Course: Aging and Eye Refraction			**Course designation:** OPT503
Semester:	**Lectures + exercises + seminar:**	**Total:**	**ECTS credits:**
5	1 + 1 + 0	30	3

Course objective:
Recapitulate the previous knowledge from the courses of Eye Anatomy and Physiology and Fundamentals of General Pathology and Eye Diseases, as well as the refraction system.
Indicate the problem of development and aging of specific eye structures, and present the changes into the clinical system, and the system of specific diseases as an elementary part of the aging process. Take special care of vision correction in senior age, as well as the requirements for better eyesight.

Course contents:
Demonstrate how aging leads to changes in every eye segment and perform an evaluation of natural changes in the eye prior to the beginning of the aging process. Connect the knowledge from ergo-ophthalmology and apply it to senior age. To study senior age refraction with emphasis on concurrent retina changes, such as macular degeneration.

Course: Contact Lenses I			**Course designation:** OPT401
Semester:	**Lectures + exercises + seminar:**	**Total:**	**ECTS credits:**
4	2 + 3 + 0	75	7

Course objective:
Teaching students how to handle, insert and take out contact lenses, perform preliminary measurements necessary for fitting the contact lenses, work with the biomicroscope, as well as to perform refraction through the contact lens in the eye.

Course contents:
1. History of contact lenses. Classifiction of contact lenses.
2. Materials used in contact lenses and requirements.
3. Technology of contact lenses production. Standards.
4. Examination of contact lenses parameters. Radius, diopter power, diameter, thickness measurements.
5. Topography of the cornea.
6. Using fluorescein to interpret images.
7. Adaptation of contact lenses.
8. Adjustment equipment. Rooms, instruments, hygienic requirements.
9. Adaptation procedure. Brief revision of eye anatomy and physiology. Adaptation requirements. Adaptation rules. Relation between the cornea and the contact lens curvature. Eye examination using a biomicroscope.
10. Anatomical and physiological characteristics of the eye and their influence on lens selection. Cornea. Eyelids. Pupils. Tear film. Conjunctiva.
11. Psychological approach to lens fitting.
12. Steps in lens fitting. Lens selection. Optical calculation. Identification of lens parameter.

Course: Contact Lenses II			**Course designation:** OPT501
Semester:	**Lectures + exercises + seminar:**	**Total:**	**ECTS credits:**
5	2 + 2 + 0	60	6

Course objective:
Teaching students how to handle, insert and take out contact lenses, perform preliminary measurements necessary for fitting the contact lenses, work with the biomicroscope, as well as to perform refraction through the contact lens in the eye.

Course contents:
Maintenance of lenses and regular control of lens wearers. Complications in lens fitting. Psychological complications and documentation. Anatomical and physiological complications and documentation. Complications due to wearing contact lenses: sediment, changes in lens parameters, complications with soft lenses, contact lenses and medication, optical complications and documentation. Videokeratometry. Hard and soft toric lenses. Contact lenses for presbyopia. Modification of RGP lens parameters.

Course: Contact Lenses III			**Course designation:** OPT601
Semester:	**Lectures + exercises + seminar:**	**Total:**	**ECTS credits:**
6	2 + 2 + 0	60	6

Course objective:
Teaching students how to handle, insert and take out contact lenses, perform preliminary measurements necessary for fitting the contact lenses, work with the biomicroscope, as well as to perform refraction through the contact lens in the eye.

Course contents:
Special indications in lens fitting. Correction of aniseikonia and aphakia. Irregular astigmatism. Keratoconus, keratoglobus, keratoplastics, fitting after refractive surgery, therapeutic lenses, contact lenses and children, lenses for prolonged wearing, contact lenses and work, sportS. Orthokeratology.

Course: English I			**Course designation:** OPT105
Semester:	**Lectures + exercises + seminar:**	**Total:**	**ECTS credits:**
1	1 + 1 + 0	30	3

Course objective:
Acquisition of the basic knowledge of the English grammar with the purpose of successful understanding of the written and spoken language.
Knowledge expansion and the development of language skills acquired through previous education with the purpose of communicating in the English language.
Improving the knowledge of professional terminology.
Usage of professional manuals, as well as general and professional dictionaries and professional literature in the field of Optometry.

Course contents:
Language principles – verb tenses, active/passive voice, word classes, word formation, verbs (auxiliary, irregular, modals, infinitive), numbers, dates, titles.
General language – business letters, e-mails, CV, basic conversation, simple dialogues in real life situations, introducing a person or a company.
Professional language – optometric terminology, optical and optometric instruments, visual aids, eye-related expressions and collocations, eye anatomy and eye systems related terminology.

Course: English II			**Course designation:** OPT205
Semester:	**Lectures + exercises + seminar:**	**Total:**	**ECTS credits:**
2	2 + 1 + 0	45	3

Course objective:
Acquisition of the basic knowledge of the English grammar with the purpose of successful understanding of the written and spoken language.
Knowledge expansion and the development of language skills acquired through previous education with the purpose of communicating in the English language.
Improving the knowledge of professional terminology (the eye - its parts and function, refractive errors, astigmatism, blindness, eye diseases).
Usage of professional manuals.
Usage of professional manuals, as well as general and technical dictionaries and technical literature in the field of Optometry.

Course contents:
Language principles – modals, collocations, concordance, compound translating techniques and multi-word lexemes.
General language – communication, research description, real life dialogues, problem explanation and solving.
Professional language – optometric terminology, expressions, collocations and terminology related to eye diseases, refractive errors and conditions.

Course: English III			**Course designation:** OPT306
Semester:	**Lectures + exercises + seminar:**	**Total:**	**ECTS credits:**
3	1 + 1 + 0	30	3

Course objective:
Acquisition of the basic knowledge of the English grammar with the purpose of successful understanding of the written and spoken language.
Knowledge expansion and the development of language skills acquired through previous education with the purpose of communicating in the English language.
Improving the knowledge of professional terminology (contact lenses, slit lamp, illumination techniques).
Usage of professional manuals. Usage of general and professional dictionaries as well as professional literature in the field of Optometry.

Course contents:
Language principles – compound and multi-word lexeme translating techniques, modal verbs.
General language – communication, providing instructions to the patient, real life dialogues, problem explanation and solving.
Professional language – optometric terminology, expressions and collocations related to eye examination, slit lamp, illumination techniques, fluorescein eye stain, contact lenses (maintenance, handling, types of lenses).

Course: English IV			**Course designation:** OPT406
Semester:	**Lectures + exercises + seminar:**	**Total:**	**ECTS credits:**
4	1 + 1 + 0	30	2

Course objective:
Acquiring the basic knowledge of the English grammar with the purpose of successful understanding of the written and spoken language.

Knowledge expansion and the development of language skills acquired through previous education with the purpose of communicating in the English language.
Improving the knowledge of professional terminology.
Usage of professional manuals with the purpose of creating a PowerPoint presentation.
Usage of general and professional dictionaries as well as professional literature in the field of Optometry.

Course contents:
Language principles – definitions, relative clauses, cause-effect relationships
General language – communication, preparing business letters, e-mails, preparation of documentation.
Professional language - optometric terminology - relating to glasses, lenses, frames, types and materials, as well as sunglasses.

Course: Ergonomics of Vision			**Course designation:** OPT305
Semester:	**Lectures + exercises + seminar:**	**Total:**	**ECTS credits:**
2	2 + 1 + 0	45	5

Course objective:
To understand and modify the individual's attitude towards their workplace and surroundings.

Course contents:
Brief recapitulation of previously acquired knowledge in the following courses: Physics, Geometrical Optics, Eye Optics, Eye Anatomy and Physiology, Eye Pathology, particularly from the aspect of macular degeneration. Nature of light, with an emphasis on wavelengths and energy efficiency in retina photochemistry. Measuring the light values, photometry, natural and artificial light sources, design of workplace lighting. Laboratory measurements, visual acuity and contrast, glaring, reflex and absorption of the visual surface and workplace. Colour vision.
Eye fatigue with various forms of incorrect workplace lighting. Vision and driving. Individual approach to the lighting of working surfaces. Special requirements of visual ergonomics and body postures when working on the computer. Sports and special protection programmes against too intense a light and glare. Protection of vision at the workplace, legislative norms.

Course: Eye Optics			**Course designation:** OPT203
Semester:	**Lectures + exercises + seminar:**	**Total:**	**ECTS credits:**
2	2 + 4 + 0	90	6

Course objective:
The aim of the course is to acquire the knowledge in eye optics necessary for its understanding and application in the courses of Refraction and binocular vision I-IV, Contact lenses I, Contact lenses II, Contact lenses III, Pediatric Refraction and Amblyopia, Aging and Eye Refraction.

Course contents:
Eye's optical system – Gullstrand's schematic eye; cornea – dioptre power of the anterior and posterior surface, and total dioptre power. Eye lens – lens dioptre power in distance accommodation. Vitreous body – composition and refractive index. Dioptre power of the eye's optical system, focal length of the eye, position of principal planes in the eye's optical system, position of the nodal points, optical axis accommodation, pupillary axis, visual axis. Light sensitivity, adaptation to light, adaptation to darkness.
Emmetropic eye - formation of the object image in the emmetropic eye, far point, near point ,refraction in the far and near point.
Nearsightedness – refractive nearsightedness, axis nearsightedness, refraction in the nearsighted eye, far point, near point, accommodation width, accommodation area, image size in the nearsighted eye, image construction in the nearsighted eye.
Farsightedness - refractive farsightedness, axis farsightedness, refraction in the farsighted eye, visus, refraction in the far point, refraction in the near point, accommodation width, image size in the farsighted eye, refraction deficit, image size calculation, image construction in the farsighted eye.
Astigmatic errors- regular astigmatism, types of astigmatic errors, direction of main cross-sections, focal line position, refraction in the astigmatic eye, visus, refraction deficit, refraction in the far point, refraction in the near point, image size in the astigmatic eye, irregular astigmatism, keratoconus, keratoconus correction.
Accommodation - physiological basics of accommodation, accommodation reflex, external and internal accommodation, accommodation area, accommodation width, necessary accommodation, consumed accommodation, image structure of an infinitely far object in the emmetropic eye, image size calculation, object image construction at a finite distance.
Age-related farsightedness - accommodation width in old-sighted eye, correction, optical effects of spectacles for near vision, determining the refraction deficit, working area with a monofocal lens, working area with a bifocal lens, working area with a trifocal lens, image construction in a corrected old-sighted eye.
Eye without the eye lens - optical features, refraction in the far point, image focal length, corrective lens, image size on the retina, looking at a near object with a lensless eye, correction with an specatcle lens, intraocular lenses, possibility of fixating intraocular lens, types of intraocular fixation.
Correction of eye errors – correction of axial symmetric errors, astigmatism correction, squinting correction, vertex distance, image size on the retina, accommodation through spectacles, visual field, visual angle, anisometropia, aniseikonia and correction. Thick lenses. What qualifies a thick and a thin lens in the human eye. Cardinal points. Preparing diagrams with focal, cardinal and nodal points.

Course: Fundamentals of Chemistry and Chemistry of Contact Lenses			**Course designation:** OPT302
Semester:	**Lectures + exercises + seminar:**	**Total:**	**ECTS credits:**
3	2 + 1 + 0	45	4

Course objective:

To acquire the fundamentals of chemistry as the basis for easier understanding of chemical processes in the human body, as well as pharmacology, and to learn about chemical processes in contact lenses and contact lens cleaning, disinfection and storing solutions.
Course contents: Elementary inorganic and organic chemistry. Materials used in contact lenses, basic requirements, composition, characteristics, chemical and physical procedures and their effect on surface characteristics of contact lenses, process analysis and material determining. Chemistry in contact lenses, deposits, deposit and microorganism interaction, cleaning and conservation solutions, and other components in contact lens solutions. Medication and contact lens interaction. Contact lens solutions and ecology.

Course: Fundamentals of Pharmacology			**Course designation:** OPT301
Semester:	**Lectures + exercises + seminar:**	**Total:**	**ECTS credits:**
3	2 + 0 + 0	30	3
Course objective: Students will acquire the basic knowledge of general pharmacology with a special emphasis on medications implemented in the diagnostics and treating of eye diseases. The students will learn about medications for other diseases that may affect eye function.			
Course contents: Fundamentals of pharmacology, fundamentals of pharmacodynamics and pharmacokinetics, pharmaceutical forms of medications and methods of application, principles of pharmacotherapy, medications used specifically in various eye diseases, medications that are given with other diseases but affect eye function, medication side effects and harmful effects, interaction of medications, pharmacoepidemiology, clinical testing of medications.			

Course: Geometrical Optics			**Course designation:** OPT201
Semester:	**Lectures + exercises + seminar:**	**Total:**	**ECTS credits:**
1	2 + 2 + 0	60	5
Course objective: The aim of the course is to acquire the knowledge in geometrical optics necessary for its understanding and application in the courses of Optical and optometric instruments, Eye Optics, Refraction and binocular vision, Contact lenses and Optometric practice.			
Course contents: General review of optics; historical development, nature and propagation of light in geometrical optics, sources of light, fundamental principles of geometrical optics, Fermat's principle of light propagation. Reflection of light; types of reflection, law of reflection, diffused light, types of mirrors. Refraction of light; types of refraction, law of refraction, total internal reflection and application. Reflection in geometrical optics; specular reflection, Gaussian optics conditions, reflection equation, linear and angle enlargement, optical systems for reflection and reflection errors (spherical aberration, astigmatism, field curve, distortion): mirrors, flat diopter, prism and plane-parallel plate, spherical diopter, thick and thin lens, system of thin lenses. Reflection in real systems. Lens errors: spherical and chromatic aberration, coma, distortion, astigmatism; lens error correction. Gullstrand's schematic eye. Trigonometric functions explanation, graphical representation of trigonometric functions. Trigonometry applied in right angled triangles and calculating the refraction of light.			

Course: Management and Entrepreneurship			**Course designation:** OPT704
Semester:	**Lectures + exercises + seminar:**	**Total:**	**ECTS credits:**
3	2 + 1 + 0	45	3
Course objective: Acquiring the knowledge and skills that will allow the students to successfully start and realize their own entrepreneurial and other projects, as well as managing the business by the principles of economical and social responsibility from the role of a future employee or entrepreneur.			
Course contents: Definition of management and basic management functions with the emphasis on planning (strategy, vision, mission, SWOT analysis), human resource potential and control (use of individual indices, absolute and relative change rates). CSR (Corporate Social Responsibility). Entrepreneurship. Marketing strategies (generic strategies) and competitive advantage. Entrepreneurial project (purpose, structure of the project and presentation).			

Course: Optical and Optometrical Instruments			**Course designation:** OPT204
Semester:	**Lectures + exercises + seminar:**	**Total:**	**ECTS credits:**
2	2 + 2 + 0	60	5
Course objective: The aim of the course is to get acquainted with optical instruments needed in the courses of Refraction and binocular vision I-IV, Contact lenses I-III, as well as Eye Optics and Technology of Optical Materials and Frames.			
Course contents:			

Division: subjective and objective, visual field, visual angle. Microscope: parts, image creation, magnification, resolving power, aperture, UV microscopes, ultramicroscopes (Tyndall effect). Schematic display of
Refraction and reflection significance on such instruments. Binoculars: parts and types, image creation, magnification. Pupillary distance determining. Types, parts and operation principle. Vertex dioptrimeter. Types, parts and operation principle. Sciascope-retinoscope. Types, parts and operation principle. Keratometer-ophthalmometer. Types, parts and operation principle. Refractometer. Types, parts and operation principle. Ophthalmoscope. Types, parts and operation principle. Phoropter. Keratoscope. Biomicroscope. Types, parts and operation principle. Perimeter.

Course: Physical Optics			**Course designation:** OPT104
Semester:	**Lectures + exercises + seminar:**	**Total:**	**ECTS credits:**
2	2 + 2 + 0	60	5
Course objective: The aim of the course is to acquire the knowledge in physical optics necessary for the understanding of its application in physiological optics.			
Course contents: Introduction. Wave optics; characteristics of wave motion, electromagnetic spectrum, characteristics of electromagnetic wave. Interference; wave coherence (constructive, destructive and partial), devices (thin layers, semi-permeable bases, holograms, Newton's rings), bright and dark stripes and their intensity. Diffraction; diffraction on small objects (obstacles, particles), diffraction on crevice and round opening. Interaction of light and matter; ideal black bodies and absorption factors, reflection and transmission, Beer-Lambert law. Black body radiation; discontinued quantum states of harmonic oscillators, continuous emission spectrum, grey body. Quantum states of electrons in the atom; linear and chord emission spectra, spontaneous and forced emission, lasers and application, resonant and non-resonant light absorption (classical and quantum view). Perception of colour; colour feeling, light dispersion, reflection of visible light on coloured surfaces, transmission on coloured transparent systems (filters, glass), physical and psychophysical review of colour feeling, psychophysical characteristics of colour, colorimetric measurements. Colour in three-colour linear model; standard perceiver, primary colours and respective trichromatic values (CIE standard), spectral characteristics of colour (reflexive and transmissive), additive and subtractive combining of colours. Vector calculus in the Euclidean space. Scalar, vector and mixed product. Graphical presentation of products and application in physical polarization.			

Course: Physics			**Course designation:** OPT102
Semester:	**Lectures + exercises + seminar:**	**Total:**	**ECTS credits:**
1	2 + 1 + 0	45	4
Course objective: Acquiring the knowledge of physics necessary for the understanding of fundamental physical processes with the application to the future courses of the study programme.			
Course contents: Introduction. Physical magnitudes. SI system of units. Fundamentals of Mechanics. Oscillations, waves and sound: harmonic oscillator. Wave energy and intensity. Waves. Transverse and longitudinal waves. Reflection and superposition of waves. Sound waves. Shock waves. Electromagnetic phenomena: current, resistance, work and power. Electric current circuits. Alternating current. Equations of magnetostatics and electrodynamics. Electromagnetic waves. Fluid dynamics: hydrostatics. Hydrodynamics. Thermodynamics: ideal gas. Thermal properties of matter. Gas mixtures. Phase diagrams. Heat and energy in transfer. 1st, 2nd and 3rd law of thermodynamics. Heat transfer. The Carnot cycle. The basics of geometrical and physical optics.			

Course: Refraction and Binocular Vision I			**Course designation:** OPT303
Semester:	**Lectures + exercises + seminar:**	**Total:**	**ECTS credits:**
3	2 + 5 + 0	105	7
Course objective: Introduce the students to basic refraction procedures and develop their monocular refraction skills.			
Course contents: Basic concepts and definitions. Visual acuity, contrast, optotypes. Accommodation. Curves of visual acuity. Ametropic eye - nearsightedness, farsightedness, astigmatism. Visual acuity and ametropia. Subjective refraction - bestform lenses and cross cylinder methods. Subjective refraction - fogging method. Vertex and cylindrical effects conversion. Objective refraction - electronic refractometry, skiascopy, ophthalmoscopy, ophthalmometry.			

Course: Refraction and Binocular Vision II			**Course designation:** OPT423
Semester:	**Lectures + exercises + seminar:**	**Total:**	**ECTS credits:**
4	2 + 3 + 0	75	5
Course objective: Introduce the students to the principles of binocular vision analysis and correction.			
Course contents:			

Fundamentals of binocular vision. Binocular equalization - procedures. Ocular motor skills, heterophoria, heterotropia, fixation disparity. Ocular motor skill testing (cover, Hirschberg and PPK methods). Stereoscopic vision. Methods of measuring heterophoria (Maddox, Bagolino, Osterberg, Schober, von Graefe, synoptophore methods). Procedure and correction using the MKH method.

Course: Refraction and Binocular Vision III			**Course designation:** OPT502
Semester:	**Lectures + exercises + seminar:**	**Total:**	**ECTS credits:**
5	2 + 3 + 0	75	6
Course objective: Introduce the students to the principles of near vision analysis and correction.			
Course contents: Accommodation: measurement and conversion of maximum accommodation effect. Convergence, convergence shares. Near addition determination, determination of sharp binocular vision limitations, accommodation balance. Near vision astigmatism. Prism correction at near. Additional methods for near vision analysis: MEM dynamic skiascopy, fused cross cylinder, von Graefe phoria. Graphic analysis, rules for prism correction according to Sheard and Percival, determining AC/A, alternative spherical correction. Near vision stress, accommodation - convergence - miosis relationship and their disorders. Aniseikonia - measurement and conversion.			

Course: Refraction and Binocular Vision IV			**Course designation:** OPT602
Semester:	**Lectures + exercises + seminar:**	**Total:**	**ECTS credits:**
6	1 + 3 + 0	60	5
Course objective: Introduce students to the integration of refractive procedures into a comprehensive examination of visual functions and the differentiation of procedures according to various client anamnesis. Practice these in intercommunication related to professional dilemmas and cases from practice.			
Course contents: Anisometropia and aniseikonia - practical instructions. Prism effects of spectacle lenses, rules for centering monofocal spectacle lenses for distance and near vision, as well as multifocal spectacle lenses. Function of contrast vision, contrast sensitivity (LCS) testing according to Ginsburg and by Buser. Night myopia and testing for it. Near vision correction: instructions for the final correction. Additional procedures for visual function analysis and exclusion of eye pathology. Vision correction after cataract surgery. Amblyopia / Low Vision.			