SLC. MS.040. LSO9001. 1693

SYLLABUS

INTERNATIONAL EUROPEAN UNIVERSITY

SCHOOL OF MEDICINE

PATHOMORPHOLOGY

2023

SYLLABUS

Discipline	PATHOMORPHOLOGY
Teacher(s)	Doctor of Medical Sciences, Professor Dyadyk Olena Oleksandrivna Lecturer Sochenko Sergiy Igorevich
Profile of the teacher(s)	https://medicine.ieu.edu.ua/pro-yemsh/kafedry/kafedra-fundamentalnykh-dystsyplin
Consultations	
Face-to-face consultations	Third Tuesday of the month from 15:00 to 16:00
Online consultations	Third Wednesday of the month from 15:00 to 16:00
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Discipline page	https://medicine.ieu.edu.ua/pro-yemsh/kafedry/kafedra-fundamentalnykh-dystsyplin

Form of final control	test	differentiated test	exam
	☒	☐	☒

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1 Brief summary of the discipline

Pathomorphology is an academic discipline that provides an understanding of the structural basis of human diseases.
for an in-depth understanding of the fundamental principles of medicine and the clinical picture of diseases with the subsequent use of this knowledge in the practical work of a doctor.

2 Prerequisite for the course

Pathomorphology as an academic discipline is based on students' mastery of human anatomy and physiology, histology, cytology, embryology and genetics, microbiology, virology and immunology, biological chemistry, medical biology and medical physics. The study of pathomorphology is integrated with the study of pathological physiology and clinical disciplines. It is based on students' study of medical biology, anatomy, histology and embryology, and is integrated with these disciplines; lays the foundation for students' study of physiology, biochemistry, pathological physiology, and clinical disciplines, which involves the integration of teaching with these disciplines and the development of skills to apply knowledge of pathomorphology in the process of further study and professional activity.

3 Purpose and objectives of the discipline

The purpose of teaching the discipline "Pathomorphology" is to study the etiology, pathogenesis, microscopic and ultramicroscopic changes in organs and tissues of the human body in various conditions of life, which involves

- study of typical general pathological processes, the totality of which determines the morphological manifestations of diseases,
- study of the structural basis of the development of diseases and their clinical manifestations, the structural basis of recovery, complications and consequences,
- study of methods of pathomorphological research: autopsy, biopsy, study of biopsy material, experimental modelling of diseases.

The main objectives of the discipline "Pathomorphology" are as follows:

- understanding of the basics of cell pathology and general pathological processes, the combination of which determines the morphological manifestations of certain diseases;
- knowledge of the morphology of diseases at different stages of their development (morphogenesis), the structural basis of recovery, complications and consequences of diseases;
- study of variants of pathomorphosis of diseases arising in connection with human living conditions, changing as a result of various therapeutic measures (pathology of therapy);
- comparison of morphological and clinical manifestations of diseases at all stages of their development, pathological conditions and diseases of the oral cavity;
- Acquiring skills in clinical and anatomical analysis, synthetic generalisation of diagnostic signs of diseases and their correct interpretation in cause and effect relationships.

4 Learning outcomes

PLO 1	Have a thorough knowledge of the structure of professional activity. Be able to carry out professional activities that require updating and integrating knowledge. Be responsible for professional development, the ability to further professional learning with a high level of autonomy.
PLO 3	Specialised conceptual knowledge that includes scientific achievements in the field of healthcare and is the basis for research, critical thinking in the field of medicine and related interdisciplinary issues.

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4 Learning outcomes

PLO 4	Identify and identify the leading clinical symptoms and syndromes (according to list 1); using standard methods, using preliminary data from the patient's history, examination of the patient, knowledge of the person, his/her organs and systems, establish a preliminary clinical diagnosis of the disease (according to list 2).
PLO 21	Search for relevant information in professional literature and databases other sources, analyse, evaluate and apply this information.
PLO 23	Evaluate the impact of the environment on human health to assess the state of morbidity of the population.
PLO 25	Clearly and unambiguously communicate own knowledge, conclusions and arguments on healthcare and related issues to specialists and non-specialists.

5 ECTS Credits

6 ECTS credits / 180 academic hours, of which 24 are lectures, 72 are practical work, 84 are independent work

6 Structure of the discipline

Topic	Lection	Practice	Ind. work
Section of the discipline 1. General pathomorphology			
Topic 1. Subject and tasks of pathomorphology. Methods of pathological examination: autopsy and biopsy. General information about pathogenic factors (endogenous and exogenous) and types of cellular reactions to them (adaptation, damage, accumulation, aging).	1	2,5	2
Topic 2. The concept of damage. Morphology of reversible and irreversible damage to cells and tissues. Necrosis and apoptosis. Selective cell death induced by the immune system and cell destruction by activated complement. Fundamentals of thanatology. Death, definition, signs of death.	1	2,5	2
Topic 3: Chronic damage. The concept of dystrophy. Parenchymal dystrophies (intracellular accumulation of proteins, fats and carbohydrates). Thesaurismosis.	1	2,5	2
Topic 4. Disorganisation of connective tissue. Vascular stromal dystrophies (extracellular accumulations). Amyloidosis.	1	2,5	2
Topic 5. Accumulation of endogenous and exogenous pigments (haemoglobinogenic, tyrosinogenic, lipidogenic). Pathomorphological manifestations of nucleoprotein metabolism and mineral metabolism (iron, copper) disorders.	-	2,5	3
Topic 6. Disorders of ion-osmotic, water balance and acid-base state. Disorders of lymph formation and circulation. Edema, excoriation. Disorders of blood filling: hyperaemia, ischaemia, bleeding, haemorrhage. Heart failure: causes, types, morphological equivalents.		2,5	2

Topic 7. Haemostatic disorders: thrombosis, DIC syndrome. Embolism: types, morphological characteristics. Heart attack. Shock: causes, pathogenesis, pathomorphological manifestations.		2,5	2
Topic 8. Causes, pathogenesis, macro- and microscopic manifestations, complications and consequences of alterations and circulatory disorders. Pathological autopsy.		2,5	-
Topic 9. Defence mechanisms and their morphological equivalents. The concept of nonspecific and specific defence mechanisms. Fundamentals of the immune response. Features of the immune response in children. Age-related involution and accretory transformation of the thymus. The general doctrine of inflammation. Acute and chronic inflammation. Exudative inflammation. Morphology of exudative inflammation.	1	2,5	3
Topic 10. Productive inflammation. Granulomatosis. Specific proliferative inflammation.	1	2,5	2
Topic 11. Pathomorphology of the immune system. Reactions and mechanisms of hypersensitivity. Autoimmune diseases. Immunodeficiency states. Reaction's rejection of transplantation.		2,5	2
Topic 12. Processes of adaptation and compensation. Structural basis of physiological adaptation of organs and cells. Types and morphological manifestations of adaptation processes (hyperplasia, hypertrophy, hypoplasia, aplasia, atrophy, metaplasia). Regeneration and repair. Sclerosis. Pathomorphology of organ failure.		2,5	2
Topic 13. The general doctrine of tumours. Nomenclature and morphological features of epithelial tumours	2	2,5	2
Topic 14. Nomenclature and morphological features of tumours of mesenchymal and neuroectodermal origin		2,5	2
Topic 15. Hematopoietic tumours.		2,5	2
Topic 16. Macroscopic and microscopic signs, complications and consequences of inflammation, immunopathological and compensatory-adaptive processes and tumours. Pathological autopsy	-	2,5	2
Final control	**Test**		
Total hours – 90 / Credits – 3,0	**8**	**40**	**42**

Chapter 2.
Special pathomorphology

Topic 17. Introduction to nosology. The concept of "disease", manifestations and complications of diseases. Principles of disease classification. The concept of "diagnosis", structure of the diagnosis. The concept of "pathomorphosis" of the disease. Types of of pathomorphosis.	-	2	2
Topic 18. Anaemia. Haemorrhagic syndromes: vasopathy, thrombocytopenia, thrombo- cytopathies, coagulopathies.	-	-	3
Topic 19. Diseases of the cardiovascular system. Atherosclerosis and arteriosclerosis (Menkeberg's mediocalcinosis, arteriolosclerosis). Aortic aneurysms (atherosclerotic, dissecting). Essential and symptomatic arterial hypertension. Ischaemic heart disease. Cerebrovascular diseases. Cardiomyopathy.	2	2	3

Topic 20. Rheumatism. Systemic connective tissue diseases with autoimmunity: systemic lupus erythematosus, rheumatoid arthritis, systemic scleroderma, dermatomyositis, Bechterew's disease, Sjogren's syndrome. Systemic vasculitis: nodular periarteritis, Takayasu arteritis, temporal (giant cell) arteritis, obliterative thrombangitis, Kawasaki disease, Schönlein-Genoch purpura, Raynaud's disease and syndrome. ANCA-associated vasculitis: microscopic polyangiitis, granulomatosis with polyangiitis (Wegener's), eosinophilic granulomatosis with polyangiitis (Churg-Strauss syndrome). Lesions of the endocardium: infective endocarditis, eosinophilic endocarditis of Lefleur.	-	2	2
Topic 21. Acute inflammatory diseases of the respiratory system: upper respiratory tract (rhinitis, sinusitis, laryngitis, epiglottitis, laryngotracheobronchitis), bronchiolitis, pneumonia. Chronic obstructive respiratory diseases: chronic obstructive bronchitis, chronic obstructive emphysema, bronchiectasis and bronchiectatic disease, bronchial asthma). Upper respiratory tract tumours, lung cancer of the lungs.	2	2	2
Topic 22. Diseases of the oropharynx, salivary glands, oesophagus, stomach. Acute and chronic gastritis (autoimmune, Helicobacter pylory-associated), Menetrier's disease. Peptic ulcer, peptic ulcer disease. Enteritis, colitis, idiopathic nonspecific intestinal diseases (ulcerative colitis, Crohn's disease). Diverticula. Hirschsprung's disease. Appendicitis. Malabsorption syndrome. Tumours of the oropharynx, esophagus, stomach, small and colon.	1	2	2
Topic 23. Diseases of the liver, biliary system and pancreas. Hepatosis, hepatitis, cirrhosis, tumours. Hepatocellular insufficiency. Portal hypertension. Biliary cholelithiasis, acute and chronic cholecystitis, tumours. Acute and chronic pancreatitis, tumours.	1	2	3
Тема 24. Etiology, pathogenesis, macro- and microscopic changes, Complications and consequences of diseases of the cardiovascular, respiratory system, gastrointestinal tract. Pathological autopsy.	-	2	2
Topic 25. Diseases of the kidneys: glomerulopathy, acute tubulonecrosis, tubulointerstitial nephritis, pyelonephritis, urolithiasis, chronic renal failure. Hydronephrosis. Cystic kidney disease: Malformations of the urinary system. Tumours of the kidneys and urinary muhira	2	2	2
Topic 26. Diseases of the female and male reproductive system. Diseases of the mammary gland. Sexually transmitted infections (syphilis, gonorrhoea, papilloma virus infection, chlamydia, ureaplasmosis, trichomoniasis. Pathology of pregnancy and postpartum period and postpartum period. Spontaneous and medical abortions. Ectopic pregnancy. NPH gestosis. Trophoblastic disease. Pathology of the afterbirth.	-	2	2
Topic 27. Prenatal pathology (gametopathies, blasto-, embryo-, fetopathies) and perinatal pathology (fetal and newborn asphyxia, birth trauma, intracranial haemorrhage, infectious diseases of the TORCH complex. Congenital syphilis). Congenital malformations: morphological characteristics.	-	2	2

Topic 28. Diseases of the endocrine system: Hypothalamic-pituitary disorders. Pathology of the adrenal glands. Pathology of the thyroid gland. Pathology of the endocrine apparatus of the pancreas. MEN-syndrome.	2	2	2
Topic 29. Diseases of the central nervous system: Neurodegenerative (neurodystrophic) (Alzheimer's disease) and demyelinating diseases (multiple sclerosis), amyotrophic lateral sclerosis. Neuritis (neuropathy). Infectious diseases: encephalitis, meningitis. Slow viral neuroinfections and prion diseases (kuru, Creutzfeldt-Jakob disease). Tumours of the central nervous system (astroglial, oligodendroglial, ependymal, neuronal, meningeal), cranial and paraspinal nerves. Post-resuscitation encephalopathy and brain death syndrome.	1	2	2
Topic 30. Diseases of muscles, bones, joints: Paget's disease; fibrous dysplasia; osteomyelitis; Duchenne muscular dystrophy; myotonia; congenital and toxic myopathies; lesions of the neuromuscular junction - myasthenia gravis.	1	-	2
Topic 31. Infectious and parasitic diseases. Characteristics of the infectious process. General characteristics of the infectious process: entrance gates of infection, primary infectious complex, spread and dissemination, ways of transmission of infectious agents; classification of infectious and parasitic diseases. Morphological variants of local and general reactions depending on the etiology of infection (bacterial, viral, parasitic, fungal, etc.): with the participation of neutrophils (purulent inflammation); with the participation of lymphocytes and macrophages (mononuclear infiltration and granulomatous inflammation); under the influence of viruses (cytopathic); with a predominance of necrotic local reaction.	2	2	2
Topic 32. Infectious diseases with an enteric mechanism of infection of various etiologies (bacterial - typhoid fever, dysentery, cholera, salmonellosis, staphylococcal infection, coli-infection, campylobacter, yersinia and viral enteritis). Helminthiasis (trichinosis, echinococcosis, cysticercosis, opisthorchiasis, schistosomiasis).	-	2	2
Topic 33. Bacterial infections: diphtheria, scarlet fever, meningococcal infection, whooping cough. Anthropozoonotic infections: plague, tularemia, brucellosis, anthrax.	-	2	2
Topic 34. Viral infections. Acute respiratory viral infections. Childhood viral infections: measles, rubella, infectious mononucleosis, chickenpox, mumps, poliomyelitis. Rabies, smallpox.	-	2	2
Topic 35. Infections with multiorgan damage. Sepsis as a special form of infection. HIV infection. Tuberculosis.	2	-	2
Exam			
Total for section 2 – 90 hours / Credits – 3,0	**16**	**32**	**42**
Total hours of the discipline –180/6,0 ECTS credits	**24**	**72**	**84**
Final control in the discipline	**Exam**		

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7 List of mandatory tasks

1. History of pathological anatomy and pathomorphology.
2. Elements of ultrastructural pathology of the cell.
3. Death of the organism from biological, social and medical perspectives. Definition of intrauterine death. Thanatogenesis.
4. Selective death of specialised cells in a living organism.
5. Genetic diseases caused by enzyme defects: lysosomal diseases, accumulation diseases.
6. Clinical and morphological features of various forms of amyloidosis
7. Mechanisms of accumulation of exogenous pigments.
8. Disorders of ion-osmotic and water balance. Hyper- and hypokalemia: role in thanatogenesis.
9. The role of the vascular wall, blood coagulation system in physiological haemostasis and thrombosis.
Hypercoagulable states.
10. Pathogenesis and main stages of development of different types of shock, typical morphological changes in organs in shock. ICE syndrome: pathogenesis, stages, their morphological signs, significance.
11. Morphological manifestations of immune reactions in peripheral lymphoid organs, thymus. The concept of innate and acquired immunity.
12. Stages of development and resolution of acute inflammation. Differences between acute and chronic
inflammation.
13. Molecular basis of cell and tissue proliferation. Stem cells and their role at different stages of embryo and ontogenesis. Pathomorphology of organ failure.
14. Molecular basis and main stages of carcinogenesis.
15. Morphology of tumours of exo- and endocrine glands and epithelial coverings.
16. Nomenclature and morphological features of tumours of mesenchymal origin.
17. Nomenclature and morphological features of tumours of nervous and melanin-forming tissues.
18. The concept of "disease", manifestations and complications of diseases. Principles of disease classification.
19. Diseases of the cardiovascular system.
20. Chronic restrictive lung diseases (fibrosing, granulomatous, allergic and smoking-related).
21. Diseases of the oropharynx, salivary glands, oesophagus.
22. Biliary stone disease, acute and chronic cholecystitis, tumours. Acute and chronic pancreatitis, tumours.
23. Secondary glomerulopathies. Tubulointerstitial nephritis. Hydronephrosis.
24. Cystic kidney disease:
25. Diseases of the mammary gland. Sexually transmitted infections (syphilis, gonorrhoea, papillomavirus infection, chlamydia, ureaplasmosis, trichomoniasis.
26. Genetic diseases: Mendelian diseases, cytogenetic diseases, diseases with multifactorial and non-classical inheritance.
27. Diseases of the endocrine system: Hypothalamic-pituitary disorders.
28. Diseases of muscles, bones, joints; congenital and toxic myopathies; lesions of the neuromuscular junction - myasthenia gravis.
29. Skin diseases: terminology that reflects the pathology of the skin.
30. Infectious and parasitic diseases. Characteristics of the infectious process.
31. Helminthiasis (trichinosis, echinococcosis, cysticercosis, opisthorchiasis, schistosomiasis)

8 Selective tasks

1. Create situational test tasks
2. Create multimedia presentations on the topics of practical classes
3. Creating biological crosswords on the topics of practical classes
4. Making posters with contours of physiological regulation of functions
5. Participation in the work of the student scientific club
6. Participation in student scientific and practical conferences
7. Organising and visiting thematic museums
8. Publication of abstracts of scientific conference reports in co-authorship with a teacher

9 Signs of discipline

Term of Teaching	Semester	International disciplinary integration	Course (year of study)	Cycles: general training/ vocational training/ free choice
1 semester	IV, VI	Yes	3st	General training

10 Grading System and Requirements

General assessment system of the discipline

The current performance of students is assessed on a 4-point scale (2; 3; 4; 5) at each practical, taking into account the approved assessment criteria for the relevant discipline. The student must receive a grade for each topic for further conversion of grades into points on a multi-point (200-point) scale.

Assessment criteria for current learning activities:

Excellent ("5") - the student has correctly answered 90-100% of the A-format tests (from the "Krok-2). Solves situational problems of increased complexity, is able to summarise the material.

Good ("4") - the student has correctly answered 70-89% of the tests of format A. Possesses the necessary practical skills and techniques to perform them to an extent exceeding the required minimum.

Satisfactory ("3") - the student correctly answered 50-69% of the tests of format A. Has only the mandatory minimum of research methods.

Unsatisfactory ("2") - the student correctly answered 50% of the tests of format A. When answering and demonstrating practical skills, he/she makes significant, gross mistakes.

Assessment of students' independent work in preparation for classroom practical classes is carried out during the current control of the topic at the relevant classroom.

The semester credit is assessed on a two-point scale (passed/not passed) and a 200-point scale by determining the arithmetic mean of current grades for each practical lesson on a 4-point scale, and its subsequent conversion to points

200-point scale. The minimum number of points that a student must score is 120.

In the fifth semester, when studying "General Pathomorphology", the form of final control is a test. In the sixth semester, when studying "Special Pathomorphology", the form of final control is a test in the relevant section of the discipline ("Special Pathomorphology") and an exam in the discipline "Pathomorphology".

10 Grading System and Requirements

A semester test is a form of final control, which consists in assessing the student's mastery of the educational material solely on the basis of the results of performing all types of tasks provided by the working curriculum. The semester test in the discipline "Pathomorphology" is conducted after the completion of the study of section 1
"General pathomorphology" and section 2 "Special pathomorphology". The test in the discipline (relevant content module) is conducted after completion of the study, before the examination session.
The exam is a form of final control of the student's mastery of theoretical and practical material in the discipline "Pathomorphology".

QR Code: https://ieu.edu.ua/docs/rate-of-study.pdf

11 Conditions for admission to the final control

Students who have completed all types of work and assignments provided for in the curriculum for the semester in accordance with the discipline, attended all classes provided for in the curriculum, written and submitted a medical history and have an average score for current academic activities of at least "3" (72 points on a 120-point scale) are admitted to the semester final control.

QR Code: https://ieu.edu.ua/docs/rate-of-study.pdf

12 Discipline policy

The policy of the discipline is determined by the requirements that scientific and practical workers make to students in the study of clinical discipline. The condition for a successful educational process is personal compliance of each student of a higher education institution with the rules of conduct adopted both at the university and in society. A future doctor must have a high level of behavioural culture, behave with dignity, tact, and self-control.
The student must be on time for classes and wear academic medical uniform (white coat or surgical suit). The student must adhere to the schedule of the educational process, come to class prepared on the topic of the lesson. During the class, the student must not leave the classroom without the permission of the teacher; use a mobile phone and other means of communication and information without the permission of the teacher, engage in outside activities, distract other students. When writing different types of papers, students must adhere to the rules of academic integrity.
The teacher must adhere to the curriculum, objectively assess students' knowledge and skills. During the educational process, the teacher must be aware of anti-corruption measures and not engage in corrupt activities.

13 Policy on absences and late assignments

A student who, for valid reasons, confirmed by documentary evidence, was not subject to current control has the right to undergo current control within two weeks after returning to study. A student who was absent from classes without valid reasons, did not participate in current control activities, did not eliminate academic debt, is not allowed to take the final semester control knowledge in this discipline, and on the day of the exam, the academic staff member assigns a grade of "failed" in the examination record. Repeated passing of a differentiated test in the discipline is assigned subject to the completion of all types of educational, independent (individual) work provided for by the working curriculum of the discipline and is carried out in accordance with the schedule of liquidation of academic debt approved by the directorate.

QR Code: https://ieu.edu.ua/docs/050.pdf

14 Academic integrity policy

Учасники освітнього процесу керуються принципами академічної доброчесності

15 Recommended sources of information

Main literature:

1. Pathomorphology: national textbook / V.D.Markovskyi, V.O.Tumanskyi IV. Sorokina et al. eds. V.D.Markovskyi, V.O.Tumanskyi - K.: VSV "Medicine", 2015 - 936 p., colour.
2. "Pathomorphology and histology: a fundamental atlas" / edited by D.D. Zerbino, M.M. Bagriy, Y.Y. Bodnar, V.A. Dibrova - Vinnytsia: Nova Knyha, 2014. 800
3. Kumar V. Fundamentals of pathology by Robbins: 10th English edition: in 2 volumes / Viney Kumar, Abdul K. Abbas, John K. Aster; scientific editorial board: I. Sorokina, S. Gychka, I. Davydenko - K. : VSV "Medicine", 2019.
4. Sorokina I.V. Pathological anatomy. Pathological anatomy: Textbook for students / I.V. Sorokina. Sorokina, A.F. Yakovtsova - Kharkiv: Fact, 2014. - 648 p.: ill.
5. Pathomorphology: textbook / I.V. Sorokina, V.D. Markovskyi, D.I. Halata et al. ; edited by I.V. Sorokina, V.D. Markovskyi, D.I. Halata. - Kyiv: AUS Medicine publishing, 2019. 320 p. + 2 colour inserts (8 p. + 12 p.).
6. BRS Pathology by Schneider & Szanto, 2017. 340p Master Medicine: General and Systematic Pathology by Paul Bass & Susan Burroughs & Norman Carr & Claire Way
7. Hyriavenko N, Lundin M, Sikora K, Piddubnyi A, Karpenko L, Kravtsova O, Hyriavenko D, Diachenko O, Sikora V, Romaniuk A. Serous Adenocarcinoma of Fallopian Tubes: Histological and Immunohistochemical Aspects. J Pathol Transl Med. 2019;53: 236-43.

Supplementary:

1. Tomashova SA, Servetnyk MI, Hrytsyna IV, Havryliuk OM, Kuzyk YI, Vovk V, Vovk V. Workbook on pathomorphology edited by Pospishil Y. Workbook on pathomorphology. Section "General pathology". Methodological developments for students of the medical faculty. - Lviv, 2016. - 100 p.
2. Hrytsyna I.V., Tomashova S.A., Havryliuk O.M. Edited by Pospishil Y.O. Methodical recommendations for students of the School of Medicine. Module 1 "General pathology". Content module 1 "Damage." - Lviv: PE "Aral", 2016. - 60 p.
3. Tomashova S.A., Hrytsyna I.V., Servetnyk M.I., Vovk V.I. Edited by Pospishil Y.O. Workbook on pathomorphology. Section "Special pathology". Methodological developments for students of the medical faculty. - Lviv, 2014. - 120 c.

Information resources

1. Testing Centre - database of licensed test tasks "Krok-1"
2. http://library.med.utah.edu/WebPath/webpath.html
3. http://www.webpathology.com/
4. https://www.geisingermedicallabs.com/lab/resources.shtml
5. https://digitalpathologyassociation.org/whole-slide-imaging-repository
6. https://www.pathologyoutlines.com/stains.html

16 Tips for successful studying on the course

If you want to be successful in this discipline, you need to:
1. Be active, persistent, inquisitive, consistent
2. Be tidy and polite
3. Systematically prepare for practical classes
4. Perform tasks for independent work and defend them in class.
5. To be present at the class in a medical gown
6. To solve tests and tasks independently, to work actively in class.
7. Prepare presentations and crosswords on the discipline. Participate in student scientific conferences and engage in research work in the department's scientific circles.

I wish you perseverance, dedication and motivation to learn. And then success will come to you! See you in class!
Don't forget your medical gowns!