



MINISTRY OF EDUCATION AND SCIENCE OF THE RUSSIAN FEDERATION  
Federal state autonomous educational institution  
of higher education  
«Far Eastern Federal University»  
(FEFU)

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**SCHOOL OF BIOMEDICINE**

" AGREED BY"  
«General medicine» educational program  
Supervising person

Yu.S. Khotimchenko



" APPROVED BY"  
Clinical Medicine  
Department Director

B.I. Geltser

« 14 » of January 2021

« 14 » of January 2021

**WORKING PROGRAM OF ACADEMIC DISCIPLINE (WPAD)**

«Ophthalmology»

Education program

Specialty 31.05.01 «General medicine»

**Form of study: full time**

year 6, semester C  
lectures 18 hours  
practical classes 36 hours  
laboratory works not provided  
total amount of in-classroom works 108 hours  
independent self-work 54 hours  
control works is not provided  
pass-fail exam at the year 6, semester B  
exam is not provided

The working program is drawn up in accordance with the requirements of the Federal state educational standard of higher education (level of training), approved by the order of the Ministry of education and science of the Russian Federation from 09.02.2016 № 95.

The working program of the discipline was discussed at the meeting of the Department of clinical medicine. Protocol No. 5, 14 of January 2021.

Authors: d.m.sc., professor Usov V.V., senior teacher Guseva E.V.

Vladivostok  
2021

**Reverse side of the title page of the WPAD**

**I. The work program was revised at the meeting of the Department:**

Protocol dated "\_\_\_\_\_" \_\_\_\_\_ 20\_\_ No. \_\_\_\_\_

Department Director \_\_\_\_\_  
(signature) (Full Name)

**II. The work program was revised at the meeting of the Department:**

Protocol dated "\_\_\_\_\_" \_\_\_\_\_ 20\_\_ No. \_\_\_\_\_

Department Director \_\_\_\_\_  
(signature) (Full Name)

**III. The work program was revised at the meeting of the Department:**

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Protocol dated "\_\_\_\_\_" \_\_\_\_\_ 20\_\_ No. \_\_\_\_\_

Department Director \_\_\_\_\_  
(signature) (Full Name)

## ANNOTATION

Discipline "Ophthalmology "is purposed for students enrolled in the educational program 31.05.01"General medicine".

Discipline is implemented in the 6 year as a basic discipline.

Development of the working program of the discipline was made in accordance to the Federal state educational standard of higher education in the specialty 31.05.01 "General Medicine" and curriculum of the student trainings.

The total complexity of the discipline is 108 hours, 3 credits.

The course program is based on the basic knowledge gained by students:

- the ability and willingness to implement the ethical and deontological principles in professional activities (GPC – 4)
- the readiness for medical use of drugs and other medical substances and their combinations in solving professional problems (GPC – 8)
- the capacity for the assessment of morphological and physiological states and pathological processes in the human body for solving professional tasks (GPC – 9)
- the readiness to collect and to analyze patient complaints, data of its history, the results of laboratory, instrumental, postmortem and other examinations to recognize the incidence or the absence of diseases (PC – 5)
- the readiness for educational activities to eliminate the risk factors and promote healthy lifestyles (PC – 16)

**Goal of the course:** is mastering the special methods of diagnostics and treatment of diseases of the visual organ, formation of the medical thinking basics and skills providing solutions for professional problems and the use of the algorithm of medical activity to provide first aid in emergency and life-threatening situations, prevention, diagnostics, treatment and rehabilitation of patients with eye disease and its subordinate apparatus.

### **Objectives:**

1. to teach students the ability to examine adult patients with pathology of the vision organ and to identify the symptoms of their disorders;

2. to give students up-to-date knowledge of etiology, pathogenesis, symptoms, diagnostics, treatment, prevention and expert evaluation of major ophthalmic diseases;

3. to form clinical thinking in students, ability to establish and justify independently the diagnosis of the most common ophthalmic diseases, to carry out their differential diagnostics, to provide first aid, to prescribe treatment for emergency conditions in accordance with the list of pathological conditions and diseases of the qualification characteristics of the specialty " Ophthalmology " and to make a plan of measures for the prevention of this category of diseases;

4. to instill in students the skills of deontology, moral and ethical legal culture as well as communication skills with the patient, his relatives and friends, taking into account the legal foundations of medical law.

As a result of the learning of this discipline, students form the following professional competences:

Code and formulation of competence	Stages of competence formation	
PC-4.4 To be able to determine the order of the volume, content and sequence of diagnostic measures, taking into account the standards of medical care.	Knows	the volume of necessary diagnostic measures, their content and sequence of implementation when examining patients with acute and chronic ophthalmologic pathology, taking into account the standards of medical care
	Is able to	determine the necessary diagnostic measures, their content and sequence of performance in the examination of patients with acute and chronic ophthalmologic pathology, taking into account the standards of medical care
	Possesses	draw up a plan of diagnostic measures for examining patients with acute and chronic ophthalmologic pathology, taking into account the standards of medical care
PC-5.4 Be able to use the international statistical classification of diseases and	Knows	the methodology for determining the main pathological conditions, symptoms, syndromes of ophthalmological diseases, nosological forms

health problems (ICD) for diagnosis		in accordance with the International Statistical Classification of Diseases and Related Health Problems, X revision
	Is able to	determine the main pathological conditions, symptoms, syndromes of ophthalmological diseases, nosological forms in patients in accordance with the International Statistical Classification of Diseases and Related Health Problems, X revision
	Possesses	skills in determining the main pathological conditions, symptoms, syndromes of ophthalmological diseases, nosological forms in patients in accordance with the International Statistical Classification of Diseases and Related Health Problems, X revision
PC-6.3 To be able to draw up a treatment plan for the disease and the patient's condition, taking into account the diagnosis, the patient's age, the clinical picture of the disease in accordance with the current procedures for the provision of medical care, clinical recommendations (treatment protocols) for the provision of medical care, taking into account the standards of medical care	Knows	the principles of planning the treatment of ophthalmological patients, taking into account the diagnosis, age of the patient, the clinical picture of the disease 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
	Is able to	plan the use of medicines, medical devices and medical nutrition, taking into account the diagnosis, age of the patient, the clinical picture of the disease 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
	Possesses	skills in determining the goals of therapeutic measures for patients with ophthalmological pathology and draw up a treatment plan taking into account the diagnosis, age of patients, the clinical picture of the disease 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
PC-7.2 Knows how to	Knows	how to prescribe medicines, medical devices and medical nutrition, taking into account the

prescribe medicines, medical devices and medical nutrition, taking into account the diagnosis, age and clinical picture of the disease 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		diagnosis, age and clinical picture of the disease 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
	Is able to	prescribe medications, medical devices and medical nutrition taking into account the diagnosis, age and clinical picture of the disease in accordance with the current procedures of medical care, clinical guidelines (treatment protocols) on the provision of medical care, taking into account the standards of medical care
	Possesses	skills to prescribe medicines, medical devices and therapeutic food, taking into account the diagnosis, age and clinical picture of the disease

The following methods of active/ interactive training are used to form the above mentioned competencies within the discipline "Ophthalmology":

1. Execution of practical training with the use of computer training programs is supposed.
2. For organization of the independent self-work it is proposed to prepare essays and reports for presentation in the group and at the student conference; as well as preparation for practical classes, work with additional literature, preparation of essays and lesson-conference.

The share of practical training conducted in interactive forms is 10% of the whole classroom time; independent extracurricular self-work – 50% of the whole time.

# **I. THE STRUCTURE AND CONTENT OF THE THEORETICAL PART OF THE COURSE (18 HOURS)**

## **Module I Anatomy and physiology of the vision organ**

Theme. 1 Anatomy of the vision organ. The concept of blindness

Lacrimal organs. Conjunctiva. Oculomotor apparatus. Eyeball. Outer (fibrous) shell of the eye: Choroid. Lens. Vitreous. Anterior and posterior chamber of the eye. Retina. Structure and functions. Visual pathway. Orbit. Structure, content, functions. Anatomy of the retina. Four neurons of the visual analyzer of the blindness concept.

### **Theme 2. Physiology of the vision organ.**

The mechanism of visual action. Optical system of eye. The concept of physical and clinical refraction. Three types of clinical refraction. Mechanism of accommodation. Modern understanding of the origin of myopia. Correction of myopia. Symptoms, treatment and prevention of myopia. Central, peripheral and binocular vision, light and color perception.

## **Module II. Methods of examination of vision organ**

### **Theme 1. Methods of examination of vision organ**

External examination of eye and its appendages (study of the orbit and surrounding tissues, eyelids, conjunctiva and lacrimal organs). Examination under side lighting. Research in transmitted light. Ophthalmoscopy. Biomicroscopy. Ophthalmotometry

## **Module III. Diseases and injuries of the vision organ**

### **Theme 1. Inflammatory diseases of eyelids, conjunctiva and cornea (adenovirus and chlamydial eye diseases).**

Inflammatory diseases of eyelids. Anatomy of the lacrimal apparatus; symptoms and treatment of dacryocystitis, phlegmon of the lacrimal sac.

Brief anatomy of the conjunctiva, common symptoms of acute conjunctivitis. Symptoms and treatment: conjunctivitis of chlamydial etiology, pneumococcal, monastery gonorrhoea in newborns and adults.

**Theme 2. Clinic and surgical treatment of cataracts. Implantation of intraocular lenses.**

Structure and chemical composition of lens. Classification of lens diseases: congenital and acquired cataracts. Cataract in general diseases, professional, traumatic, etc. Four stages of senile cataracts. Surgical treatment of cataracts: extra- and intracapsular cataract extraction, cryoextraction. Correction of aphakia. Implantation of intraocular lenses.

**Theme 3. Inflammatory diseases of vascular tract and optic nerve.**

Blood supply to the eye vascular tract. Classification of uveitis. Common symptoms and complications of anterior uveitis. Symptoms and treatment of metastatic hematogenous and toxic-allergic uveitis. Chorioiditis clinic.

**Theme 4. Disturbances of the eye hydrodynamics. Primary and secondary glaucoma.**

Exchange of intraocular fluid. The main symptoms of glaucoma. Classification of primary glaucoma. Glaucoma clinics. The principle of tonography. Gonioscopy. Medical and surgical treatment of glaucoma.

**Theme 5. Diseases of the retina, optic nerve and orbit**

Normal ocular fundus. Fundus in hypertensive disease, nephropathy of pregnant women, diabetes. Symptoms and treatment of acute obstruction of central retinal vessels. Stagnant nipple of the optic nerve (symptoms, etiology, outcome, treatment). Primary and secondary of the optic nerve atrophy (symptoms and treatment). Symptoms, stages, treatment of melanoblastoma of the vascular tract. Orbit phlegmon: etiology, symptoms, treatment.

**Theme 6. Injury to the vision organ. Injury prevention.**

Classification of perforated eye injury. Signs of the penetrating wounds of cornea and sclera. Complications of penetrating wounds, first aid, primary surgical



treatment of penetrating wounds. Symptoms, pathological anatomy, ethiology and prevention of sympathetic inflammation. Prevention of eye injuries

## **I. THE STRUCTURE AND CONTENT OF THE PRACTICAL PART OF THE COURSE (36 HOURS)**

### **Theme 1. Anatomy of the vision organ. The concept of blindness (4 hours)**

Lacrimal organs. Conjunctiva. Oculomotor apparatus. Eyeball. Outer (fibrous) shell of the eye: Choroid. Lens. Vitreous. Anterior and posterior chambers of eye. Retina. Structure and functions. Visual pathway. Orbit. Structure, content, functions. Anatomy of the retina. Four neurons in the visual analyzer.

### **Theme 2. Methods of the vision organ examination. The scheme of examination of patient and filling medical history (4 hours)**

External (general) inspection. Examination of complaints and anamnesis. External examination of eyes of his appendages. Study of the orbit and surrounding tissues. Eyelid research. Study of the connective membrane (conjunctiva). The study of the lacrimal organs. Study at lateral (focal) illumination. Research in transmitted light. Ophthalmoscopy in direct form. Biomicroscopy. Analysis of intraocular pressure. Medical history chart

### **Theme 3. Visual functions and methods of their examination (4 hours)**

Definition of visual acuity, examination of color perception at the Rabkin polychromatic tables and Yustova threshold tables, determination of the fields of view with control method and with perimeter of the Förster objects and white and colored objects, conduction of campimetria to identify scotomas and a blind spot, rough determination of binocular vision and using sweetest, determination and evaluation of data sensitivity on adaptometry.

### **Theme 4. Visual acuity, refraction, presbyopia (4 hours)**

Study of visual acuity, Snellen's formula. Familiarity with the Rotta device and a set of optical lenses for the glass selection. The concept of physical and clinical refraction: emmetropia, myopia, hypermetropia. Symptoms and complications of myopia, issues of treatment and prevention, selection of glasses and prescription.

### **Theme 5. Diseases of eyelids, lacrimal organs, conjunctiva (2 hours)**

Pathology of eyelids: blepharitis, neoplasms, dermatitis of eyelids, anomalies of position and shape of eyelids. Symptoms and treatment of diseases of lacrimal organs: abnormalities, Sjögren's syndrome, diseases of lacrimal apparatus, dacryocystitis etc. Patency test of lacrimal passages (collargol), probing and irrigation of lacrimal ducts. Signs and treatment of acute conjunctivitis. Diphtheria. Denotational fever, epidemic keratoconjunctivitis. Their treatment.

### **Theme 6. Diseases of cornea, sclera, orbit, vascular tract of the eye (2 hours)**

Keratitis. Classification of keratitis. Symptoms and treatment of certain types of keratitis. Scleritis and episcleritis. Uveitis and other diseases of the vascular tract. Symptoms, diagnostics, treatment.

### **Theme 7. Diseases of lens (2 hours)**

Cataracts, classification and signs. Conservative and operative surgery. The aphakia and pseudophakia.

### **Theme 8. Pathology of retina and optic nerve (2 hours)**

Retinal detachment, causes, symptoms, diagnostics, treatment. Signs and treatment of retinal detachment. Diseases of optic nerve, neuritis, stagnant nipple, optic nerve atrophy. Maculodystrophy. Ophthalmoscopy in the pathology of the optic nerve.

### **Theme 9. Injuries of the vision organ (4 hours)**

#### **Ocular trauma. Types of injuries of the vision organ and subsidiary organs.**

Emergency care for penetrating and non-penetrating eye injuries, eye burns. Radiation methods of foreign body localization in the eye cavity and principles of surgical treatment of patients with various types of penetrating wounds.

### **Theme 10. Glaucoma (2 hours)**

Methods of tonometry and tonography, gonioscopy. Glaucoma: symptoms, diagnostics, classification, treatment and prevention.

### **Theme 11. Ophthalmology (2 hours)**

Oncological processes of eyelids and orbits. Melanoblastoma of the vascular tract and retinoblastoma. Diagnostics and treatment of ophthalmological patients.

### **Theme 12. Credit. (4 hours)**

### **III. TRAINING AND METHODOLOGICAL SUPPORT INDEPENDENT SELF-WORK OF STUDENTS**

The main content of the topics, evaluation tools are presented in the WPAD: terms and concepts necessary for mastering the discipline.

During the mastering the course “Ophthalmology”, the student will have to do a large amount of independent self-work, including preparation for seminars and writing an essay.

Practical classes help students to deeper learn the material, to acquire the skills of creative work on documents and primary sources.

Plans for practical classes, their topics, recommended literature, the purpose and objectives of its study are communicated by the teacher at the introductory classes or in the curriculum for the discipline.

Before starting to study the topic, it is necessary to familiarize yourself with the basic questions of the practical training plan and the list of recommended literature.

Starting the preparation for the practical lesson, first of all it is necessary to refer to the lecture notes, sections of textbooks and teaching aids in order to get a general idea of the place and significance of the topic in the course being studied. Then work with additional literature, make notes on the recommended sources.

In the process of studying the recommended material it is necessary to understand the construction of the topic being studied, highlight the main points, trace their logic and thereby get into the essence of the problem being studied.

It is necessary to keep records of the material being studied in the form of an outline, which, along with the visual, includes the motor memory and allows you to accumulate an individual fund of auxiliary materials for a quick repetition of what you read, to mobilize accumulated knowledge. The main forms of writing: a plan (simple and detailed), extracts, theses.

In the preparation process, it is important to compare the sources, think over the material being studied and build an algorithm of actions, carefully consider your oral presentation.

At a practical lesson, each participant should be ready to speak on all the questions posed in the plan, to be as active as possible in their consideration. The speech should be convincing and reasoned, and simple reading of an essay is not allowed. It is important to show own attitude to what is being said, express your personal opinion, understanding, substantiate it and draw the right conclusions from what has been said. Student can refer to notes of references and lectures, directly to primary sources, use the knowledge of monographs and publications, facts and observations of modern life, etc.

A student who did not have time to speak at a practical lesson can present a prepared summary to the teacher for verification and, if necessary, answer the teacher's questions on the practical lesson to get a credit score on this topic.

The teaching and methodological support of students' independent work in the discipline "Anesthesiology, resuscitations, intensive therapy" is presented in Appendix 1 and includes:

- characteristics of tasks for independent self-work of students and methodological recommendations for their implementation;
- requirements for the reports and presentation of the results of independent self-work;
- criteria for assessment of execution of the independent self-work.

## IV MONITORING THE ACHIEVEMENT OF THE COURSE

### OBJECTIVES

Competence and its code		Stages of competence formation			
No.	Controlled sections / topics of disciplines	Codes and stages of the formation of competencies	Evaluation tools		
			Current control	Intermediate certification / exam	
1	<b>Module I</b> Anatomy and physiology of the vision organ  <b>Module II.</b> Methods of examination of vision organ  <b>Module III.</b> Diseases and injuries of the vision organ	PC-4.4 To be able to determine the order of the volume, content and sequence of diagnostic measures, taking into account the standards of medical care.	Knows	EO-1 Interview	Questions of final control A semester - 1-36
			Is able to	PW-1 Test	PW-1 Test
			Possesses	EO-3 Report	EO2 Colloquium
	<b>Module I</b> Anatomy and physiology of the vision organ  <b>Module II.</b> Methods of examination of vision organ  <b>Module III.</b> Diseases and injuries of the vision organ	PC-5.4 Be able to use the international statistical classification of diseases and health problems (ICD) for diagnosis	Knows	EO-1 Interview	Questions of final control A semester - 1-38
			Is able to	PW-1 Test	PW-1 Test
			Possesses	EO-3 Report	EO2 Colloquium
	<b>Module I</b> Anatomy and physiology of the vision organ  <b>Module II.</b> Methods of examination of vision organ  <b>Module III.</b> Diseases and injuries of the vision organ	PC-6.3 To be able to draw up a treatment plan for the disease and the patient's condition, taking into account the diagnosis, the patient's age, the clinical picture of the disease in accordance with the current procedures for the provision of medical care, clinical recommendations (treatment protocols) for the provision of medical care, taking into account the standards of medical care	Knows	EO-1 Interview	Questions of final control A semester - 36-110
			Is able to	PW-1 Test	PW-1 Test
			Possesses	EO-3 Report	EO2 Colloquium

<p><b>Module I</b> Anatomy and physiology of the vision organ</p> <p><b>Module II.</b> Methods of examination of vision organ</p> <p><b>Module III.</b> Diseases and injuries of the vision organ</p>	<p>PC-7.2 Knows how to prescribe medicines, medical devices and medical nutrition, taking into account the diagnosis, age and clinical picture of the disease 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</p>	Knows	EO-1 Interview	Questions of final control A semester - 1-38
		Is able to	PW-1 Test	PW-1 Test
		Possesses	EO-3 Report	EO2 Colloquium

*Approximate types of assessment tools: interview on situational tasks, written or computer testing, standard calculations, individual tasks, abstract, essay, etc.*

Control and methodological materials as well as criteria and indicators necessary for the assessment of knowledge and skills and characterizing the stages of the formation of competencies in the process of mastering the educational program are presented in Appendix 2.

## **V. A LIST OF TEXTBOOKS AND METHODOLOGICAL SUPPORT OF THE DISCIPLINE**

### **Main literature**

1. Atlas of Ocular Anatomy / Mohammad Wakeel Ansari, Ahmed Nadeem / Springer International Publishing Switzerland 2016  
<https://link.springer.com/book/10.1007/978-3-319-42781-2#authorsandaffiliationsbook>
2. Manual of Retinal Diseases / Carlos A. Medina, Justin H. Townsend, Arun D. Singh / Springer International Publishing Switzerland 2016  
<https://link.springer.com/book/10.1007/978-3-319-20460-4#editorsandaffiliations>

### **Additional literature**

1. Common Eye Diseases and their Management / Nicholas R. Galloway, Winfried M. K. Amoaku, Peter H. Galloway, Andrew C Browning / Springer International Publishing 2016 <https://link.springer.com/book/10.1007/978-3-319-32869-0#authorsandaffiliationsbook>

## LIST OF INFORMATION TECHNOLOGIES AND SOFTWARE

The location of the computer equipment on which the software is installed, the number of jobs	List of licensed software
Multimedia auditorium Vladivostok Russian island, Ayaks 10, building 25.1, RM. M723 Area of 80.3 m2 (Room for independent work)	Windows Seven enterprice SP3x64 Operating System Microsoft Office Professional Plus 2010 office suite that includes software for working with various types of documents (texts, spreadsheets, databases, etc.); 7Zip 9.20 - free file archiver with a high degree of data compression; ABBYY FineReader 11 - a program for optical character recognition; Adobe Acrobat XI Pro 11.0.00 - software package for creating and viewing electronic publications in PDF; WinDjView 2.0.2 - a program for recognizing and viewing files with the same format DJV and DjVu.

In order to provide special conditions for the education of persons with disabilities all buildings are equipped with ramps, elevators, lifts, specialized places equipped with toilet rooms, information and navigation support signs

### VI. GUIDELINES FOR LEARNING OF THE DISCIPLINE

In the process of studying the discipline "Ophthalmology" various methods and tools for learning the educational content are offered: lecture, practical exercises, tests, testing, independent work of students.

The lecture is the main active form of performing the classroom studies, explaining the fundamental and most difficult theoretical sections of human anatomy, which involves intense mental activity of student and this is especially difficult for first-year students. A lecture should always be informative, educational, and organizing. Lecture notes help to learn the theoretical material of the discipline. Listening to a lecture it is necessary to take note of the most important and preferably

by student's own formulations, which allows to memorize the material better. Synopsis is useful when it is written by a student. Student can develop his/her own word reduction scheme. The name of the paragraphs can be highlighted with colored markers or pens. In a lecture the teacher gives only a small fraction of the material on one or other topics that are given in textbooks. Therefore, when working with the lecture notes, it is always necessary to use the main textbook and additional literature that are recommended in this discipline. It is such serious work of a student with lecture material that allows him to achieve success in mastering new knowledge. For the presentation of the lecture course on the discipline "Ophthalmology", the following forms of active learning are used: lecture-conversation, lecture-visualization, which are made on the basis of knowledge obtained by students in interdisciplinary disciplines: "Human Anatomy", "Normal Physiology" "Pathological anatomy", "Pathological physiology". Presentations, tables, charts on a blackboard are used to illustrate the verbal information. In the course of the presentation of the lecture material posed questions or questions with elements of discussion.

### **Lecture – visualization**

Lecture is accompanied by tables, slideshows, which contributes to a better perception of the material. Lecture - visualization requires certain skills - verbal presentation of the material must be accompanied and combined with visual form. The information presented in the form of diagrams on the board, tables, slides, allows you to form problematic issues, and contributes to the development of professional thinking of future specialists.

### **Lecture - conversation.**

Lecture-conversation, or it is also called in pedagogy a form of education “dialogue with the audience,” is the most common form of active learning and allows you to involve students in the learning process, as there is direct contact with the teacher audience. Such contact is achieved in the course of the lecture, when students are



asked questions of a problem or informational matter, or when invite students to ask the questions themselves. Questions are offered to the entire audience, and any of the students can offer their own answer, another can complement it. At the same time, from lecture to lecture it is possible to identify more active students and try to activate students who are not participating in the work. This form of lecture allows teacher to engage students in work, increase their attention, thinking, gain collective experience, learn how to formulate questions. The advantage of the lecture-conversation is that it allows to attract the attention of students to the most important issues of the topic, to determine the content and pace of presentation of educational material.

### **Lecture - press conference**

At the beginning of the lesson, the teacher announces the topic of the lecture and invites students to ask him in writing questions on this topic. Each student must formulate the most interesting questions on the topic of the lecture within 2-3 minutes, write them on a piece of paper and pass the note to the teacher. The teacher within 3-5 minutes sorts the questions according to their semantic content and begins to give a lecture. The presentation of the material is presented in the form of a coherent disclosure of the topic, and not as an answer to each question asked, but during the lecture the corresponding answers are formulated. At the end of the lecture, the teacher conducts a final assessment of the questions, revealing the knowledge and interests of the students.

### **Practical classes in the discipline "Ophthalmology"**

Practical classes is a collective form of consideration of educational material. Seminars, which are also one of the main types of practical classes designed for in-depth study of the discipline, held interactively. At the workshop on the topic of the seminar, questions are sorted out and then, together with the teacher, they hold a discussion, which is aimed at consolidating the material under discussion, developing skills to debate, develop independence and critical thinking, the students' ability to navigate through large information flows, develop and defend their own position on problematic issues academic disciplines. As active learning methods are used in practical classes: a press conference, a detailed conversation, a dispute. A

detailed conversation involves preparing students for each issue of the lesson plan with a uniform list of recommended and additional literature recommended for all. Reports are prepared by students on pre-proposed topics.

Dispute in the group has several advantages. The dispute may be called by the teacher during the course of the lesson or planned by him in advance. In the course of the controversy, students form resourcefulness, quick thinking reaction.

Press conference. The teacher instructs 3-4 students to prepare short reports. Then one of the participants from this group makes a report. After the report, students ask questions that are answered by the speaker and other members of the expert group. Based on the questions and answers, a creative discussion takes place along with the teacher.

## VII. LOGISTICS DISCIPLINE

For practical work, as well as for the organization of independent work, students have access to the following laboratory equipment and specialized classrooms that meet the current sanitary and fire regulations, as well as safety requirements during training and scientific and industrial works:

<b>Name of the equipped rooms and rooms for independent work</b>	<b>List of main equipment</b>
The computer class of the School of biomedical AUD. M723, 15 work placts	<p>Screen, electrically 236*147 cm to trim the screen; Projector DLP technology, 3000 ANSI LM, WXGA with 1280x800 resolution, 2000:1 Mitsubishi EW330U; Subsystem of specialized mounting equipment course-2007 Tuarex; Subsystem of videocommunity: matrix switch DVI and DXP 44 DVI Pro advertising; extension cable DVI over twisted pair DVI 201 TX/RX advertising; Subsystem of audiocommentary and sound; speaker system for ceiling si 3ct LP Extron on from; digital audio processor DMP 44 LC the Extron; the extension for the controller control IPL T CR48; wireless LAN for students is provided with a system based on 802.11 a/b/g/N 2x2 MIMO(2SS) access points.</p> <p>Monoblock HP Loope 400 all-in-one 19.5 in (1600x900), core i3-4150t, 4GB DDR3-1600 (1x4GB), 1TB HDD 7200 SATA, and a DVD+ / -RW, GigEth, Wi-Fi and BT, the USB port of roses/MSE, Win7Pro (64-bit)+Win8.1Pro(64-bit), 1-1-1 Wty</p>

Multimedia audience	Monoblock Lenovo C360G-i34164G500UDK; projection Screen Projecta Elpro Electrol, 300x173 cm; Multimedia projector, Mitsubishi FD630U, 4000 ANSI Lumen 1920 x 1080; Flush interface with automatic retracting cables TLS TAM 201 Stan; Aversion CP355AF; lavalier Microphone system UHF band Sennheiser EW 122 G3 composed of a wireless microphone and receiver; Codec of videoconferencing LifeSizeExpress 220 - Codeonly - Non-AES; Network camera Multipix MP-HD718; Two LCD panel, 47", Full HD, LG M4716CCBA; Subsystem of audiocommentary and sound reinforcement; centralized uninterrupted power supply
Reading rooms of the Scientific library of the University open access Fund (building a - 10)	Monoblock HP Loope 400 All-in-One 19.5 in (1600x900), Core i3-4150T, 4GB DDR3-1600 (1x4GB), 1TB HDD 7200 SATA, DVD+/-RW,GigEth,wifi,BT,usb kbd/mse,Win7Pro (64-bit)+Win8.1Pro(64-bit),1-1-1 Wty Speed Internet access 500 Mbps. Jobs for people with disabilities equipped with displays and Braille printers.; equipped with: portable reading devices flatbed texts, scanning and reading machines videovelocity with adjustable color spectrums; increasing electronic loops and ultrasonic marker
Accreditation-simulation center of the school of Biomedicine	



MINISTRY OF EDUCATION AND SCIENCE OF THE RUSSIAN FEDERATION  
Federal state autonomous educational institution  
of higher education  
**« Far Eastern Federal University »**  
(FEFU)

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**SCHOOL OF BIOMEDICINE**

**TRAINING AND METHODOLOGICAL SUPPORT OF INDEPENDENT  
WORK OF STUDENTS  
on discipline «Ophthalmology»**

**Direction of training (specialty) 31.05.01 General medicine  
Form of training: full-time**

Vladivostok  
2021

Independent self-work includes:

- 1) library or homework with educational literature and lecture notes,
- 2) preparation for practical classes,
- 3) preparation for testing and control interview (credit)

The procedure for the performance of independent self-work by students is determined by the schedule for the performance of independent self-work on the discipline.

### **Schedule of independent work on the discipline**

<b>No.</b>	<b>Date / Deadline</b>	<b>Type of independent work</b>	<b>Estimated norms of time for execution (hour)</b>	<b>Form of control</b>
1	2-3 week	Essay	9	OR-3-Report
2	4-15 week	Presentation on the essay topic	18	POA-3-Report
3	17-18 week	Preparation for exam	27	OA-1-Interview PW-1 - Test

### **Topics for reports and essays**

There are 54 hours of independent work within the discipline, within the framework of these hours 2 oral reports are must be carried out on the proposed topics.

1. Founders of Russian ophthalmology.
2. Development of ophthalmology in the USSR and the Russian Federation.
3. Anatomy of eyelids, blood supply, innervation, function, research methods.
4. The structure of the conjunctiva, blood supply, innervation, function, research methods.
5. Eye socket, the walls, holes in it, its vessels and nerves. The ratio of the orbit to the paranasal sinuses of nose and skull cavity.

6. Outer capsule of the eye, structural features, innervation, nutrition, function, examination methods.
7. Vascular tract (lat.), its compartments, structural features, innervation, blood supply, function, examination methods.
8. Iris (lat.). Structure, blood supply, innervation, function, examination methods.
- 9 Ciliated body (lat.). Structure, blood supply, innervation, function, examination methods.
10. Proper choroid (lat). Structure, blood supply, innervation, function. Method of examination.
11. Retina (lat.). Structure, blood supply, innervation, function, features of the structure of the yellow spot. Methods of examination.
12. Optic nerve (lat.), anatomy of the shell.
13. Normal ocular fundus. Optic disc, retinal vessels, yellow spot.
14. The contents of eyeball (lens, vitreous, intraocular fluid), anatomy, chemical composition, function, examination methods.
15. Tear-producing apparatus of eye. Structure, blood supply, innervation, function, examination methods.
16. Tear-removing apparatus of eye. Structure, blood supply, innervation, function, examination methods.
17. Pathways of visual analyzer. Act of vision, examination methods.
18. Oculomotor muscles. Places of attachment, blood supply, innervation, function, examination methods.
19. Eye chambers, intraocular fluid (anatomy, chemical composition).
20. The structure of the iris-corneal angle. Function, examination methods.

### **Guidelines for writing and design of an essay**

Essay is a creative activity of the student reproducing in its structure the research activities to solve theoretical and applied problems in a particular branch of scientific knowledge. That is why the course certification work is an essential component of the educational process in higher education.

The essay is a model of scientific research, independent self-work in which a student solves a problem of a theoretical or practical nature, applying the scientific principles and methods of a given branch of scientific knowledge. The result of this scientific search may have not only subjective, but also objective scientific novelty, and therefore can be presented for discussion by the scientific community in the form of a scientific report or presentation at scientific-practical conferences, as well as in a form of research article.

Essay involves the acquisition of skills for building business cooperation, based on ethical standards of scientific activity. Purposefulness, initiative, disinterested cognitive interest, responsibility for the results of their actions, conscientiousness, competence - personality traits that characterize the subject of research activities corresponding to the ideals and norms of modern science.

The essay is an independent educational and research activity of the student. The teacher assists in a consultative manner and assesses the process and the results of the activity. Teacher provides an approximate topic of the essay work, specifies the problem and topic of research with a student or intern, helps to plan and organize research activities, assigns time and a minimum number of consultations.

The teacher receives the text of the essay for verification at least ten days before the defense.

Generally there is a certain structure of the essay, the main elements of which in order of their location are the following:

1. Title page.
2. Goal.
3. Table of Contents
4. List of abbreviations, symbols and terms (if necessary).
5. Introduction.
6. Main part.
7. Conclusion.
8. Reference list.
9. Appendixes.

The title page contains educational institution, graduating department, author, teacher or supervisor, research topic, place and year of the essay.

The title of the essay should be as short as possible and fully consistent with its content.

The table of contents (content) reflects the names of the structural parts of the essay and the pages on which they are located. The table of contents should be placed at the beginning of work on one page.

The presence of a detailed introduction - a mandatory requirement for the abstract. Despite the small volume of this structural part, its preparation causes considerable difficulties. However, this is a qualitatively executed introduction that is the key to understanding the entire work, which testifies to the professionalism of the author.

Thus, the introduction is a very crucial part of the essay. The introduction should start with a justification of the relevance of the chosen topic. As applied to the essay, the concept of "relevance" has one feature. From how the author of the essay can choose a topic and how correctly he understands and evaluates this topic from the point of view of modernity and social significance, characterizes his scientific maturity and professional preparedness.

In addition, in the introduction it is necessary to isolate the methodological basis of the essay, name the authors, whose works constituted the theoretical basis of the study. A review of the literature on the topic should show the author's thorough acquaintance with special literature, his ability to systematize sources, critically examine them, highlight the essential and determine the most important in the up-to-date state of knowledge of the topic.

The introduction reflects the importance and relevance of the chosen topic, defines the object and subject, purpose and objectives, and the chronological framework of the study.

The introduction ends with a statement of the general conclusions about the scientific and practical significance of the topic, the degree of its knowledge and sources, and the hypothesis being put forward.



The main part describes the essence of the problem, reveals the topic, determines the author's position, factual material is given as an argument and for display of further provisions. The author must demonstrate the ability to consistently present the material while analyzing it simultaneously. Preference is given to the main facts, rather than small details.

The essay ends with the final part called "conclusion". Like any conclusion, this part of the essay serves as a conclusion due to the logic of the study which is a form of synthesis accumulated in the main part of scientific information. This synthesis is a consistent, coherent presentation of the results obtained and their relation to a common goal and specific tasks set and formulated in the introduction. At this place there is a so-called "output" knowledge, which is new in relation to the original knowledge. The conclusion may include suggestions of practical matter, thereby increasing the value of theoretical materials.

So, the conclusion of the essay should contain: a) presents the conclusions of the study; b) theoretical and practical significance, novelty of the essay; c) indicated the possibility of applying the results of the study.

After conclusion it is acceptable to place the reference list of the literature used throughout. This list is one of the essential parts of the essay and reflects the independent creative work of the author of the essay.

The list of sources used is placed at the end of the work. It is made either in alphabetical order (by the name of the author or the name of the book), or in the order in which the references appear in the text of the prepared work. In all cases, the full title of the work, the names of the authors or the editor of publication are indicated if the writing team involved a group of authors, data on the number of volumes, the name of the city and publisher in which the work was published, year of publication, number of pages.

### **Methodical recommendations for the presentation preparation**

For preparation of presentation it is recommended to use: PowerPoint, MS Word, Acrobat Reader, LaTeX-bev package. The simplest program for creation of

presentations is Microsoft PowerPoint. To prepare a presentation, it is necessary to process the information collected while writing the essay.

The sequence of preparation of the presentation:

1. Clearly state the purpose of the presentation.
2. Determine what the presentation format will be: live presentation (then how long it will be) or e-mail (what will be the context of the presentation).
3. Select the entire content of the presentation and build a logical chain of presentation.
4. Identify key points in the content of the text and highlight them.
5. Determine the types of visualization (pictures) to display them on slides in accordance with the logic, purpose and specificity of the material.
6. Choose the design and format the slides (the number of pictures and text, their location, color and size).
7. Check the visual perception of the presentation.

The types of visualization include illustrations, images, charts, tables. The illustration is a representation of a real-life visual. The images - as opposed to illustrations - are metaphor. Their purpose is to cause an emotion and create an attitude towards it, to influence the audience. With the help of well-designed and presented images, information can remain permanently in a person's memory. Chart is visualization of quantitative and qualitative relationships. They are used for convincing data demonstration, for spatial thinking in addition to the logical one. Table is a specific, visual and accurate data display. Its main purpose is to structure information, which sometimes facilitates the perception of data by the audience.

#### *Practical hints on preparing a presentation*

- printed text + slides + handouts are prepared separately;
- slides -visual presentation of information that should contain a minimum of text and maximum of images that bring a meaning, to look visually and simply;
- textual content of the presentation - oral speech or reading, which should include arguments, facts, evidence and emotions;
- recommended number of slides 17-22;

- mandatory information for the presentation: the subject, surname and initials of the speaker; message plan; brief conclusions from all that has been said; list of sources used;

- handouts should be provided with the same depth and coverage as the live performance: people trust more what they can carry with them than disappear images, words and slides are forgotten, and handouts remain a constant tangible reminder; handouts are important to distribute at the end of the presentation; Handouts should be different from slides, should be more informative.

### **Methodical instructions on preparation for practical classes**

Control of the results of the independent self-work is performed in the course of practical training, oral interviews, interviews, solving case study tasks, control work, including testing.

1. For practical training student must prepare: repeat the lecture material, read the desired section on the topic in the textbook.

2. The lesson begins with a quick frontal oral questioning on a given topic.

3. In classroom students work with lecture notes, slides.

4. For classes it is necessary to have a notebook for writing theoretical material, a textbook.

6. At the end of the lesson the homework is given on a new topic and is invited to make tests on the material just studied in the classroom (summary).

7. Performances and activity of students are evaluated by the current assessment.

### **Guidelines for the preparation of the report**

1. Students have independent choice of the topic of the report.

2. Selection of literary sources on the selected topic from the recommended main and additional literature is offered in the working program of the discipline, as well as work with the resources of the information and telecommunication network "Internet" specified in the working program.

3. Working with the text of scientific books textbooks must not be reduced to the reading of material, it is also necessary to analyze the selected literature, compare the presentation of the material on the topic in different literary sources, choose materials, so that the disclose the topic of the report.
4. The analyzed material is to be summarized, the most important thing is that it should not be just a conscientious rewriting of the source texts from selected literary sources without any comments and analysis.
5. On the base of analysis and synthesis of literature data, student makes a plan of the report, on the base of which the text of the report is prepared.
6. The report should be structured logically, the material is presented integrally, coherently and consistently, conclusions must be made. It is desirable that the student could express his/her opinion on the formulated problem.
7. The report takes 7-10 minutes. The report is told, not read on paper.

### **Guidelines for working with literature**

1. We need to make an initial list of sources. The basis can be a list of literature recommended in the working program of the course. For convenience, you can create your own card file of selected sources (author's name, title, characteristics of the publication) in the form of a working file in the computer. This electronic file has the advantage, because it allows you to add sources, replace the need for one to the other, to remove those that were not relevant to the subject. The initial list of literature can be supplemented using the electronic catalogue of the FEFU library, and do not hesitate to ask for help from the library staff.
2. Working with literature on a particular topic, it is necessary not only to read, but also to learn the method of its study: to make a brief summary, algorithm, scheme of the read material, which allows you to understand it faster, remember. It is not recommended to rewrite the text verbatim.

### **Criteria for evaluation of the oral report**

Oral report on the discipline "Ophthalmology" are evaluated by the grade system: 5, 4, 3.

"grade 5" is given to a student if he expressed the opinion on the formulated problem, reasoned it, having its contents and components precisely defined, able to analyze, generalize material and draw correct conclusions using the main and additional literature, freely answers questions that testifies that he knows and owns material.

"grade 4" is designated to a student, if he/she presents material on the chosen topic coherently and consistently, gives arguments to prove a particular position in the report, demonstrates the ability to analyze the main and additional literature, but admits some inaccuracies in the wording of concepts.

"grade 3" is given to the student if he/she had performed independent analysis of the main and additional literature, however those or other provisions of the report are not always enough reasoned, mistakes are allowed at the presentation of material and not always fully answers additional questions on the subject of the report.

### **Evaluation criteria for essays.**

The stated understanding of the essay as a holistic copyright text defines the criteria for its evaluation: the novelty of the text; the validity of the source choice; the degree of disclosure of the issue essence; compliance with the requirements for registration.

**Essay novelty:** a) the relevance of the research topic; b) novelty and independence in the problem formulation, formulation of a new aspect of the well-known problem in the establishment of new connections (interdisciplinary, intra-subject, integration); c) ability to work with research and critical literature, systematize and structure research material; d) the appearance of the author's position, independence of assessments and judgments; d) stylistic unity of the text, the unity of genre features.

**The degree of disclosure of the question essence:** a) the plan compliance with an essay; b) compliance with the content of topic and plan of an essay; c) completeness and depth of knowledge on the topic; d) the validity of the methods and techniques of work with the material; e) ability to generalize, draw conclusions, compare different points of view on one issue (problem).

**The validity of the source choice:** a) evaluation of the used literature: whether the most famous works on the research topic are involved (including recent journal publications, recent statistics, reports, references, etc.)

**Compliance with the requirements for registration:** a) How true are the references to the used literature, quotes; b) assessment of literacy and presentation culture (including spelling, punctuation, stylistic culture), knowledge of terminology; c) compliance with the requirements for the volume of essay.

**The reviewer should clearly state** the remarks and questions, preferably with references to the work (possible on specific pages of the work), to research and evidence that the author did not take into account.

**The reviewer may also indicate:** whether student has addressed the topic earlier (essays, written works, creative works, olympic works, etc.) and whether there are any preliminary results; how the graduate has conducted the work (plan, intermediate stages, consultation, revision and processing of the written or lack of a clear plan, rejection of the head recommendations).

**The student submits** an essay for review no later than a week before the defense. The reviewer is the teacher. Experience shows that it is advisable to acquaint the student with the review a few days before the defense. Opponents are appointed by the teacher from the students. For an oral presentation a student needs about 10–20 minutes (approximately as long as he answers with tasks for the exam).

**Grade 5** is given if all the requirements for writing and defending an essay are fulfilled: the problem is indicated and its relevance is justified, a brief analysis of different points of view on the problem under consideration is made and one's own position is logically presented, conclusions are formulated, the topic is fully

disclosed, the volume is met, external requirements are met design, given the correct answers to additional questions.

**Grade 4** is given if the basic requirements for the essay and its defense are met, but there are some shortcomings. In particular, there are inaccuracies in the presentation of the material; or there is no logical sequence in the judgments; not sufficient volume of the essay; there are omissions in the design; additional questions for the defense are accompanied with incomplete answers.

**Grade 3** is given if there are significant deviations from the requirements for referencing. In particular: the topic is covered only partially; factual errors in the content of an essay or when answering additional questions; there is no output c.

**Grade 2** - the topic of an essay is not disclosed, a significant misunderstanding of the problem is found.

**Grade 1** - student's essay is not presented.



MINISTRY OF EDUCATION AND SCIENCE OF THE RUSSIAN FEDERATION  
Federal state autonomous educational institution  
of higher education  
« **Far Eastern Federal University** »  
(FEFU)

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**SCHOOL OF BIOMEDICINE**

**ASSESSMENT FUND**  
**on discipline «Ophthalmology»**  
**Direction of training (specialty) 31.05.01 General medicine**  
**Form of training: full-time**

Vladivostok  
2021



## Passport of assessment fund

Completed in accordance with the Regulations on the Funds of Evaluation Assets of Educational Programs of Higher Education - Bachelor's Programs, Specialties, FEFU Magistrates, approved by order of the Rector No. 12-13-850 of May 12, 2015.

Code and formulation of competence	Stages of competence formation	
PC-4.4 To be able to determine the order of the volume, content and sequence of diagnostic measures, taking into account the standards of medical care.	Knows	the volume of necessary diagnostic measures, their content and sequence of implementation when examining patients with acute and chronic ophthalmologic pathology, taking into account the standards of medical care
	Is able to	determine the necessary diagnostic measures, their content and sequence of performance in the examination of patients with acute and chronic ophthalmologic pathology, taking into account the standards of medical care
	Possesses	draw up a plan of diagnostic measures for examining patients with acute and chronic ophthalmologic pathology, taking into account the standards of medical care
PC-5.4 Be able to use the international statistical classification of diseases and health problems (ICD) for diagnosis	Knows	the methodology for determining the main pathological conditions, symptoms, syndromes of ophthalmological diseases, nosological forms in accordance with the International Statistical Classification of Diseases and Related Health Problems, X revision
	Is able to	determine the main pathological conditions, symptoms, syndromes of ophthalmological diseases, nosological forms in patients in accordance with the International Statistical Classification of Diseases and Related Health Problems, X revision
	Possesses	skills in determining the main pathological conditions, symptoms, syndromes of ophthalmological diseases, nosological forms in patients in accordance with the International Statistical Classification of Diseases and Related Health Problems, X revision

<p>PC-6.3</p> <p>To be able to draw up a treatment plan for the disease and the patient's condition, taking into account the diagnosis, the patient's age, the clinical picture of the disease in accordance with the current procedures for the provision of medical care, clinical recommendations (treatment protocols) for the provision of medical care, taking into account the standards of medical care</p>	Knows	the principles of planning the treatment of ophthalmological patients, taking into account the diagnosis, age of the patient, the clinical picture of the disease 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
	Is able to	plan the use of medicines, medical devices and medical nutrition, taking into account the diagnosis, age of the patient, the clinical picture of the disease 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
	Possesses	skills in determining the goals of therapeutic measures for patients with ophthalmological pathology and draw up a treatment plan taking into account the diagnosis, age of patients, the clinical picture of the disease 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
<p>PC-7.2</p> <p>Knows how to prescribe medicines, medical devices and medical nutrition, taking into account the diagnosis, age and clinical picture of the disease 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</p>	Knows	how to prescribe medicines, medical devices and medical nutrition, taking into account the diagnosis, age and clinical picture of the disease 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
	Is able to	prescribe medications, medical devices and medical nutrition taking into account the diagnosis, age and clinical picture of the disease in accordance with the current procedures of medical care, clinical guidelines (treatment protocols) on the provision of medical care, taking into account the standards of medical care
	Possesses	skills to prescribe medicines, medical devices and therapeutic food, taking into account the diagnosis, age and clinical picture of the disease

## MONITORING THE ACHIEVEMENT OF THE COURSE

### OBJECTIVES

Competence and its code		Stages of competence formation			
No.	Controlled sections / topics of disciplines	Codes and stages of the formation of competencies	Evaluation tools		
			Current control		Intermediate certification / exam
1	<b>Module I</b> Anatomy and physiology of the vision organ  <b>Module II.</b> Methods of examination of vision organ  <b>Module III.</b> Diseases and injuries of the vision organ	PC-4.4 To be able to determine the order of the volume, content and sequence of diagnostic measures, taking into account the standards of medical care.	Knows	EO-1  Interview	Questions of final control  A semester - 1-36
			Is able to	PW-1  Test	PW-1  Test
			Possesses	EO-3  Report	EO2 Colloquium
	<b>Module I</b> Anatomy and physiology of the vision organ  <b>Module II.</b> Methods of examination of vision organ  <b>Module III.</b> Diseases and injuries of the vision organ	PC-5.4 Be able to use the international statistical classification of diseases and health problems (ICD) for diagnosis	Knows	EO-1  Interview	Questions of final control  A semester - 1-38
			Is able to	PW-1  Test	PW-1  Test
			Possesses	EO-3  Report	EO2 Colloquium
	<b>Module I</b> Anatomy and physiology of the vision organ  <b>Module II.</b> Methods of examination of vision organ  <b>Module III.</b> Diseases and injuries of the vision organ	PC-6.3 To be able to draw up a treatment plan for the disease and the patient's condition, taking into account the diagnosis, the patient's age, the clinical picture of the disease in accordance with the current procedures for the provision of medical care, clinical recommendations (treatment protocols) for the provision of medical care, taking into account the standards of medical care	Knows	EO-1  Interview	Questions of final control  A semester - 36-110
			Is able to	PW-1  Test	PW-1  Test
			Possesses	EO-3  Report	EO2 Colloquium

	<b>Module I</b> Anatomy and physiology of the vision organ  <b>Module II.</b> Methods of examination of vision organ  <b>Module III.</b> Diseases and injuries of the vision organ	PC-7.2 Knows how to prescribe medicines, medical devices and medical nutrition, taking into account the diagnosis, age and clinical picture of the disease 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	Knows	EO-1 Interview	Questions of final control A semester - 1-38
			Is able to	PW-1 Test	PW-1 Test
			Possesses	EO-3 Report	EO2 Colloquium

### Questions to assess preliminary competencies

#### 1. Anatomy.

Anatomy of the orbit, anatomy of eyeball and its appendages, age-related features of the vision organ since birth to adulthood. Anatomical elements of refraction, accommodation, presbyopia.

#### 2. Histology, embryology, Cytology.

Embryogenesis of the eyeball. Histology of visual analyzer and additional apparatus.

#### 3. Normal physiology.

Physiological features of the cornea. The mechanism of accommodation. Circulation of chamber moisture. Physiology of the visual analyzer, visual functions. Dynamics of formation of visual functions depending on age.

#### 4. Pathological anatomy, clinical pathological anatomy.

Pathological anatomy and histology of inflammatory and degenerative diseases and tumors of eye membranes. Cytodiagnostics. Biopsy.

#### 5. Biochemistry.

The role of biochemical changes in the pathogenesis of eye diseases and interpretation of laboratory parameters. Biochemistry of peripheral nervous system and sensory organs. Composition of intraocular fluid, tears, cornea, lens, vitreous. Production and quantity of intraocular fluid, outflow. Examination methods for some metabolic disorders.

## 6. Microbiology, virology and immunology.

The influence of different microflora on the state of eyes. Monastery gonorrhoea, its prevention, the causative agent of trachoma, adenoviral and other viral diseases of eye. Eye symptoms of botulism. Normal microflora of conjunctiva. Age peculiarities of the production of interferons, interferonogens used to improve tissue immunity.

## 7. Otolaryngology.

The structure of the paranasal sinuses. The role of acute and chronic inflammatory diseases of the nasopharynx and paranasal sinuses in the occurrence of ocular pathology (conjunctivitis, dacryocystitis, orbit phlegmon, uveitis, optic neuritis, etc.).

## 8. Oncology, radiation therapy.

Methods and techniques for bone, boneless observation and localization of images of the orbit area. X-ray. Computer tomography. Radiation therapy of eye tumors.

## 9. Neurology, medical genetics.

Structure and functions of the visual analyzer. Terms of formation of the visual analyzer. Eye pathology induced by diseases of central nervous system. Methods of eye examination for topical diagnosis of the nervous system pathology.

Innervation of the eye structures and its appendages.

## 10. Dermatovenerology.

Pathology of eyes in erythematous lupus (uveitis). Herpetic keratitis, shellfish blepharitis and conjunctivitis. Eye lesions in Dering's dermatosis, Stevens-Johnson disease. Ocular manifestations of syphilis. Monastery gonorrhoea.

11. Traumatology and orthopedics. Changes in the orbital tissue at the fracture of the skull bases.

## 12. Propedeutics of internal diseases, radiation diagnosis.

Ophthalmic signs of hypertension, atherosclerosis, kidney disease, metabolic disorders.

13. Phthisiopulmonology. Tuberculosis-allergic and tuberculosis-hematogenous eye diseases. Principles of general and local treatment of eye tuberculosis. Methods tuberculinization of tuberculosis of the eye.

### **Questions for credit in the discipline**

1. The general structure of the vision organ: eyeball, pathways, subcortical centers, higher visual centers.
2. Eyeball shell. The eyeball: the outer shell of cornea and sclera.
3. Middle shells of eye (vascular or uveal tract): iris, ciliary body (ciliary body), choroid (choroid).
4. The inner shell of eye is retina. Optic nerve. Chiasm. Optic tract.
5. Clinical anatomy of lacrimal tract. Methods of their examination.
6. Eye chamber. Aqueous humor. Lens. Vitreous.
7. Eye hydrodynamics: intraocular fluid, its production and outflow. The angle of the anterior chamber as the main way of outflow of intraocular fluid.
8. Anatomy of the subordinate and auxiliary apparatus of eye.
9. Retina. The mechanism of visual perception. Optic nerve and visual pathways.
10. The orbit (eye socket), wall of the orbit. Eye hole and channel of the optic nerve, the top orbital cleft, the inferior orbital fissure.
11. Oculomotor muscles, their place of origin and attachment, innervation, function.
12. Conjunctiva. Three its compartments, particular the histological structure of each of them.
13. Eyelids: their shape, position, structure. Features of eyelid skin in adults and children. Cartilage, meibomian glands, eyelid edges, eyelashes and their position.
14. Lacrimal organs: their location, structure, functions. The mechanism of absorption and conduction of tears.
15. Physical refraction of eye. Clinical refraction of eye. Types of clinical refraction, their characteristics.
16. Objective and subjective methods for determination of clinical refraction.
17. The orbit (eye socket), wall of the orbit. Eye hole and the channel of the optic nerve, the top orbital cleft, the inferior orbital fissure.

18. Central vision. The concept of angle of view. The principle of constructing a table to determine visual acuity. Methods of determination.
19. The optical system of eye, its constituent parts. The concept of physical refraction. Units of optical power measurement.
20. Eye optical system. The concept of diopter.
21. Subjective method for determination of the clinical refraction type.
22. Accommodation. Presbyopia. Causes, correction.
23. Myopia. Characteristic. Possibilities of optical correction. Principles of prevention of progression.
24. Up-to-date treatment methods. The possibility of prevention.
25. Accommodation. Mechanism. Age change. Correction of presbyopia.
26. Progressive myopia. Clinical course. Diagnostics. Possibilities of optical correction.
27. Biomicroscopy. Clinical features of the method.
28. Pathology of lens. Modern methods of surgical treatment of cataracts.
29. Congenital cataracts, classification, indications for surgical treatment, methods of surgical treatment.
30. Keratitises. Herpetic keratitis. Symptoms, diagnostics, treatment.
31. Diseases of the cornea. Etiology, pathogenesis, clinical symptoms.
32. Dacryocystitis of newborns. Diagnostics, treatment.
33. Retinal detachment. Symptoms, diagnostics, treatment.
34. Paralytic strabismus. Etiology, pathogenesis, principles of treatment.
35. Congenital glaucoma. Principles of treatment of congenital and juvenile glaucoma.
36. Hailstone/ chalazion / age. Symptoms, differential diagnostics, principles of treatment.
37. Age-related cataracts. Diagnostics, signs, treatment. Optical correction of aphakia.
38. Acute obstruction of the central retinal artery. Etiology, symptoms, treatment. Forecast.

39. Anterior uveitis. Etiology, symptoms, treatment.
40. Acute bacterial conjunctivitis. Symptoms, treatment, prevention.
41. Central retinal vein thrombosis. Etiology, diagnostics, symptoms, complications, treatment, outcomes.
42. Acute dacryocystitis (lacrimonal sac abscess). Symptoms, course, outcomes. Principles of treatment and prevention.
43. Clinical course of primary open-angle glaucoma. Diagnostic method. Early diagnosis of glaucoma. Treatment.
44. Clinical course of primary angle-closure glaucoma. Diagnostic method. Glaucoma attack relief.
45. Congenital glaucoma. Clinical classification.
46. Optic neuritis. Etiology. Diagnostics, symptoms, treatment.
47. Surface forms of herpetic keratitis. Symptoms, treatment.
48. Retinal detachment. Etiology. Diagnostics, symptoms. Treatment.
49. Penetrating wounds to the eyeball.
50. Sympathetic inflammation. Dispensary observation of patients with penetrating wounds.
51. Burns to the eyeball and the appendage. The provision of first aid.

**Criteria for the assessment of "credit" at the end of the semester:**

1. No missed lectures and practical classes
2. Active work in the classroom.
3. Preparation of a presentation and reports on the proposed topic
4. Passes test credit

**Criteria for evaluation of oral response**

"grade 5" is given to student if he/she gives the correct answers to the discussed questions with difference in depth and completeness of disclosure of a subject, is able to draw conclusions and generalizations to give the reasoned answers which are logical and consecutive.



"grade 4" is assigned to a student if he/she is on the issues under discussion provides the right answers, is the depth and completeness of the topic, knows how to make conclusions and generalizations, but allowed one or two mistakes in the answers.

"grade 3" is given to a student if he/she gives answers to the discussed questions which insufficiently open it, there is no logical construction of the answer, admits several mistakes.

"grade 2" is given to a student if he gives answers to the discussed questions, which show that he does not own the material of the topic, can not give reasoned answers, serious errors in the content of the answer are allowed.

### **Evaluation tools for current certification**

Control tests are designed for students studying the course

**Control tests** are designed for the students studying the course "Epidemiology".

The tests are necessary for the control of knowledge during the current interim attestation, and for the evaluation of knowledge and thus to get credit for course.

While working with tests the student are asked to select one answer from the three - four proposed. At the same time the tests are not identical in their complexity.

Offered tests contain several variants of correct answers. The student must select all the correct answers.

The tests are designed both for individual and collective solving them. They can be used in the process both classroom lessons and independent work. The tests, required for the control of knowledge, are chosen in the process of the intermediate certification by each teacher individually.

The results of the test tasks are evaluated by a teacher on a five-mark grading scale or system of "**credit**" - "**not credit**".

Evaluation of "**excellent**" is got by student at the correct answer to more than 90% of the proposed tests.

Evaluation of "**good**" getting - at the correct answer by more than 70% of tests.

Evaluation of "**satisfactory**" - at the correct answer to 50% of the offered tests.

### Sample test tasks

1. The thinnest wall of the orbit are:
  - a) outer wall
  - b) upper wall;
  - c) inner wall;
  - d) + lower wall;
2. The optic nerve canal is necessary for the passage of:
  - a) optic nerve;
  - b) ophthalmic artery;
  - c) + both of them;
  - d) neither one nor the other.
3. One of the main functions of the cornea:
  - a) support;
  - b) + light-conducting;
  - c) moisture producing.
4. Choroid provides blood supply:
  - a) + outer layers of the retina;
  - b) inner layers of the retina;
  - c) the entire retina;
  - d) all of the above.
5. The blood supply of the eyeball is carried out:
  - a) + ophthalmic artery;
  - b) the central artery of the retina;
  - c) posterior ciliary arteries;
  - d) A and B are correct;
6. In a healthy adult, the ratio of the caliber of arteries and retinal vein is defined as follows:
  - a) 1:2;

- b) 2:3;
- c) +1:1;
- d) 1:1.5.

7. Clinical refraction is:

- a) + the ratio between the optical power and the length of the axis of the eye;
- b) refractive power of the optical system, expressed in diopters;
- c) radius of curvature of the cornea;
- d) refractive power of the lens;

8. 1 diopter is the refractive power of a lens with a focal length:

- a) +100 m;
- b) 10 m;
- c) 1 m;
- d) 10 cm;

9. The nearest point of clear vision is:

- a) + a point located at the top of the cornea;
- b) a point located in front of the lens;
- c) a point located behind the lens;
- d) the minimum distance at which the considered objects at the maximum voltage of accommodation;

10. What is meant by the definition of "visual acuity":

- a) the space perceived by the fixed eye;
- b) + the ability of the eye to perceive objects clearly in the center and on the periphery;
- c) the minimum angle of view that allows you to perceive the points separately.

11. Accommodation is:

- a) + static refraction;
- b) refractive power of the cornea;
- c) anterior-posterior axis of the eye;
- d) adaptation of the visual apparatus to the examination of objects at various distances from the eye;

12. Chronic inflammation of the meibomian glands is:

- a) + barley;
- b) chalazion;
- c) eyelid abscess;
- d) internal barley.

13. Scaly blepharitis is characterized by:

- a) redness of the edges of the eyelids;
- b) thickening of the edges of the eyelids;
- c) excruciating itching in the eyelids;
- d) + the roots of the eyelashes are covered with dry scales;

14. The distance from which the study of visual acuity is carried out according to the tables during a medical examination:

- a) 3 meters;
- b) 4 meters;
- c) +5 meters.

15. The distance from which the study of visual acuity is carried out according to the tables in the clinic:

- a) 3 meters;
- b) 4 meters;
- c) +5 meters.

16. What method is used to determine the field of view in the clinic:

- a) + perimetry;
- b) ophthalmoscopy;
- c) biomicroscopy.

17. What method is used to determine the field of view during a medical examination:

- a) + perimetry;
- b) ophthalmoscopy;
- c) biomicroscopy.

18. What are the physiological functions of the conjunctiva?

- a) + protective, trophic;
- b) refracts light;
- c) is responsible for color perception.

19. One of the signs of cataract:

- a) photophobia;
- b) + gradual decrease in visual acuity;
- c) drooping eyelids.

20. Symptoms of a foreign body of the cornea:

- a) + feeling of a foreign body in the eye, pain
- b) decreased sensitivity of the cornea;
- c) strabismus.

21. A burn of the eyeball of the first degree is characterized by the following symptoms:

- a) deep necrosis of the cornea;
- b) + hyperemia of the conjunctiva;
- c) narrowing of the field of view

22. The order of first aid within the clinic or first-aid post for penetrating wounds of the eyeball;

- a) to drip miotics;
- b) + apply a bandage over the eye and immediately hospitalize in the ophthalmological department;
- c) outpatient treatment.

23. In ptosis, the following symptoms are noted:

- a) inability to close the eye;
- b) inversion of the lower eyelid;
- c) + immobility of the upper eyelid, drooping of the upper eyelid.

24. Indicate one of the following tumors of the eyelids, which is considered malignant:

- a) + adenocarcinoma;
- b) papilloma;

c) nevus.

25. A substance in a tear that has bactericidal properties:

a) + lysozyme;

b) phosphatase;

c) chymotrypsin.

26. Which drug, when instilled into the eyes, causes accommodation paralysis:

a) furacillin solution;

b) + atropine solution;

c) pilocarpine solution.

27. The pupil is:

a) + a hole in the iris;

b) volumetric body;

c) part of the lens.

28. Iridocyclitis is:

a) inflammation of the cornea;

b) inflammation of the vitreous body;

c) + inflammation of the iris and ciliary body.

29. When examining the fundus, the doctor looks at:

a) + retinal vessels;

b) iris;

c) lens.

30. Dichromasia is a violation in differentiation;

a) one color

b) three colors;

c) + two colors.

MINISTRY OF EDUCATION AND SCIENCE OF THE RUSSIAN FEDERATION

Federal state autonomous educational institution

of higher education

« **Far Eastern Federal University** »

(FEFU)

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SCHOOL OF BIOMEDICINE

**GLOSSARY**

**on discipline «Ophthalmology»**

**Direction of training (specialty) 31.05.01 General medicine**

**Form of training: full-time**

Vladivostok

2021

- amblyopia "by idle eyes" appearing when anisometropia, strabismus, disruption of binocular vision. To prevent the development of amblyopia with refractive errors, it is necessary to use glasses from preschool age;

- anterior and posterior chamber,

- congenital occurring in one or both eyes as a result of abnormalities in the development of the visual tract or various intrauterine pathological processes that have left no visible traces;

- hard (polymethylmethacrylate - PMMA) and soft, that is elastic (silicone, acrylic, hydrogel),

- hysterical amblyopia occurs suddenly, most often after any affect.

- spherical, toric and multifocal.

**A lens** is an optical medium that not only transmits light but also refracts it. Lenses can be biological (cornea, lens), spectacle, contact, intraocular. As well as positive and negative, spherical and toric, monofocal and multifocal, etc.

**Aberration** (from lat. Aberrare - avoid, err) - image errors caused by the deviation of the light beam in the real optical system from its direction in the ideal optical system. Aberrations include myopia, hyperopia, astigmatism, coma, distortion, irregular aberrations, etc.

**Ablation** (photoablation) is a type of action of laser radiation on living tissue, consisting in its removal, evaporation produced by splitting molecular bonds.

**Accommodation** is an adaptive function of the eye, providing the possibility of high visual resolution at different distances from it. The ability to translate the look far away subject in close and back. It is realized by means of lens and a ciliary body. The factors influencing the work of accommodation include chromatic and spherical aberrations, astigmatism and dozens of others.

**Amblyopia** is a decreased vision. Due to the occurrence several types of amblyopia are distinguished:

**Amblyopia** is divided into: disbinocular, refractive, anisometric, obscuration; right-sided, left-sided and bilateral; low (visual acuity of the squinting eye 0,4-0,8), medium (0,2-0,3); high (0,05-0,1) and very high (below 0,04) degree.



**Ametropia** - a deviation of clinical refraction of the eye from normal. There are primary ametropia, the cause of which are mainly violations of the anatomical and optical ratio (myopia, hypermetropia, astigmatism, anisometropia, etc.) and secondary ametropia, the cause of which is external exposure or disease (keratoconus, nuclear cataract with myopization, operations for cataracts, myopia, retinal detachment, etc.). Aberrometric terminology is used to characterize refractive changes in secondary ametropies.

**Anisometropia** is a condition in which the difference in refraction in both eyes is more than one diopter.

**Antimetropia** - a condition in which the refraction in both eyes has the opposite sign (plus and minus).

**Aphacia** - a condition in which the eye is no lens. Refraction is characterized by an average of about +12 diopters.

**Artificial tear** - medications that moisturize the surface of the cornea and conjunctiva. They are used for deficiency of tears due to the appearance of dry eye syndrome, Segren's disease, in the postoperative period. Artificial tear preparations include Sistine, oftigel, natural tear, sodium hyaluronate (0.18 %).

**Artyphacia** - condition of eyes, in which instead own crystalline lens implanted artificial - intraocular lens.

**Astigmatism** - uneven refraction. With regular (correct) astigmatism, there is a difference in refraction in the two main meridians (conditionally horizontal and conditionally vertical). When irregular (irregular) astigmatism refraction is different for different segments of the same meridian.

Autorefractokeratometry is the definition of objective refraction of the eye, reflecting the approximate value of defocus, astigmatism and optical power of the cornea in its Central zone.

**Binocular vision** - simultaneous visual work with two eyes to form a visual image in a three-dimensional image.

**Biometrics** (ultrasound and optical) is a lifetime measurement of different sizes of intraocular structures. The measurement of the anteroposterior segment of

the eyeball, the thickness of the lens and the depth of the anterior chamber can be considered traditional. If this concept is understood more widely, now there are many new diagnostic devices that can accurately measure the various morphological structures of the living eye, without injury, cuts, and sometimes without contact. This biomicrotechnology using optical coherence tomography and ultrasound biomicroscopy, and optical pachymetry and more.

**Biomicroscopy** is an in vivo visualization of the eye based on increased image and creating a contrast between the illuminated and unlit areas.

**Cataract** - clouding of the natural lens. There are congenital and acquired cataracts.

**Conjunctivitis** - inflammation of the mucous membrane of the eyeball and the inner surface of the eyelids-conjunctiva. The cause of conjunctivitis is most often an infection or allergy.

**Contact lenses** - a lens temporarily placed in the conjunctival cavity on the surface of the cornea. With their help, you can correct almost any kind of ametropia and even some aberrations of the highest order. Hard (or elastic) contact lenses are now rarely used, mainly in high-degree astigmatism and to stabilize the flow of keratoconus. Soft lenses are widely used and constantly upgraded - gas permeable, disposable, for correction of presbyopia. There are orthokeratological lenses, wearing which for several hours leads to a temporary (1-2 days) change in the curvature of the cornea. These lenses can be worn at night, and removing them in the morning, get good vision for the whole day.

**Cycloplegia medicamentous** - paralysis of accommodation, achieved by instillation of drops (atropine, cyclomed, etc.). Drugs affect the ciliary body. Cycloplegia is accompanied by mydriasis. The true refraction of the eye can be checked only in the conditions of cycloplegia.

**Defocus.** In the literature on optics defocus is called aberration of the lower, the second order-myopia, farsightedness.

**Diopter** is a value used for the optical power of lenses. The refractive power of a lens with a focal length of 1 m is taken as one diopter.

**Diopter**-a device for determining the optical power of spectacle lenses.

**Dry eye syndrome** is a set of xerotic changes in the cornea and conjunctiva caused by a systematic violation of the stability of the tear film. Syndrome affects from 7 to 17 % of the population of highly developed countries. Some causes of dry eye syndrome: autoimmune diseases; endocrine dysfunction; kidney disease; pregnancy; ophthalmic surgery (including LASIK); some eye drops; harmful environmental factors (conditioned air, working with monitors, wearing contact lenses).

**Emmetropia** - the absence of ametropia. Normal refraction. A condition in which the main focus of the optical system of the eye coincides with the retina. The achievement of emmetropia is a purpose of laser correction.

**FTK** - phototherapy keratectomy-excimer laser surgery, which consists in the evaporation of several microns of corneal thickness without changing its refraction. It is used to remove persistent surface opacities.

**Glare-effect (from persistent. glare-blinding)** - optical phenomenon, which consists in blinding the patient in the dark and dusk, when even dim light enters the eyes. The causes of the glare effect are similar to the causes of the halo effect.

**Glaucoma** is a disease in which irreversible atrophy of the nerve fibers of the optic disc occurs, most often against the background of increased intraocular pressure (IOP). Previously, it was believed that glaucoma is always accompanied by an increase in IOP, but now there is a separate nosology-glaucoma with low pressure (GND). One of the causes of MHD is the development of glaucoma in a patient who has previously been laser-corrected. Laser correction is not the cause of glaucoma, but complicates its early diagnosis. Standard methods of measuring intraocular pressure are not able to determine the true IOP in a patient undergoing laser correction. Patients who have undergone laser correction, after forty years need to undergo regular ophthalmological examination only in specialized clinics engaged in refractive surgery.

**Gonioscopy** is a method of investigation that allows to examine the angle of the anterior chamber of the eye. Used in the diagnostics of glaucoma, iridocyclitis, iris tumors, etc.

**Halo-effect** (from persistent. halo-halo) - an optical phenomenon, which is a bright glowing, often rainbow, ring around the light sources (and blurring the boundaries of the light source). Appears in darkness and dusk. Due to the fact that in the dark the pupil expands and in the visual act begins to participate corneal zone, not subjected to laser ablation (more precisely, the transition zone of laser ablation). This optical effect is most often observed in those patients who during laser correction have to narrow the optical ablation zone due to the thin cornea.

**Herpetic keratitis** is an inflammatory disease of the cornea caused by herpes simplex virus, which is dangerous only for humans. Even after the disappearance of inflammatory phenomena, the virus remains in the human body. When a factor provokes the activation of the virus, inflammation appears again. One of the provoking factors is ultraviolet light. Accordingly, the excimer laser can provoke an exacerbation of herpetic keratitis. If there are traces of herpetic keratitis on the cornea, it makes sense to conduct a preventive course of medical treatment in the postoperative period of laser correction.

**Hyperopia** (farsightedness) is a violation of the anatomical and optical ratio, in which the optical power of the eye is too small in comparison with its length or, conversely, the length of the eye is too small in comparison with its optical power. The refractive focus of the rays is behind the retina. For eyeglass correction of hypermetropia, positive ("plus", convex) lenses are used, which increased refraction of the optical system to the desired level. There are different classifications of hypermetropia. For some of them, a weak degree of hypermetropia - up to 2-3 DPTR, average - up to 4-6 DPTR, high - more than 4-6 DPTR. Now it often used for classification, which is considered weak hyperopia to 2.25 d, medium - to 5.25 diopters, high of 5.25 diopters and more.

**Induced aberrations** - aberrations, the cause of which began operation, trauma, inflammation.

**Instillation** - a type of local administration of drugs, which consists in the instillation of drops in the conjunctival sac.

**IOL** - intraocular (intraocular) lens, artificial lens. IOL is implanted into the eye: in the surgical treatment of cataracts instead of the natural clouded lens; for the correction of high-degree ametropia instead of the natural lens (aspiration of the transparent lens with IOL implantation) or nearby (implantation of phakic IOL) with it.

IOLs are mainly divided into:

**IOP** - intraocular pressure is the main indicator reflecting the peculiarities of intraocular fluid circulation from the ciliary body to the anterior chamber angle. It is measured by two main methods: contact (by Maklakov) and non-contact (pneumotonometry).

It is carried out on a biomicroscope with a slit lamp. With the help of biomicroscopy it is possible to visualize eyelids, conjunctiva, limb, cornea, anterior chamber, iris, lens, vitreous body, etc. with the help of special lenses it is possible to examine the angle of the anterior chamber (gonioscopy) and the fundus (ophthalmoscopy).

**Keratitis** - inflammation of the cornea. Keratitis may be adenovirus, acanthameba, bacterial, Brucella, herpes, vitamin deficiency, fungal, diplomatically, radiation, meibomitis, neuroparalitical, post-traumatic, syphilitic, tuberculosis etc.

**Keratoconus** - non-inflammatory cone-shaped protrusion of the central part of cornea. Neither the causes, nor the factors that provoke the appearance of keratoconus, are still not known.

**Keratometry** is a measure of the cornea curvature. Performed using ophthalmometers, autokeratorefractometer, keratopograph. The average radius of curvature of the cornea is 7.7 mm. The average optical power of the cornea is 44.0 DPTR.

**Keratotomy** the incision of cornea. Anterior radial keratotomy (incision) consists of applying several non-penetrating incisions around the center of the

cornea for surgical correction of myopia and astigmatism (tangential incisions). Currently, this surgery is rarely used.

**Laser coagulation** is the destruction (cauterization) of living tissue with the formation of a "scar" (for example, preventive laser coagulation, which consists in the formation of a point "scar" connecting the retina and the underlying tissue to reduce the risk of retinal detachment).

**LASIK** - Laser assisted in situ keratomileusis (on-site laser keratomileusis) is a type of laser excimer vision correction surgery. This name is due to the fact that the laser keratomileusis was first carried out on the spot, not on the eye - the corneal flap was completely separated from the eye and "ground" on a special device to the desired shape. During LASIK corneal flap is not completely separated from the cornea.

**Light-electromagnetic oscillations** in the visible range. One of the types of electromagnetic oscillations is laser radiation.

**Microkeratome** is a microsurgical apparatus designed to form a corneal flap of a certain thickness and diameter.

**MICRON** - micrometer, micron.  $1 \mu\text{m}$  is equal to one thousandth of a millimeter. The thickness of the cornea in the optical center of the eye is on average about 500 microns, i.e. 0.5 mm.

**Mydriasis** - the eye condition, in which the pupil is dilated, regardless of the degree of illumination. The cause of the mydriasis can be drugs, trauma, acute glaucoma attack, etc. Mydriasis accompanies drug cycloplegia required in the preoperative examination of patients.

**Myopia** (myopia) is a disturbance of the anatomical and optical ratio, in which the optical power of the eye is too large compared to its length or, conversely, the length of the eye is too large compared to its optical power. The refractive focus of the rays is in front of the retina. For spectacle correction of myopia, negative ("minus", concave) lenses are used, which reduce the refraction of the optical system to the desired level. Distinguish between myopia and 3.25 diopters, the average extent to 6.25 diopters and a high of 6.25 diopters and more.

**NM** - nanometer. 1 nm is equal to one thousandth of a micrometer.

**Ocular hypertension** - increased intraocular pressure. Not always ocular hypertension is a manifestation of glaucoma. In excimer laser surgery, sometimes faced with increased pressure as a side effect of glucocorticoids, which are used locally, in the form of drops. The replacement of glucocorticoids (dexamethasone, oftan-dexamethasone, tobradex, maxitrol, sofradeks) nonsteroidal anti-inflammatory drugs (diclof, naclof, indollar) the intraocular pressure is reduced.

**Ophthalmoscopy** (biomicroscopy) is an examination method that allows study the fundus. Ophthalmoscopy can be direct and indirect. Indirect ophthalmoscopy is divided into monocular and binocular. About ten years ago, a new technique - laser scanning ophthalmoscopy, which allows to obtain a three-dimensional image of the fundus and carry out a lot of different measurements with an accuracy of 1 micron. For conducting ophthalmoscopy use of mirror Ophthalmoscope; hand-held electric Ophthalmoscope; binocular head Ophthalmoscope; slit lamp; laser scanning Ophthalmoscope.

**Perimetry** - the study of the central and peripheral fields of vision by determining their boundaries and light-distinguishing sensitivity of the retina. It is intended for the diagnosis of diseases of the retina, optic nerve, chiasm, pathways and visual cortex.

**Presbyopia** is an age - related accommodation disorder that leads to a decrease in its volume. Violation of the elasticity of the lens and a decrease in the volume of accommodation leads to a gradual progressive distance of the nearest point of clear vision. After 40-45 years, a person needs to wear glasses with positive lenses when looking at closely spaced objects. From 40 to 50 years to read need glasses about +1 DPTR, from 50 to 60-about +2 DPTR, from 60 to 70-about +3 DPTR, etc.

**PRK** - photorefractive keratectomy - excimer laser surgery to correct myopia, hypermetropia and astigmatism. Its peculiarity is the ablation on the surface of the cornea without forming a corneal flap. The main drawbacks of PRK: refractive

pronounced regression; a long and painful postoperative period; a high probability of resistant surface corneal opacity (high haze).

**Pterygium** (pterygium) - a dystrophic process, which is a growth of the conjunctiva of the eyeball to the cornea.

**Ptoxis** - temporary or permanent drooping of the upper eyelid.

**Refraction** is the refractive power of an optical system.

**Spasm of accommodation** (false myopia) - the lack of complete relaxation of accommodation in the distance vision and increased clinical refraction due to the weakness of the accommodation apparatus. When conducting autorefractometry in terms of accommodation spasm decrease "pros" and appear or intensify negative effects. The true refraction of the eye with accommodation spasm can be determined only with medical cycloplegia .

**Strabismus** - deviation of one of the eyes from the general point of fixation, accompanied by a violation of binocular vision. There are strabismus: convergent, divergent and vertical; monolateral (constantly mowing one eye) and alternating (alternately mowing one, then the other eye); periodic and constant. One of the reasons, along with diseases of the central nervous system, infections, mental injuries and a significant decrease in the vision of one eye, is ametropia. It is possible to carry out hardware and surgical treatment of strabismus, but the key to the success of the treatment, first of all, is the elimination of the cause of the disease (if possible).

**Tear film** - a thin layer of tears covering the surface of the cornea. It consists of three main layers. It provides smoothness, sphericity and transparency of the cornea.

**The ciliary body** (ciliary body, ciliary muscle) is an intermediate structure between the iris and the vascular membrane of the eye. A unique organ that can both perform the function of accommodation muscle and produce intraocular moisture. The spasm of the ciliary body distorts the data of autorefractometry, therefore, to identify the true parameters of ametropia during the examination, it is necessary to paralyze accommodation with medication - to conduct cycloplegia.



**The destruction of the vitreous body** is a violation of the transparency of the vitreous body associated with dystrophic, inflammatory, traumatic processes and hemorrhages. With a high degree myopia, the destruction of the vitreous body occurs in the vast majority of cases and in a stable state can be considered as a variant of the norm. In the presence of destruction people periodically notice the floating cloud in the field of vision ("floaters", dark spots, rings, webs, "string of pearls").

**The fundus** is an image of the inner surface of membranes of the posterior part of the eyeball, obtained during ophthalmoscopy. The term "fundus" is not synonymous with the word "retina".

The optical axis is a straight line through the center of the macula and the point at which the eye is focused. This line does not always cross the center of the cornea, pupil and lens.

The optical center of the cornea is the place of passage through the cornea of the optical axis of the eye. The optical center of the cornea does not always coincide with the anatomical one.

**Tonometry** - measurement of intraocular pressure.

**Videokeratography** (electroretinography) - getting a topographical map of the anterior corneal surface, containing the data about radius of curvature, the elevation of the individual sections relative to a certain reference plane and the changes of curvature in one Meridian. Keratotopograph, works on the projection principle and able to analyze not only the anterior but also the posterior surface of the cornea.

**Visual acuity** is the sensitivity of the visual analyzer, reflecting the ability to distinguish the boundaries and details of visible objects. Determined by the minimum angular distance between two points at which they are perceived separately. The minimum angular distance is one minute (1), which corresponds to the size of the image on the retina of 0.004 mm - the diameter of the cone.

**Wavelength** is the distance that an electromagnetic wave travels in one oscillation period.