 17. Cardiac valve replacement
Pr17 "Cardiac valve replacement" (full-time). Differentiated approach in the choice of patients. Methods of conducting TAVI. Postoperative management of patients.
Topic 18. Practice-oriented differentiated test
Pr18 «Practice-oriented graded test» (full-time) The test will include theoretical questions, practical task, coronary angiogram description and assessment.

7.2 Learning activities

LA1	Self-study
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LA2	Preparing to practice-oriented graded test
LA3	Preparing presentation and reporting
LA4	Solving of situational clinical tasks
LA5	E-learning on platforms (GoogleMeet, MIX.sumdu.edu.ua)
LA6	Preparing to practical classes
LA7	Watching training videos
LA8	Working with books and relevant information resources
LA9	Practical work with the patient in the catheterization operating room and specialized departments of hospitals

8. Teaching methods

Course involves learning through:

TM1	Case-based learning.
TM 2	Team-based learning.
TM 3	Think-pair-share
TM 4	Practical-based learning
TM 5	Brain storm.
TM 6	Study discussion.

The discipline is taught using advanced teaching methods that contribute to developing professional skills aimed at training practice-oriented specialists and stimulating scientific activity.

Ability to abstract thinking, analysis and synthesis. Ability to learn and master modern knowledge, applying it in practice. Knowledge and understanding of the subject area and professional activity comprehension. Ability to adapt and act in a new situation. Ability to make reasoned decisions; work in a team; skills in interpersonal relationship. Ability to use information and communication technologies. Determination and persistence to the tasks and commitments undertaken.

9. Methods and criteria for assessment

9.1. Assessment criteria

ECTS	Definition	National scale	Rating scale
	Outstanding performance without errors	5 (Excellent)	$170 \leq RD \leq 200$
	Above the average standard but with minor errors	4 (Good)	$140 \leq RD < 169$
	Fair but with significant shortcomings	3 (Satisfactory)	$120 \leq RD < 139$
	Fail – some more work required before the credit can be awarded	2 (Fail)	$0 \leq RD < 119$

9.2 Formative assessment

FA1	Peer assessment
FA2	Teacher's instructions in the process of performing practical and situational tasks
FA 3	Clinical cases assessment
FA 4	Questionnaire and oral comments of the teacher based on the results of survey
FA 5	Assessment of coronary angiograms

9.3 Summative assessment

SA1	Evaluation of written tasks, questionnaire, solving of situational case
SA2	Assessment of coronary angiograms
SA3	Final evaluation: practice-oriented graded test

Form of assessment:

9 semester		200 scores
SA1. Evaluation of written tasks, questionnaire, solving of situational case		120
	Answering the questions, situational tasks solving, assessment of coronary angiograms	120
SA3. Final evaluation: practice-oriented graded test		80
	Evaluation of theoretical answers (3x20)	60
	Assessment of coronary angiograms	10
	Evaluation of practical skills	10

Form of assessment (special cases):

9 semester		200 scores
SA1. Evaluation of written tasks, questionnaire, solving of situational case		120
	In particular situations and limitation practical classes must be conducted distantly using such platforms as Mix.sumdu.edu.ua, Google meet.	110
SA2. Assessment of coronary angiograms		10
	In particular situations and limitation practical classes must be conducted distantly using such platforms as Mix.sumdu.edu.ua, Google meet	10
SA3. Final evaluation: practice-oriented graded test		80

	In particular situations and limitation practical classes must be conducted distantly using such platforms as Mix.sumdu.edu.ua, Google meet	80
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Total mark of discipline is defined as the summarizing of points for current educational activities (not less than 72) and points for exam (not less than 48).

The calculation of the number of points for the current performance is based on the student's marks on the traditional 4-point rating scale by arithmetic mean calculating. The resulting value is converted into points by the formula: 110 multiplied by the arithmetic mean and divided by 5. The following marks for coronary angiogram assessment are: "5" - 10 points, "4" - 8 points, "3" - 6 points, "2" - 0 points. The maximum number of points for the current educational activities of the student - 120.

The final assessment of the discipline is a practice-oriented graded test done at the end of the study semester according to the schedule completed by the Dean's office of the Medical institute. Students who have a current educational score of at least 72 points, who have not missed practical classes are admitted to the graded test. The practice-oriented graded test consists of 3 theoretical questions, each is graded at 12, 16 or 20 points, which corresponds to the traditional 4-point system "3", "4" or "5" respectively. The following marks for practical skill are: "5" - 10 points, "4" - 8 points, "3" - 6 points, "2" - 0 points. The assessment of coronary angiogram is evaluated in 10, 8 or 6 points, which corresponds to the traditional 4-point system "3", "4" or "5". Having summarized all the points for theoretical questions, practical skill and assessment of coronary angiogram the graded test is credited to the student if he scored at least 48 points out of 80 possible.

General mark of the discipline must be not more than 200.

10. Learning resources

10.1 Material and technical support

MTS1	Information and communication systems
MTS2	Library funds, archive of electrocardiograms, coronary angiograms, results of laboratory methods of examination
MTS3	Computers, computer systems and networks
MTS4	Multimedia, video and audio, projection equipment (video cameras, projectors, screens, laptops, etc.)
MTS5	Software (for support of distant learning)
MTS6	Municipal Non-Commercial Enterprise of Sumy Regional Council "Sumy Clinical Cardiology Dispensary"
MTS7	Medical equipment (electrocardiograph, tonometer, phonendoscope, catheterization laboratory)

10.1 Information and methodical support

Essential Reading	
1	Cardiology Procedures [Электронный ресурс]: A Clinical Primer / edited by Robert C. Hendel, Carey Kimmelstiel. – 1st ed. 2017. – London: Springer London, 2017. – XI, 347 p.
2	Pogorielova, O. S. Acute coronary syndrome [Текст]: study guide / O. S. Pogorielova. — Sumy: Sumy State University, 2021. — 73 p.
3	Internal Medicine. An Illustrated Radiological Guide / J.A. Al-Tubaikh; by Jarrah Ali Al-Tubaikh. — 2nd ed. 2017. — Cham: Springer International Publishing, 2017. — XVI, 592 p.

Supplemental Reading	
1	Integrative Cardiology [Электронный ресурс]: A New Therapeutic Vision / edited by Massimo Fioranelli. – 1st ed. 2017. – Cham: Springer International Publishing, 2017. – XII, 276 p.
2	Goldman-Cecil medicine [Текст]. V.1 / L. Goldman, L. Schafer, M. Crow etc. —25-th ed. — Saunders: Saunders Elsevier, 2016. — 1489 p.
3	Braunwald's heart disease: A textbook of cardiovascular medicine, 2-Volume Set 10th Edition. International edition. // by Douglas L. Mann, Douglas P. Zipes, Peter Libby, Robert O. Bonow. – Publisher: Elsevier, 2015. – 2136 pages.