INTERNATIONAL HIGHER SCHOOL OF MEDICINE

Special Clinical Disciplines Department

SYLLABUS

X-ray diagnosis and differential diagnosis of respiratory tuberculosis

2025-2026 academic

for students of medical faculty

5th Course X th Semester … groups of the Central Campus,

… groups of the Issyk-Kul campus

2 credits (60 h, including auditoria 32 h, self-working – 28 h)

Lecturers: **Fedorova Svetlana Vladimirovna**
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Venue: Vedanta plus», classroom № 209, № 213, № 208, № 307
National Center of Phthisiology, classroom № 001

The Syllabus is considered
at the meeting of the department of Special Clinical Disciplines
Protocol № 1 dated 29.08.2025

Head of the department __ _____ D.A. Maktybaeva

Course Objective: The main goal of the course for mastering the academic discipline "X-ray diagnosis and differential diagnosis of respiratory tuberculosis" is to acquire by students fundamental basic knowledge, skills and abilities in the field of phthisiopulmonology, X-ray diagnosis and differential diagnosis of tuberculosis based on evidence and WHO recommendations aimed at early detection, adequate treatment of tuberculosis at all levels of health care, taking into account the future specifics of work and the needs of consumers (both patients and employers), as well as the ability to apply the acquired knowledge, skills and abilities to effectively solve tasks in the field of professional activity.

As a result of studying the discipline, the student must:

Know:

- The main criteria for evaluating a set of measures to detect tuberculosis
- The physics of X-rays
- Methods for obtaining X-ray images
- Patterns of X-ray image formation (skiology)
- Device principles, types and characteristics of Computed Tomographs
- Fundamentals of imaging with X-rays and tomography
- Physical and technological foundations of X-ray studies
- Indications and contraindications for X-ray and Computed Tomography
- Pharmacodynamics, indications and contraindications for the use of X-ray contrast agents
- The main radiological signs of pulmonary system diseases

Skill:

- Select individuals at high risk of tuberculosis
- Prescribe a set of appropriate examinations and correctly interpret their results in accordance with approved national diagnostic algorithms
- Interpret, analyze and record the results of X-ray studies performed in adults and children
- Interpret, analyze and record tomography results
- Interpret and analyze the data of tomographic studies
- Interpret, analyze and record the results of X-ray computed tomography, including the use of contrast agents
- Interpret and analyze computed tomographic signs (semiotics) of pulmonary system abnormalities in adults and children
- Evaluate the normal radiographic anatomy of the respiratory organs (lungs), taking into account age and gender characteristics
- Determine the adequacy of the available diagnostic information to word up a conclusion of the performed X-ray examination
- Draw up, substantiate and submit to the attending physician a plan for further X-ray examination of the patient in accordance with the current procedures for the provision of medical care, clinical recommendations (treatment protocols) on the provision of medical care, taking into account the standards of medical care
- To identify and analyze the reasons for the discrepancy between the results of X-ray studies with the data of other diagnostic methods, clinical and pathoanatomical diagnoses
- Determine pathological conditions and signs of nosological forms, draw up a conclusion of the performed X-ray examination
- Use automated systems for archiving X-ray examinations and work in the intrahospital network.

Attitude:

- the skills of monitoring the effectiveness of tuberculosis detection and optimization of a set of measures to detect tuberculosis at all levels of health care.

Pre requisites: normal anatomy, normal physiology, pathological anatomy, pathological physiology, microbiology, radiology, propaedeutics of internal diseases, basic pharmacology, pulmonology, pediatrics, internal diseases, clinical pharmacology.

Post requisites: polyclinic medicine, family medicine.

THEMATIC PLAN OF LECTURES

№	Theme of lecture	Hours	Data
Unit No. 1: "Methods of radiological diagnosis of respiratory tuberculosis in adults and children, essence, advantages and disadvantages. Typical x-ray picture of tuberculosis in adults and children. X-ray signs of tuberculosis. X-ray and differential diagnosis of hilar lymphadenopathy and pulmonary infiltrates."			
1.	Methods of X-ray diagnostics of respiratory tuberculosis, essence, advantages and disadvantages. Typical x-ray picture of tuberculosis in adults and children. X-ray signs of tuberculosis.	2	Accordingly to the schedule

2.	X-ray and differential diagnosis of intrathoracic lymphadenopathy and pulmonary infiltrates	2	~
Unit No. 2: "X-ray and differential diagnosis of pulmonary disseminations, cavities, round formations and pleurites."			
3.	X-ray and differential diagnostics of disseminated processes and round shadows	2	~
4.	X-ray and differential diagnosis of cavities, pleurites, spontaneous pneumothorax	2	~
Total:		8	

THEMATIC PLAN OF PRACTICAL CLASSES

№	Theme of practical class	Hours	Data
Unit No. 1: "Methods of radiological diagnosis of respiratory tuberculosis in adults and children, essence, advantages and disadvantages. Typical x-ray picture of tuberculosis in adults and children. X-ray signs of tuberculosis. X-ray and differential diagnosis of hilar lymphadenopathy and pulmonary infiltrates."			
1.	Normal chest x-ray in direct and lateral projection. Computed tomography of the chest is normal. Interpretation of a series of normal radiographs, CT scans	2	Accordingly to the schedule
2.	Schematic description of a chest radiograph. Interpretation and description of a series of radiographs, computed tomography	2	~
3.	Typical radiological signs of tuberculosis in children. Differential diagnosis of tuberculosis of the intrathoracic lymph nodes with oncological diseases, sarcoidosis, aneurysm of the heart and large vessels, diaphragmatic hernia, esophageal diverticulum, etc. Interpretation of a series of radiographs, computed tomograms.	2	~
4.	X-ray picture of the primary tuberculosis complex in children by stages (infiltration, resorption, compaction, calcification), Gon's complex. Differential diagnosis of primary tuberculosis complex with pneumonia in children. Interpretation of a series of radiographs, computed tomography	2	~
5.	Typical radiological signs of tuberculosis in adults. Pulmonary tuberculosis as the most common clinical form. X-ray diagnosis of infiltrative tuberculosis. Differential diagnosis of tuberculous pulmonary infiltrates with pneumonia, oncological diseases, sarcoidosis, pulmonary embolism, etc. Interpretation of a series of radiographs, computed tomography	2	~
6.	Module 1. Counting of individual rating in the first unit.	2	~
Unit No. 2: "X-ray and differential diagnosis of pulmonary disseminations, cavities, round formations and pleurites."			
7.	X-ray diagnosis of disseminated processes in the lungs. Differential diagnosis of disseminated processes with pneumonia, cancer, granulomatosis of non-tuberculous nature. Interpretation of a series of radiographs, computed tomography	2	~
8.	X-ray diagnosis of disseminated processes in the lungs. Differential diagnosis of disseminated processes with parasitic diseases, occupational diseases, connective tissue diseases, etc. Interpretation of a series of radiographs, computed tomograms.	2	~
9.	X-ray diagnosis of rounded shadows in the lungs. Differential diagnosis of tuberculomas with malignant and benign tumors, parasitic cysts, interlobar pleurisy, rounded infiltrates, etc. Interpretation of a series of radiographs, computed tomograms.	2	~
10.	Radiological diagnosis of annular shadows. Differential diagnosis of tuberculous caverns with abscessing pneumonia, decaying tumor, parasitic cysts after emptying, bullous emphysema, etc. Interpretation of a series of radiographs, computed tomography	2	~
11.	X-ray signs of fluid accumulation in the pleural cavity. X-ray diagnosis of pleurisy. Interpretation of a series of radiographs, computed tomography	2	~
12.	Final class. Module 2. Counting of individual rating in the second unit. Counting of individual overall score for students.	2	~

Total:	24

THEMATIC PLAN OF INDEPENDENT WORK OF STUDENTS

№	Theme of independent work	Hours	Data
Unit No. 1: "Methods of radiological diagnosis of respiratory tuberculosis in adults and children, essence, advantages and disadvantages. Typical x-ray picture of tuberculosis in adults and children. X-ray signs of tuberculosis. X-ray and differential diagnosis of hilar lymphadenopathy and pulmonary infiltrates."			
1.	Topic 1: "Sarcoidosis (pulmonary radiographic manifestations)." Work with literature.	2	Accordingly to the schedule
2.	Topic 2: "Hodgkin and non-Hodgkin lymphomas (radiological manifestations)." Work with literature.	2	~
3.	Topic 3: "Central lung cancer (radiological manifestations)." Work with literature.	2	~
4.	Topic 4: "Nonspecific pneumonia (radiological manifestations)." Work with literature.	2	~
5.	Topic 5: "Interpretation of a series of radiographs and computed tomograms for the differential diagnosis of pulmonary infiltrates. Compilation of a comparative table with radiological characteristics of tuberculous pneumonia, nonspecific pneumonia, pulmonary atelectasis and primary tuberculosis complex." Assignment for independent completion.	2	~
6.	Topic 6: "Interpretation of a series of radiographs and computed tomograms for the differential diagnosis of hilar lymphadenopathy. Drawing up a comparative table with radiological characteristics of tuberculosis of the intrathoracic lymph nodes, sarcoidosis of the intrathoracic lymph nodes, central lung cancer, Hodgkin lymphoma." Assignment for independent completion.	2	~
7.	Topic 7: "Solving a series of clinical cases in the differential diagnosis of pulmonary infiltrates and hilar lymphadenopathy." Assignment for independent completion.	2	~
Unit No. 2: "X-ray and differential diagnosis of pulmonary disseminations, cavities, round formations and pleurites."			
8.	Topic 8: "Peripheral lung cancer (radiological manifestations)." Work with literature.	2	~
9.	Topic 9: "Benign lung tumors (radiological manifestations)." Work with literature.	2	~
10.	Topic 10: "Parasitic cysts of the lungs (radiological manifestations)." Work with literature.	2	~
11.	Topic 11: "Interpretation of a series of radiographs and computed tomograms for the differential diagnosis of pulmonary disseminated processes. Drawing up a comparative table with radiological characteristics of miliary tuberculosis, disseminated tuberculosis, pneumoconiosis and oncological diseases." Assignment for independent completion.	2	~
12.	Topic 12: "Interpretation of a series of radiographs and computed tomograms for the differential diagnosis of round opacities in the lungs. Drawing up a comparative table with radiological characteristics of tuberculoma, peripheral lung cancer, hamartoma, parasitic cyst, retention cyst." Assignment for independent completion.	2	~
13.	Topic 13: "Interpretation of a series of radiographs and computed tomograms for the differential diagnosis of ring-shaped opacities in the lungs. Drawing up a comparative table with radiological characteristics of a tuberculous cavity, a destructive form of lung cancer, a parasitic cyst after a breakthrough, an abscess after a breakthrough." Assignment for independent completion.	2	~
14.	Topic 14: "Interpretation of a series of radiographs and computed tomograms for the differential diagnosis of pleurisy and pneumothorax. Drawing up a comparative table with the characteristics of pleural effusion in diseases of various etiologies. Drawing up a comparative	2	~

	table with the characteristics of open, closed and valve pneumothorax." Assignment for independent completion.		
Total:		28	

Recommended reading for the discipline:

Basic literature:

1. Lecture course on phthisiopulmonology, lectures 1, 4-7.
2. WHO consolidated guidelines on tuberculosis Module 2: Screening. Systematic screening for tuberculosis disease. 2021
3. John Crofton Crofton's clinical tuberculosis. The third edition. 2009
4. Stephen M. Ellis, Christopher Flower; editors: Harald Ostensen, Holger Peterson. The WHO manual of diagnostic imaging: radiographic anatomy and interpretation of the chest and the pulmonary system. 2006
5. Veena Chowdhury, Arun Kumar Gupta. Diagnostic radiology chest and cardiovascular imaging, Third Edition. 2010

Additional literature:

1 Palomino J.C. Tuberculosis. 2007

Grading policy and procedures for all types of work

For the period of studying the discipline, the student gains points for the relevant parameters (per unit):
current score - 40 points
independent work - 20 points
control score (final assessment of knowledge per unit) - 40 points
Maximum score - 100 (40+20+40)

Grading system for student's achievements

Criteria for grading for the discipline				
Maximum score	Intervals			
	«unsatisfactory»	«satisfactory»	«good»	«excellent»
Criteria by intervals	insufficient mastery of the threshold level of competence formation, does not know a significant part of the program material, makes significant mistakes, does not cope with practical tasks	threshold level of competence formation, knowledge of only the basic material, difficulties in performing practical tasks	high level of competence formation, without significant inaccuracies	high, advanced level of competence formation, without inaccuracies
Current control - 40	0-23	24-30	31-35	36-40
IWS - 20	0-11	12-14	15-17	18-20
Control work (module) – 40	0-23	24-30	31-35	36-40
Total - 100	0-59	60-75	76-89	90-100

For missed classes, the overall score for the discipline is reduced: up to 25% of classes missed - by 2 points, from 25 to 50% of classes - by 5 points, 50% or more of classes - by 10 points. For violations of the conduct policy, the overall discipline score will be reduced by a maximum of 10 points.

Conduct policy: (late arrivals, absences, behavior in the classroom, late submission of work).

- Punctuality and completion of tasks.
- Mandatory attendance of classes.
- Attending class in a clean medical uniform.
- Eliminating conversations on a cell phone in the classroom.
- Active participation in the learning process.
- Doing homework on time.
- Academic detention at the time specified by the teacher.

For violations of the Conduct Policy, the total points for discipline might be reduced to 1-10 points.

Academic Ethics Policy.

- Be tolerant, respect the opinions of others.
- Formulate objections in the correct form.

- Constructively support feedback in all classes.
- Plagiarism and other forms of dishonest work are unacceptable. Plagiarism includes the following: the absence of references when using printed and electronic materials, quotes, thoughts and works of other authors or students.
- Prompting and cheating during tests, exams, classes is unacceptable as well as passing an exam for another student, unauthorized copying of materials.
For violations of the Academic Ethics Policy, the total points for the discipline may be reduced to 1-10 points.

Guidelines for the lessons of the discipline

1. Key questions of the practical class 1: «Normal chest X-ray in AP and lateral projection. Normal computed tomography of the chest. Interpretation of a series of normal radiographs, CT scans».

2 hours

- Basic Radiographic Techniques
- Patient Positioning and Respiration
- Criteria of X-ray film quality
- Computed Radiography
- Normal Anatomy of the Chest, Airways, Trachea and Bronchi
- Pulmonary Arterial and Venous Circulation, Pulmonary Arteries
- Methods of X-ray examination for tuberculosis of the respiratory organs.
- AP, PA and lateral Radiography, longitudinal and transverse tomography, indications for performing various types of radiography and tomography.
- Digital radiography chest organs.
- Computed tomography in the diagnosis of tuberculosis and others diseases of the lungs, mediastinum and pleura.
- Indications for various types X-ray examination in various forms of tuberculosis of the respiratory organs and in preparing patients for surgery.
- Fluorography and digital fluorography of the chest organs.
- X-ray contrast studies for pulmonary tuberculosis and other lung diseases.
- X-ray and computer tomographic picture of a normal chest.
- Screening of targeted population for TB.

Recommended literature for the class:

Basic literature:

1. Lecture course on phthisiopulmonology, lecture 1.
2. WHO consolidated guidelines on tuberculosis Module 2: Screening. Systematic screening for tuberculosis disease. 2021, P. 23-37, 41-42.
3. John Crofton Crofton's clinical tuberculosis. The third edition. 2009, P. 83.
4. Stephen M. Ellis, Christopher Flower; editors: Harald Ostensen, Holger Peterson. The WHO manual of diagnostic imaging: radiographic anatomy and interpretation of the chest and the pulmonary system. 2006, P. 1-61, 119-124.
5. Veena Chowdhury, Arun Kumar Gupta. Diagnostic radiology chest and cardiovascular imaging, Third Edition. 2010, P. 1-28, 90-116, 154-177, 272-314.

2. Key questions of the practical class 2: «Schematic description of a chest radiograph. Interpretation and description of a series of radiographs, computed tomography».

2 hours

- What is the basic approach to a chest X-ray?
- Radiologic modalities used to evaluate chest symptoms
- What is the difference between chest radiograph and CT scan?
- What are common findings on chest X-ray?
- What is normal chest X-ray?
- What is an abnormal chest X-ray?
- How should a normal chest X-ray look?
- What is an X-ray interpretation?
- How do you read and interpret a chest X-ray?
- The description of chest X-ray findings, sequences of actions
- What is an X-ray conclusion?

Recommended literature for the class:

Basic literature:

1. Lecture course on phthisiopulmonology, lecture 1.
2. John Crofton Crofton's clinical tuberculosis. The third edition. 2009, P. 83.

3. Stephen M. Ellis, Christopher Flower; editors: Harald Ostensen, Holger Peterson. The WHO manual of diagnostic imaging: radiographic anatomy and interpretation of the chest and the pulmonary system. 2006, P. 1-61, 119-124.
4. Veena Chowdhury, Arun Kumar Gupta. Diagnostic radiology chest and cardiovascular imaging, Third Edition. 2010, P. 1-28, 90-116, 154-177, 272-314.

3. Key questions of the practical class 3: «Typical radiological signs of tuberculosis in children. Differential diagnosis of tuberculosis of the intrathoracic lymph nodes with oncological diseases, sarcoidosis, aneurysm of the heart and large vessels, diaphragmatic hernia, esophageal diverticulum, etc. Interpretation of a series of radiographs, computed tomograms».

2 hours

- What are the radiological signs of TB in children?
- Can TB not be shown in X-ray?
- Can a TB patient have normal chest X-ray?
- What are the X-ray symptoms of intrathoracic lymph nodes TB?
- Can you confirm TB by X-ray?
- How can you describe the X-ray difference between TB and sarcoidosis?
- How can you confirm the clinical DS of sarcoidosis?
- How can you describe the X-ray difference between TB and Hodgkin's disease?
- How can you confirm the clinical DS of Hodgkin's lymphoma?
- How can you describe the X-ray difference between TB and central cancer?
- How can you confirm the clinical DS of central cancer?
- How can you describe the X-ray difference between TB and aneurysm of the heart and large vessels?
- How can you describe the X-ray difference between TB and diaphragmatic hernia?
- How can you describe the X-ray difference between TB and esophageal diverticulum?

Recommended literature for the class:

Basic literature:

1. Lecture course on phthisiopulmonology, lectures 1, 4.
2. John Crofton Crofton's clinical tuberculosis. The third edition. 2009, P. 39, 45, 62.
3. Stephen M. Ellis, Christopher Flower; editors: Harald Ostensen, Holger Peterson. The WHO manual of diagnostic imaging: radiographic anatomy and interpretation of the chest and the pulmonary system. 2006, P. 135-142.
4. Veena Chowdhury, Arun Kumar Gupta. Diagnostic radiology chest and cardiovascular imaging, Third Edition. 2010, P. 154-177, 212-235.

Additional literature:

1. Palomino J.C. Tuberculosis. 2007, P. 525-543.

4. Key questions of the practical class 4: «X-ray picture of the primary tuberculosis complex in children by stages (infiltration, resorption, compaction, calcification), Gon's complex. Differential diagnosis of primary tuberculosis complex with pneumonia in children. Interpretation of a series of radiographs, computed tomography»

2 hours

- What is the other name of primary tuberculosis?
- What is the primary complex of childhood TB?
- What are the X-ray findings in children with primary TB complex?
- What are the X-ray stages of primary tuberculosis complex?
- What are the CT findings of primary TB complex in children?
- What are the X-ray findings in children with pneumonia?
- What are the CT findings of pneumonia in children?
- What is the difference between pneumonia and primary TB complex?
- How to confirm the clinical DS of pneumonia in children?
- To differentiate primary TB complex with other diseases, when lung infiltrate associates with intrathoracic lymphadenopathy (sarcoidosis, oncological diseases, infectious diseases).

Recommended literature for the class:

Basic literature:

1. Lecture course on phthisiopulmonology, lectures 1, 4.
2. John Crofton Crofton's clinical tuberculosis. The third edition. 2009, P. 39.
3. Stephen M. Ellis, Christopher Flower; editors: Harald Ostensen, Holger Peterson. The WHO manual of diagnostic imaging: radiographic anatomy and interpretation of the chest and the pulmonary system. 2006, P. 73-84.
4. Veena Chowdhury, Arun Kumar Gupta. Diagnostic radiology chest and cardiovascular imaging, Third Edition. 2010, P. 60-68, 154-177.

Additional literature:

1. Palomino J.C. Tuberculosis. 2007, P. 525-543.

5. Key questions of the practical class 5: «Typical radiological signs of tuberculosis in adults. Pulmonary tuberculosis as the most common clinical form. X-ray diagnosis of infiltrative tuberculosis. Differential diagnosis of tuberculous pulmonary infiltrates with pneumonia, oncological diseases, pulmonary sarcoidosis, pulmonary embolism, etc. Interpretation of a series of radiographs, computed tomography»

2 hours

- What are the radiological signs of pneumonia?
- What are the CT findings of pneumonia?
- What is the difference between pneumonia and infiltrative TB (TB pneumonia)?
- How to confirm the clinical DS of pneumonia?
- What are the radiological signs of lung cancer?
- What are the CT findings of lung cancer?
- What forms of lung cancer must be differential diagnosis with infiltrative TB (TB pneumonia) to perform in?
- What is the difference between infiltrative TB (TB pneumonia) and lung cancer?
- How to confirm the clinical DS of lung cancer?
- What are the radiological signs of pulmonary sarcoidosis?
- What are the CT findings of pulmonary sarcoidosis?
- What forms of pulmonary sarcoidosis must be differential diagnosis with infiltrative TB (TB pneumonia) to perform in?
- What is the difference between infiltrative TB (TB pneumonia) and pulmonary sarcoidosis?
- How to confirm the clinical DS of pulmonary sarcoidosis?
- What are the radiological signs of pulmonary embolism?
- What are the CT findings of pulmonary embolism?
- What forms of pulmonary embolism must be differential diagnosis with infiltrative TB (TB pneumonia) to perform in?
- What is the difference between infiltrative TB (TB pneumonia) and pulmonary embolism?
- How to confirm the clinical DS of pulmonary embolism?

Recommended literature for the class:

Basic literature:

1. Lecture course on phthisiopulmonology, lectures 1, 5.
2. John Crofton Crofton's clinical tuberculosis. The third edition. 2009, P. 75-83.
3. Stephen M. Ellis, Christopher Flower; editors: Harald Ostensen, Holger Peterson. The WHO manual of diagnostic imaging: radiographic anatomy and interpretation of the chest and the pulmonary system. 2006, P. 63-66.
4. Veena Chowdhury, Arun Kumar Gupta. Diagnostic radiology chest and cardiovascular imaging, Third Edition. 2010, P. 60-68, 154-177, 246-258.

Additional literature:

1. Palomino J.C. Tuberculosis. 2007, P. 487-519.

6. Key questions of the practical class 6: « Module 1. Counting of individual rating in the first unit**»**

2 hours

- Interpreting series of X-rays with intrathoracic lymphoadenopathy
- Interpreting series of X-rays with pulmonary infiltrates
- Solving clinical cases with intrathoracic lymphoadenopathy
- Solving clinical cases with pulmonary infiltrates
- Testing
- Counting of individual rating in the first unit.

7. Key questions of the practical class 7: «X-ray diagnosis of disseminated processes in the lungs. Differential diagnosis of disseminated processes with pneumonia, cancer, granulomatosis of non-tuberculous nature. Interpretation of a series of radiographs, computed tomography»

2 hours

- What is lung dissemination?
- What are the radiological signs of disseminated pulmonary tuberculosis?
- What diseases are considered for differential diagnosis of disseminated pulmonary TB?
- What are radiological signs of pulmonary sarcoidosis (disseminated form)?
- How to differ disseminated TB and pulmonary sarcoidosis?
- How to confirm clinical DS of pulmonary sarcoidosis?
- What are radiological signs of pneumonia (disseminated forms)?

- How to differ disseminated TB and pneumonia (disseminated forms)?
- How to confirm clinical DS of pneumonia?
- What are radiological signs of oncological disseminations?
- How to differ disseminated TB and oncological diseases?
- How to confirm clinical DS of cancer?

Recommended literature for the class:

Basic literature:

1. Lecture course on phthisiopulmonology, lectures 1, 4.
2. John Crofton Crofton's clinical tuberculosis. The third edition. 2009, P. 94-103.
3. Stephen M. Ellis, Christopher Flower; editors: Harald Ostensen, Holger Peterson. The WHO manual of diagnostic imaging: radiographic anatomy and interpretation of the chest and the pulmonary system. 2006, P. 63-66.
4. Veena Chowdhury, Arun Kumar Gupta. Diagnostic radiology chest and cardiovascular imaging, Third Edition. 2010, P. 60-89, 117-133.

Additional literature:

1. Palomino J.C. Tuberculosis. 2007, P. 487-519.

8. Key questions of the practical class 8: «X-ray diagnosis of disseminated processes in the lungs. Differential diagnosis of disseminated processes with parasitic diseases, occupational diseases, connective tissue diseases, etc. Interpretation of a series of radiographs, computed tomograms».

2 hours

- What are the radiological signs of disseminated caused by parasitic disease?
- How to differ disseminated TB and disseminated caused by parasitic disease?
- How to confirm clinical DS of parasitic diseases?
- What are radiological signs of occupational diseases?
- How to differ disseminated TB and occupational diseases?
- How to confirm clinical DS of occupational diseases?
- What are radiological signs of disseminations caused by connective tissue diseases?
- How to differ disseminated TB and disseminations caused by connective tissue diseases?
- How to confirm clinical DS of connective tissue diseases?

Recommended literature for the class:

Basic literature:

1. Lecture course on phthisiopulmonology, lectures 1, 4.
2. John Crofton Crofton's clinical tuberculosis. The third edition. 2009, P. 94-103.
3. Stephen M. Ellis, Christopher Flower; editors: Harald Ostensen, Holger Peterson. The WHO manual of diagnostic imaging: radiographic anatomy and interpretation of the chest and the pulmonary system. 2006, P. 63-66.
4. Veena Chowdhury, Arun Kumar Gupta. Diagnostic radiology chest and cardiovascular imaging, Third Edition. 2010, P. 60-89, 117-133.

Additional literature:

1. Palomino J.C. Tuberculosis. 2007, P. 487-519.

9. Key questions of the practical class 9: «X-ray diagnosis of rounded shadows in the lungs. Differential diagnosis of tuberculomas with malignant and benign tumors, parasitic cysts, interlobar pleurisy, rounded infiltrates, etc. Interpretation of a series of radiographs, computed tomograms».

2 hours

- What lung diseases show rounded shadows on X-rays?
- What are the X-ray signs of a tuberculoma in the lungs?
- What kinds of infections cause lung nodules?
- What are the X-ray signs of malignant lung tumors?
- How can you tell the difference between tuberculoma and peripheral lung cancer?
- How to confirm the clinical DS of peripheral lung cancer?
- What are the X-ray signs of benign lung tumors?
- How can you tell the difference between tuberculoma and benign lung tumor?
- How to confirm the clinical DS of benign lung tumor?
- What are the X-ray signs of lung hydatid cyst?
- How can you tell the difference between tuberculoma and lung hydatid cyst?
- How to confirm the clinical DS of lung hydatid cyst?
- What are the X-ray signs of interlobular pleurisy?
- How can you tell the difference between tuberculoma and interlobular pleurisy?
- How to confirm the clinical DS of interlobular pleurisy?

Recommended literature for the class:

Basic literature:

1. Lecture course on phthisiopulmonology, lectures 1, 5.
2. John Crofton Crofton's clinical tuberculosis. The third edition. 2009, P. 75-83, 92-94.
3. Stephen M. Ellis, Christopher Flower; editors: Harald Ostensen, Holger Peterson. The WHO manual of diagnostic imaging: radiographic anatomy and interpretation of the chest and the pulmonary system. 2006, P. 46-47, 63-72, 105-118.
4. Veena Chowdhury, Arun Kumar Gupta. Diagnostic radiology chest and cardiovascular imaging, Third Edition. 2010, P. 60-68, 178-235.

Additional literature:

1. Palomino J.C. Tuberculosis. 2007, P. 487-519.

10. Key questions of the practical class 10: «Radiological diagnosis of annular shadows. Differential diagnosis of tuberculous caverns with abscessing pneumonia, decaying tumor, parasitic cysts after emptying, bullous emphysema, etc. Interpretation of a series of radiographs, computed tomography»

2 hours

- What are the X-ray signs of cavitary tuberculosis?
- How to confirm the clinical DS of cavitary tuberculosis?
- What is the radiological diagnosis of abscessing pneumonia?
- What is the difference between TB cavity and abscessing pneumonia?
- How to confirm the clinical DS of abscessing pneumonia?
- What is a cystic lung disease?
- What are the X-ray and CT findings of pulmonary cysts?
- What is a bullous emphysema?
- What are the X-ray and CT findings of bullous emphysema?
- What is the difference between bullous emphysema and cysts?
- What are the different types of pulmonary cysts?
- Does emphysema cause cysts?

Recommended literature for the class:

Basic literature:

1. Lecture course on phthisiopulmonology, lectures 1, 5.
2. John Crofton Crofton's clinical tuberculosis. The third edition. 2009, P. 75-83.
3. Veena Chowdhury, Arun Kumar Gupta. Diagnostic radiology chest and cardiovascular imaging, Third Edition. 2010, P. 60-68.

Additional literature:

1. Palomino J.C. Tuberculosis. 2007, P. 487-519.

11. Key questions of the practical class 11: «X-ray signs of fluid accumulation in the pleural cavity. X-ray diagnosis of pleurisy. X-ray signs of accumulation of gas in the pleural cavity. X-ray diagnosis of spontaneous pneumothorax. Interpretation of a series of radiographs, computed tomography».

2 hours

- What are the signs on an X-ray for pleural effusion?
- How is fluid in pleural cavity diagnosed?
- What is fluid accumulation in the pleural cavity?
- What is fluid in the pleural cavity?
- What types of fluid are in the pleural space?
- Does a pleural effusion need treatment?

Recommended literature for the class:

Basic literature:

1. Lecture course on phthisiopulmonology, lectures 1, 5, 6.
2. John Crofton Crofton's clinical tuberculosis. The third edition. 2009, P. 92-94.
3. Stephen M. Ellis, Christopher Flower; editors: Harald Ostensen, Holger Peterson. The WHO manual of diagnostic imaging: radiographic anatomy and interpretation of the chest and the pulmonary system. 2006, P. 105-118.
4. Veena Chowdhury, Arun Kumar Gupta. Diagnostic radiology chest and cardiovascular imaging, Third Edition. 2010, P. 272-314.

12. Key questions of the practical class 12: «Final class. Module 2. Counting of individual rating in the second unit. Testing. Counting of students' overall score».

2 hours

- Interpreting series of X-rays with pulmonary disseminations.
- Interpreting series of X-rays with pulmonary round opacities.
- Interpreting series of X-rays with pulmonary cavities.

- Interpreting series of X-rays with pleural effusions.
- Interpreting series of X-rays with spontaneous pneumothorax.
- Solving clinical cases with disseminations
- Solving clinical cases with round opacities
- Solving clinical cases with cavities
- Solving clinical cases with pleurites.
- Solving clinical cases with pneumothorax.
- Testing
- Counting of individual rating in the second unit.
- Counting of students' overall score.

Methodological instructions for the implementation of independent work on the discipline, indicating the deadlines for submission

Unit No. 1: "Methods of radiological diagnosis of respiratory tuberculosis in adults and children, essence, advantages and disadvantages. Typical x-ray picture of tuberculosis in adults and children. X-ray signs of tuberculosis. X-ray and differential diagnosis of hilar lymphadenopathy and pulmonary infiltrates."

1. Key questions of the independent work Topic 1: "Sarcoidosis (pulmonary radiographic manifestations)." Work with literature.
2 hours
- The essence of disease, morphological and clinical features of sarcoidosis
- Classification of sarcoidosis
- X-ray presentations of intrathoracic lymph nodes sarcoidosis
- Verification of clinical DS «Sarcoidosis»
- Differential diagnosis with tuberculosis

Recommended reading for the class:
Basic literature:
1. Veena Chowdhury, Arun Kumar Gupta. Diagnostic radiology chest and cardiovascular imaging, Third Edition. 2010, P. 119-120, 169-172.
2. Stephen M. Ellis, Christopher Flower; editors: Harald Ostensen, Holger Peterson. The WHO manual of diagnostic imaging: radiographic anatomy and interpretation of the chest and the pulmonary system. 2006, P. 99-101.

2. Key questions of the independent work Topic 2: "Hodgkin and non-Hodgkin lymphomas (radiological manifestations)." Work with literature.
2 hours
- Classification of lymphomas
- Etiology, pathogenesis, morphological and clinical features of lymphomas
- X-ray presentations of lymphomas
- Verification of clinical DS in lymphomas
- Differential diagnosis with tuberculosis

Recommended reading for the class:
Basic literature:
1. Veena Chowdhury, Arun Kumar Gupta. Diagnostic radiology chest and cardiovascular imaging, Third Edition. 2010, P. 232-233.

3. Key questions of the independent work Topic 3: "Central lung cancer (radiological manifestations)." Work with literature.
2 hours
- Etiology, pathogenesis, clinical features of central cancer
- X-ray features of central cancer
- Verification of clinical DS «Central cancer»
- Differential diagnosis with tuberculosis

Recommended reading for the class:
Basic literature:
1. Veena Chowdhury, Arun Kumar Gupta. Diagnostic radiology chest and cardiovascular imaging, Third Edition. 2010, P. 216-221.

4. Key questions of the independent work Topic 4: "Nonspecific pneumonia (radiological manifestations)." Work with literature.
2 hours

- Etiology, pathogenesis of nontuberculous pneumonia
- Clinical presentations of nontuberculous pneumonia
- Morphological and X-ray types of nontuberculous pneumonia
- X-ray presentations of nontuberculous pneumonia
- Verification of clinical DS «Nontuberculous pneumonia»
- Differential diagnosis with tuberculosis

Recommended reading for the class:

Basic literature:

1. Veena Chowdhury, Arun Kumar Gupta. Diagnostic radiology chest and cardiovascular imaging, Third Edition. 2010, P. 69-83, 88, 236-237, 246-256.
2. Stephen M. Ellis, Christopher Flower; editors: Harald Ostensen, Holger Peterson. The WHO manual of diagnostic imaging: radiographic anatomy and interpretation of the chest and the pulmonary system. 2006, P. 73-77.

5. Key questions of the independent work Topic 5: "Interpretation of a series of radiographs and computed tomograms for the differential diagnosis of pulmonary infiltrates. Compilation of a comparative table with radiological characteristics of tuberculous pneumonia, nonspecific pneumonia, pulmonary atelectasis and primary tuberculosis complex." Assignment for independent completion.

2 hours

- Interpreting X-rays and computed tomograms for differential diagnosis of infiltrates
- Filling out comparative tables for differential diagnosis of infiltrates
- Assignment of tasks on Google classroom (X-rays, comparative tables for differential diagnosis of infiltrates)

Recommended reading for the class:

Basic literature:

1. Veena Chowdhury, Arun Kumar Gupta. Diagnostic radiology chest and cardiovascular imaging, Third Edition. 2010, P. 60-62., 69-83, 236-237, 246-256.

6. Key questions of the independent work Topic 6: "Interpretation of a series of radiographs and computed tomograms for the differential diagnosis of hilar lymphadenopathy. Filling out a comparative table with radiological characteristics of tuberculosis of the intrathoracic lymph nodes, sarcoidosis of the intrathoracic lymph nodes, central lung cancer, Hodgkin's lymphoma." Assignment for independent completion.

2 hours

- Interpreting X-rays and computed tomograms for differential diagnosis of intrathoracic lymphoadenopathy
- Filling out comparative tables for differential diagnosis of intrathoracic lymphoadenopathy
- Assignment of tasks on Google classroom (X-rays, comparative tables for differential diagnosis of intrathoracic lymphoadenopathy)

Recommended reading for the class:

Basic literature:

1. Veena Chowdhury, Arun Kumar Gupta. Diagnostic radiology chest and cardiovascular imaging, Third Edition. 2010, P. 169-172, 212-233.
2. Stephen M. Ellis, Christopher Flower; editors: Harald Ostensen, Holger Peterson. The WHO manual of diagnostic imaging: radiographic anatomy and interpretation of the chest and the pulmonary system. 2006, P. 65-66.

7. Key questions of the independent work Topic 7: "Solving a series of clinical cases in the differential diagnosis of pulmonary infiltrates and hilar lymphadenopathy." Assignment for independent completion.

2 hours

- Solving clinical cases for differential diagnosis of hilar lymphoadenopathy on Google classroom
- Solving clinical cases for differential diagnosis of pulmonary infiltrates on Google classroom

Recommended reading for the class:

Basic literature:

1. Veena Chowdhury, Arun Kumar Gupta. Diagnostic radiology chest and cardiovascular imaging, Third Edition. 2010, P. 60-62., 69-83, 169-172, 212-233, 236-237, 246-256.
2. Stephen M. Ellis, Christopher Flower; editors: Harald Ostensen, Holger Peterson. The WHO manual of diagnostic imaging: radiographic anatomy and interpretation of the chest and the pulmonary system. 2006, P. 65-66.

Unit No. 2: "X-ray and differential diagnosis of pulmonary disseminations, cavities, round formations and pleurites."

8. Key questions of the independent work Topic 8: "Peripheral lung cancer (radiological manifestations)." Work with literature.

2 hours

- Etiology, pathogenesis of peripheral cancer
- Clinical features of peripheral cancer
- X-ray features of peripheral cancer
- Verification of clinical DS «Peripheral cancer»
- Differential diagnosis with tuberculosis

Recommended reading for the class:

Basic literature:

1. Veena Chowdhury, Arun Kumar Gupta. Diagnostic radiology chest and cardiovascular imaging, Third Edition. 2010, P. 178-208, 212-233.

9. Key questions of the independent work Topic 9: "Benign lung tumors (radiological manifestations)." Work with literature.

2 hours

- Etiology, pathogenesis, varieties of benign tumors
- Clinical features of benign tumors
- X-ray features of benign tumor
- Verification of clinical DS in benign tumors
- Differential diagnosis with tuberculosis

Recommended reading for the class:

Basic literature:

1. Veena Chowdhury, Arun Kumar Gupta. Diagnostic radiology chest and cardiovascular imaging, Third Edition. 2010, P. 178-208.

10. Key questions of the independent work Topic 10: "Parasitic cysts of the lungs (radiological manifestations)." Work with literature.

2 hours

- Protozoal and metazoal parasitic infections
- Hydatid disease, etiology, pathogenesis
- Structure of hydatid cyst
- Clinical presentations of hydatid disease
- X-ray presentations of hydatid cyst
- Verification of clinical DS «Hydatid cyst»
- Differential diagnosis with tuberculosis

Recommended reading for the class:

Basic literature:

1. Veena Chowdhury, Arun Kumar Gupta. Diagnostic radiology chest and cardiovascular imaging, Third Edition. 2010, P. 83-85, 178-208.

11. Key questions of the independent work Topic 11: "Interpretation of a series of radiographs and computed tomograms for the differential diagnosis of pulmonary disseminated processes. Filling out a comparative table with radiological characteristics of miliary tuberculosis, disseminated tuberculosis, pneumoconiosis and oncological diseases." Assignment for independent completion.

2 hours

- Interpreting X-rays and computed tomograms for differential diagnosis of pulmonary disseminations
- Filling out comparative tables for differential diagnosis of pulmonary disseminations
- Assignment of tasks on Google classroom (X-rays, comparative tables for differential diagnosis of pulmonary disseminations)

Recommended reading for the class:

Basic literature:

1. Veena Chowdhury, Arun Kumar Gupta. Diagnostic radiology chest and cardiovascular imaging, Third Edition. 2010, P. 63, 117-133.

12. Key questions of the independent work Topic 12: "Interpretation of a series of radiographs and computed tomograms for the differential diagnosis of round opacities in the lungs. Filling out a comparative table with radiological characteristics of tuberculoma, peripheral lung cancer, hamartoma, parasitic cyst, retention cyst." Assignment for independent completion.

2 hours

- Interpreting X-rays and computed tomograms for differential diagnosis of round opacities
- Filling out comparative tables for differential diagnosis of round opacities

- Assignment of tasks on Google classroom (X-rays, comparative tables for differential diagnosis of round opacities)

Recommended reading for the class:

Basic literature:

1. Veena Chowdhury, Arun Kumar Gupta. Diagnostic radiology chest and cardiovascular imaging, Third Edition. 2010, P. 64, 71, 178-208, 212-233.

13. Key questions of the independent work Topic 13: "Interpretation of a series of radiographs and computed tomograms for the differential diagnosis of ring-shaped opacities in the lungs. Filling out a comparative table with radiological characteristics of a tuberculous cavity, a destructive form of lung cancer, a parasitic cyst after a breakthrough, an abscess after a breakthrough." Assignment for independent completion.

2 hours

- Interpreting X-rays and computed tomograms for differential diagnosis of cavities
- Filling out comparative tables for differential diagnosis of cavities
- Assignment of tasks on Google classroom (X-rays, comparative tables for differential diagnosis of cavities)

Recommended reading for the class:

Basic literature:

1. Veena Chowdhury, Arun Kumar Gupta. Diagnostic radiology chest and cardiovascular imaging, Third Edition. 2010, P. 62, 184, 215-216.
2. Stephen M. Ellis, Christopher Flower; editors: Harald Ostensen, Holger Peterson. The WHO manual of diagnostic imaging: radiographic anatomy and interpretation of the chest and the pulmonary system. 2006, P. 51-52.

14. Key questions of the independent work Topic 14: "Interpretation of a series of radiographs and computed tomograms for the differential diagnosis of pleurisy. Filling out a comparative table with the characteristics of pleural effusion in diseases of various etiologies. Interpretation of a series of radiographs and computed tomograms for the differential diagnosis of pneumothorax. Filling out a comparative table with the characteristics of open, closed and tension pneumothorax." Assignment for independent completion.

2 hours

- Classification of pleurites
- Etiology, pathogenesis of pleurites
- Clinical features of pleurites
- X-ray presentations of pleurites
- Peculiarities of pleural effusion in different diseases, differential diagnosis of transudate and exudate
- Videothoracoscopy for the verification of clinical DS in pleurites
- Spontaneous pneumothorax, definition, etiology, pathogenesis
- Types of spontaneous pneumothorax: opened, closed, tension
- Clinical features of spontaneous pneumothorax
- X-ray features of spontaneous pneumothorax

Recommended reading for the class:

Basic literature:

1. Veena Chowdhury, Arun Kumar Gupta. Diagnostic radiology chest and cardiovascular imaging, Third Edition. 2010, P. 63, 85-86, 222, 241-242, 273-299.