

MINISTRY OF HEALTH OF THE REPUBLIC OF BELARUS
EDUCATIONAL INSTITUTION
BELARUSIAN STATE MEDICAL UNIVERSITY



APPROVED

by First Vice-Rector, Professor

_____ S.V. Gubkin

24.11.2016

Reg. # УД-*Л. 542а/1617*/уч.

OPHTHALMOLOGY

**Curriculum of higher educational institution
in the educational discipline for the specialty:**

1-79 01 01 "General Medicine"

Minsk, BSMU 2016

Curriculum is based on the standard educational program "Ophthalmology" approved on "29" 07 2016, registration N° ТД L.542 /тип.

COMPILERS:

L. N. Marchenko, Head of the Eye Diseases Department, Doctor of Medical Sciences, Professor;

M.F. Dzhumova, Ph. D., Associate Professor

RECOMMENDED FOR APPROVAL:

by the Eye Diseases Department of the Educational Institution " Belarusian State Medical University

(protocol N°5 "04" 11. 2016).

by the Methodological Committee of Surgical Sciences of the Educational Institution "Belarusian State Medical University

(protocol N° 3 "16" 11. 2016).

EXPLANATORY NOTE

"Ophthalmology" is the discipline containing modern scientific data in etiology, pathogenesis, clinical picture, diagnostics, treatment and prevention of eye diseases.

The curriculum for the discipline "Ophthalmology" aims at studying the latest scientific data on the eye diseases, optics and refraction, examination methods of eye and visual functions; ocular complications of the cardiovascular, nervous and endocrine systems disorders, congenital abnormalities of the vision organ.

The purpose of teaching and studying the discipline "Ophthalmology" consists in forming and the acquisition of scientific knowledge about the diagnostics and treatment of eye diseases.

The tasks of studying the discipline are to acquire competences, based on the student's ability to search for educational and informational resources and to master the methods for gaining and analyzing the knowledge of:

- the most important clinical manifestations of widespread eye diseases;
- basic concepts about the diagnosis of eye diseases, ways of studying the eye, conjunctiva, eyelid and lacrimal apparatus, visual functions;
- basic concepts about principles of general and local therapy of eye diseases;
- the most important manifestations typical for eye complications of the cardiovascular, nervous, infectious diseases and diseases of blood and endocrine systems, congenital abnormalities of the eyes;
- basic concepts of eye diseases, leading to vision deterioration and blindness;
- basic concepts about ways of preventing damage to the eyes, principles and methods of dispensary work;
- concepts of rendering emergency medical aid in case of various injuries and eye diseases.

The tasks of teaching "Ophthalmology" lie in the formation of social, personal and professional competences, based on the knowledge and application of:

- methods of examination of patients with symptoms of the eye diseases;
- methods of eye diseases diagnosis, contributing to the formation of clinical thinking in compliance with the rules of medical ethics and deontology;
- methods of the main eye diseases diagnosis, leading to vision deterioration and blindness;
- methods of providing emergency medical aid in various injuries and eye diseases.

The specific features of the doctor's training in the specialty 1-79 01 01 "General Medicine " determines the need for student's focused study of the most important clinical manifestations of the eye diseases, diagnosis and treatment of the eye diseases, methods of rendering emergency medical aid in various eye injuries.

Teaching and successful studying of the discipline "Ophthalmology" is based on the knowledge of the following disciplines acquired by the students:

Medical and Biological Physics. Medical devices and equipment used in ophthalmology.

Medical Biology and General Genetics. Cytobiology. Protozoology. Elementary biology. Filo-opto-morfogenez of the eye.

Latin Language. Knowledge of Latin and Greek derivation and a certain minimum of terminology in Latin.

Human Anatomy. Structure of the eyeball.

Histology, Cytology, Embryology. Methods of histologic and cytologic studies.

Normal Physiology. Eye. Functions.

Microbiology, Virology, Immunology. Infectious and parasitic diseases, their microbiological characteristics. Concept on immunity and allergy. General characteristics of reactions of cellular and humoral immunity reactions. Carrying out dab, crops, scraping.

Pathological Anatomy. Inflammation: concept, etiology and pathogenesis, classification (common inflammation, specific inflammation).

Pharmacology. Mechanisms of medicine effect, dosage and ways of introduction. Systematization of medicines according to their effect.

anatomy, histology and relationship of components of the eyeball, physiological role of each element and the eye as a whole, functions of vision, methods of eye study;

Requirements to student training.

By the end of studying the discipline "Ophthalmology" the student should

know:

- anatomy, histology and relationship of components of the eyeball, physiological role of each element and the eye as a whole, functions of vision, methods of study of the eye;
- visual functions and methods of their study, pathology of visual functions;
- types, methods of defining clinical refraction and astigmatism, ways of correcting anomalies of refraction and astigmatism, accommodation and anisometropia;
- etiology, classification, pathogenesis, clinical picture, diagnostics and differential diagnostics, methods of preventing and treating the most widespread diseases and injuries of the vision organ;
- the main eye diseases, leading to vision deterioration and blindness;
- ocular manifestations of hypertension, diabetes mellitus, HIV infection;
- signs of trauma of the eyeball (mechanical injuries, thermal, chemical and radiate burns, penetrating ocular injury), ways of rendering emergency medical aid;

be able to:

- apply methods of the eye study to determine a clinical diagnosis;
- study visual functions;
- define measures for rehabilitation, dispensary activities, prevention of diseases, administer treatment in diseases of eyelids and conjunctivas;

- render emergency medical aid in case of trauma and diseases of eyes.

master:

- intraocular pressure assessment by palpation;
- removing foreign bodies from the conjunctiva of the eyeball;
- skills of rendering emergency medical aid in burns and various injuries eyes.

The structure of the curriculum in the educational discipline "Ophthalmology" includes two sections.

Total number of hours for the study of the discipline is 86 academic hours. Classroom hours according to the types of studies: lectures - 10 hours, practical classes - 45 hours, student independent work (self-study) - 31 hours.

Current assessment is carried out according to the syllabus of the specialty in the form of a graded credit (8 semester).

Form of higher education – full-time.

TOPIC PLAN OF CLASSROOM STUDIES

Section (topic) name	Number of class hours	
	lectures	Practical classes
1. GENERAL OPHTHALMOLOGY	2	20
1.1. Ophthalmology, history of Ophthalmology. Anatomy and Development of the Eye. Physiology of Eye and Vision	2	5
1.2. Visual functions (visual acuity, visual fields, colour vision, dark adaptation, binocular vision), age dynamics of their development	-	5
1.3. Clinical Methods in Ophthalmology	-	5
1.4. Optics and Refraction, Accommodation. Myopia	-	5
2. DISEASES OF THE EYE	8	25
2.1. Diseases of the Eyelids, Conjunctiva and Lacrimal Apparatus	-	5
2.2. Diseases of the Cornea and Sclera	2	4
2.3. Strabismus and Nystagmus	-	1
2.4. Diseases of the Lens	-	2
2.5. Uveitis	2	3
2.6. Glaucomas	-	5
2.7. Mechanical Injuries. Non-mechanical injuries. Chemical, thermal, electrical, radiational injuries (burns).	2	4
2.8. Diseases of the Retina (changes of vision organ in illnesses)	-	1
Number of hours	10	45

CONTENTS OF THE TRAINING MATERIAL

1. General ophthalmology

1.1. Ophthalmology, history of Ophthalmology. Anatomy and Development of the Eye. Physiology of Eye and Vision

Ophthalmology, its content and tasks. History of Ophthalmology. The structure and level of eye disease, poor vision and blindness. Preventive measures in the field of vision protection. Preventive medical examination.

Anatomy and Development of the eye.

The eyeball. Anteroposterior diameter, horizontal diameter, vertical diameter, circumference, volume, weight. Fibrous coat. Cornea. Limbus. Sclera. Vascular coat (uveal tissue). Iris. Ciliary body. Choroid. Nervous coat (retina segments). Retina. Macula. Optic nerve. Visual pathway. Anterior segment. Anterior chamber. Posterior chamber. Crystalline lens. Vitreous. Orbit, extraocular muscles and appendages of the eye. Eyelids. Conjunctiva. The lacrimal apparatus. Lacrimal gland. Lacrimal sac. Nasolacrimal duct and canaliculi.

Formation of optic vesicle and optic stalk. Formation of lens vesicle. Formation of optic cup. Changes in the associated mesoderm. Development of various ocular structures.

1.2. Visual functions (visual acuity, colour vision, perimetry, dark adaptation, binocular vision), age dynamics of their development.

Physiology of vision phototransduction. Photochemical changes. Electrical changes. Processing and transmission of visual impulse. Pathology of visual functions: central field, peripheral field of vision, color vision, binocular vision.

Testing of visual acuity. The distant visual acuity. Snellen's test types. General physical and systemic examination. Visual acuity equivalents. Procedure of testing. Visual acuity for near. Distance visual acuity testing with and without correction and with a pinhole.

Perimetry. The visual field . Central field. Peripheral field of vision. Methods of estimating the visual fields. Kinetic and static perimeter. Kinetic versus static perimetry. Manual perimetry. Confrontation method. Campimetry. Goldmann's perimeter. Automated perimetry. Automated perimeters. Advantages of automated perimetry over manual perimetry. Interpretation of automated perimetry print out field charts. Testing strategies and programs. Diagnosis of glaucoma field defects on HFA single-field printout.

Colour vision is a function of the cones. Theories of colour vision. Red sensitive cone pigment. Green sensitive cone pigment. Blue sensitive cone pigment. Young-Helmholtz theory. Opponent colour theory of Hering. Types of the congenital disorders of color sight, their frequency.

Sense of contrast. The light sense. Light adaptation. Dark adaptation. Physiology of binocular vision.

1.3. Clinical Methods in Ophthalmology

General physical and systemic examination. Ocular examination. External inspection of the eye. Pupillary reaction testing. Ocular motility testing. External examination of the eye in newborns and children.

Fundus examination. Diagnostic tests. Oblique illumination. Tonometry. Techniques of fundus examination. Fundus fluorescein angiography. Electroretinography and electrooculography. Visually evoked response (VER). Ultrasonography. Special evaluation schemes. Evaluation of glaucoma case, squint epiphora dry eye, proptosis, refractive errors.

1.4. Optics and Refraction. Accommodation. Myopia.

Optics. Light. Geometrical optics. Optics of the eye (visual optics). Errors of refraction. Hypermetropia. Myopia. Astigmatism. Anisometropia. Aniseikonia.

Accommodation and its anomalies. Accommodation. Mechanism. Far point and near point. Range and amplitude. Anomalies of accommodation. Presbyopia. Insufficiency of accommodation. Paralysis of accommodation. Spasm of accommodation.

Determination of refraction errors. Objective refraction. Subjective refraction. Spectacles and contact lenses. Spectacles Contact lenses. Refractive surgery.

2. SPECIAL OPHTHALMOLOGY

2.1. Diseases of the Eyelids, Conjunctiva and Lacrimal Apparatus

Diseases of the Eyelids

Applied anatomy: cross anatomy, structure glands of eyelid, blood supply, nerve supply. Congenital anomalies. Oedema of eyelids. Inflammatory disorders: blepharitis, chalazion, hordeolum internum, molluscum contagiosum.

Anomalies in the position of lashes and lid margin: trichiasis, entropion, ectropion, symblepharon, ankyloblepharon, blepharophimosis, lagophthalmos, blepharospasm, ptosis. Tumours. Injuries.

Diseases of the Conjunctiva

Applied anatomy: parts, structure, glands. Inflammations of conjunctiva: infective conjunctivitis, bacterial, chlamydial, viral, allergic conjunctivitis, granulomatous conjunctivitis.

Degenerative conditions: pinguecula, pterygium, concretions. Symptomatic conditions: hyperaemia, chemosis, ecchymosis, xerosis, discoloration.

Cysts and tumours: cysts of conjunctiva, tumours of conjunctiva.

Diseases of the Lacrimal Apparatus

Applied anatomy: structure, functions, secretion of tears, elimination of tears.

The tear film and the dry eye: Sjogren's syndrome.

The watering eye: etiology, clinical evaluation.

Dacryocystitis: congenital, chronic dacryocystitis, acute dacryocystitis, surgical technique of DCR and DCT.

Swellings of the lacrimal gland: dacryoadenitis, mickulicz's syndrome, dacryopes. Tumours.

2.2. Diseases of the Cornea and Sclera

Diseases of the Cornea

Anatomy and physiology: applied anatomy, applied physiology, congenital anomalies.

Inflammations of the cornea: ulcerative keratitis, non-ulcerative keratitis, superficial, deep.

Corneal degenerations: age-related corneal degenerations, pathological corneal degenerations, corneal dystrophies, anterior dystrophies, stromal dystrophies, posterior dystrophies.

Ectatic conditions of cornea: keratoconus, keratoglobus, keratoconus posterior.

Abnormalities of cornea: transparency, corneal oedema, corneal opacity, corneal vascularization. Keratoplasty.

Diseases of the Sclera

Applied anatomy.

Inflammations of the: episcleritis, scleritis, anterior, posterior.

Blue sclera. Staphylomas: anterior, intercalary, ciliary, equatorial, posterior.

2.3. Strabismus and Nystagmus

Anatomy and physiology of the ocular motility system. Extraocular muscles. Ocular motility.

Binocular, single vision: definition, pre-requisites, anomalies.

Strabismus: definition and classification, evaluation of a case, pseudostrabismus, heterophoria, heterotropia, concomitant strabismus, incomitant strabismus, strabismus surgery.

Nystagmus: physiological, sensory deprivation, motor imbalance.

2.4. Diseases of the Lens

Anatomy and physiology: applied anatomy, applied physiology and biochemistry.

Cataract: congenital and developmental cataract, acquired cataract, management of cataract.

Surgical techniques for cataract extraction: intracapsular cataract extraction, conventional extracapsular cataract extraction. Manual small incision cataract surgery. Phacoemulsification. Surgical techniques of extracapsular cataract extraction for childhood cataract. Intraocular lens implantation. Complications of cataract surgery and their management.

Displacements of the lens: subluxation, dislocation.

Congenital anomalies of the lens.

2.5. Uveitis

Applied anatomy: iris, ciliary body, choroid. Congenital anomalies.

Inflammations (uveitis): general considerations, anterior uveitis, posterior uveitis, endophthalmitis and panophthalmitis, specific clinico-etiological types of uveitis.

Degenerative conditions of iris and choroid. Congenital anomalies.
Tumours of choroid, ciliary body and iris.

2.6. Glaucomas

Anatomy and physiology. Applied anatomy. Applied physiology.
General considerations. Definition and classification of glaucoma. Pathogenesis of glaucomatous ocular damage.

Congenital glaucomas: terminology, primary developmental glaucoma, developmental glaucoma with associated anomalies.

Primary open-angle glaucoma and related conditions: primary open-angle glaucoma, ocular hypertension, normal tension glaucoma.

Primary angle-closure glaucoma: latent glaucoma, intermittent glaucoma, acute congestive glaucoma, postcongestive angle-closure glaucoma, chronic closed angle glaucoma, absolute glaucoma.

Secondary glaucomas.

Surgical procedures for glaucoma.

2.7. Mechanical Injuries. Non-mechanical injuries. Chemical, thermal, electrical, radiational injuries (burns)

Mechanical injuries: extraocular foreign bodies, blunt trauma, perforating injuries, perforating injuries with retained intraocular foreign bodies (iofb), sympathetic ophthalmitis.

Non-mechanical injuries. Chemical injuries: acid burns, alkali burns. Thermal injuries. Electrical injuries. Radiational injuries: ultraviolet radiations, infrared radiations, ionizing radiational injuries.

2.8. Diseases of the Retina (changes of vision organ in illnesses)

Vascular disorders. Viral infections. Retinopathy of prematurity. Retinoblastoma.

Vascular disorders. Central retinal artery occlusions: etiology, diagnosis, treatment. Central retinal vein occlusions: etiology, diagnosis, treatment. Hypertensive retinopathy. Retinopathy in pregnancy – induced hypertension. Metabolic disorders. Diabetic retinopathy. Haematological diseases.

Viral infections. Ocular involvement in aids. Systemic infections, bacterial infections.

Retinopathy of prematurity: pathogenesis, diagnosis, treatment.

Retinoblastoma: diagnosis, treatment, prognosis.

EDUCATIONAL - METHODOLOGICAL MAP OF THE DISCIPLINE "OPHTHALMOLOGY"

Section, topic #	Section (topic) name	number of hours		Self-studies	number of hours
		lectures	practical		
1.	GENERAL OPHTHALMOLOGY	2	20	10	
1.1.	Ophthalmology, history of Ophthalmology. Anatomy and Development of the Eye. Physiology of Eye and Vision	2	5	3	Conversations
1.2.	Visual functions (visual acuity, colour vision, perimetry, dark adaptation, binocular vision)	-	5	2	Conversations. Written examinations
1.3.	Clinical Methods in Ophthalmology	-	5	2	Conversations.
1.4.	Optics and refraction, accommodation. Myopia.	-	5	3	Conversations. Reports on classroom practical exercises with their oral presentation
2.	SPECIAL OPHTHALMOLOGY	8	25	21	
2.1.	Diseases of the Eyelids, Conjunctiva and Lacrimal apparatus	2	5	3	Conversation. Abstract presentation
2.2.	Diseases of the Cornea and Sclera	2	4	3	Oral examinations. Test papers Conversations.
2.3.	Strabismus and Nystagmus		1	2	Conversations.
2.4.	Diseases of the Lens		2	2	Oral examinations. Control questions.

					Conversations
2.5.	Uveitis	2	3	3	Oral examinations. Conversations
2.6.	Glaucomas				Written examinations. Control questions. Conversations. Abstracts presentation
		2	5	3	
2.7.	Mechanical Injuries. Non-mechanical injuries. Chemical, thermal, electrical, radiational injuries (burns)	-	4	3	Conversations. Oral examinations.
2.8.	Diseases of the Retina (changes of vision organ in illnesses)	-	1	2	Computer tests. Graded credit Dif. form of assessment

INFORMATION AND METHODOLOGICAL PART

LITERATURE

Key sources:

1. Khurana, A.K. Comprehensive Ophthalmology 4th ed / A.K. Khurana. Published by New Age International (P) Ltd., 2007. - 593 pages.

Additional sources:

2. Kanski, J. J. Clinical Ophthalmology 6th ed / J. J. Kanski. Edinburgh London New York Oxford Philadelphia st Louis Sydney Toronto, 2007. - 923 pages.

LIST OF DIAGNOSTIC AIDS

The following forms are used for the diagnosis of competencies:

1. Oral:
 - conversations;
 - graded credit;
 - dif. assessment.
2. Written:
 - written examinations;
 - abstract presentation.
3. Oral-written:
 - reports on classroom practical exercises with their oral defense.
4. Technical:
 - computer testing.

LIST OF PRACTICAL SKILLS

1. Assessment of intraocular pressure by palpation;
2. Removing foreign bodies from the conjunctiva of the eyeball;
3. Instillation of eye drops, ointments application.

LIST OF LECTURES (8 semester)

1. Clinical anatomy and physiology the eye.
2. Diseases of the Eyelids, Conjunctiva and Lacrimal Apparatus.
3. Diseases of the Cornea.
4. Glaucomas.
5. Uveitis.

LIST OF PRACTICAL CLASSES (8 semester)

1. Anatomy and Development of the Eye. Physiology of Eye and Vision.
2. Visual functions (visual acuity, colour vision, perimetry, dark adaptation, binocular vision).
3. Clinical Methods in Ophthalmology.
4. Optics and refraction, accommodation. Myopia.
5. Diseases of the Eyelids, Conjunctiva and Lacrimal Apparatus.
6. Diseases of the Cornea and Sclera. Strabismus and Nystagmus.
7. Diseases of the Lens. Uveitis.
8. Glaucomas.
9. Mechanical Injuries. Non-mechanical injuries. Chemical, thermal, electrical, radiational injuries (burns). Diseases of the Retina (changes of vision organ in illnesses).

**PROTOCOL OF THE CURRICULUM APPROVAL
BY OTHER DEPARTMENTS**

Title of the discipline requiring approval	Department	Amendments to the curriculum of the academic discipline	Decision of the department, which designed the curriculum (date, protocol #)
1. Normal anatomy	Department of normal anatomy	No offers and changes	04.11. 2016 protocol № 5
2. Normal physiology	Department of normal physiology	No offers and changes	04.11. 2016 protocol № 5

COMPILERS/AUTHORS:

Head of the Department of
Eye Diseases,
Educational Establishment
"Belarusian State Medical University"



L. N. Marchenko

Associate Professor of the Department,
Eye Diseases of
Educational Establishment
"Belarusian State Medical University"



M. F. Dzhumova

Curriculum content, composition and accompanying documents comply with established requirements.

Dean of the Medical Faculty of
International Students

24 11 2016



V. V. Davydov

Methodologist of Educational
Institution

"Belarusian State medical
University"

24 11 2016



S. A. Kharytonava

Head of the Foreign Languages
Department



M. N. Petrova

Information about the authors (compilers) of the curriculum

surname, name, middle name	MARCHENKO LYUDMILA NIKOLAEVNA
Position, scientific degree, academic status	Head of the Eye Diseases Department, BSMU, Doctor of Medical Sciences, Professor
Office tel #:	(017) 227 81 95
E-mail:	liudmila.marchenko@gmail.com
Surname, name, middle name	DZHUMOVA MARINA FIODOROVNA
Position, scientific degree, academic status	Associate Professor of the Eye Diseases Department, BSMU, Ph. D.
Office tel #:	+375 29 696 74 57
E-mail:	marina_dzhumova@mail.ru