VELEUČILIŠTE VELIKA GORICA
UNIVERSITY of APPLIED SCIENCES VELIKA GORICA

BASIC COURSE INFORMATION WITHIN THE STUDY PROGRAMME

PROFESSIONAL UNDERGRADUATE STUDY PROGRAMME

EYE OPTICS

VELEUČILIŠTE VELIKA GORICA
UNIVERSITY of APPLIED SCIENCES VELIKA GORICA

Course title: Anatomy, Physiology and Histology of the Eye

Course Code:
OPT209

Semester:	Lectures + Exercises + Seminar:	Total Hours:	ECTS Credits:
2	2 + 1 + 0	45	5

Course Objective:
To acquire fundamental knowledge of the anatomy and physiology of the eye necessary for understanding the subjects Ocular Pathology, Pharmacology, Contact Lenses, Refraction and Binocular Vision, and others.

Course Content:
The sense of vision and its development. Structure of the eyeball. The external fibrous layer of the eyeball: sclera and cornea. The middle vascular layer of the eyeball: choroid, iris, and ciliary body. The inner layer of the eyeball: retina, sensory cells, macula lutea, and optic disc. Refractive structures of the eye: crystalline lens, anterior and posterior chambers, vitreous body. Formation and circulation of aqueous humor; venous drainage (Schlemm's canal). Blood and lymph vessels of the eye (arteria centralis retinae, arteria lacrimalis, arteriae ciliares, arteria supraorbitalis and arteria ethmoidalis). The orbit. Extraocular muscles and their innervation. Protective structures of the eye: eyelids, conjunctiva, and lacrimal apparatus. Formation of visual sensation (light and color perception), rhodopsin. The optic nerve, visual pathway, and visual centers in the brain. Optical system of the eye and accommodation. Binocular vision, horopter, perimetry, and examination of the ocular fundus.

General and Specific Competences (Knowledge and Skills):
By mastering the course content, students will be able to apply knowledge and skills related to a comprehensive biosocio-psychological approach to maintaining health and addressing visual health challenges. Students will also gain the necessary background for advanced courses related to ocular pathology and treatment methods.

Learning Outcomes:
After successfully completing this course, students will be able to:

1. Present the anatomy and physiology of the eye within the human sensory system.
2. Describe the embryogenesis of the eye in relation to the development of the central nervous system.
3. Explain the histological structure of the eye.
4. Clarify the physiological functions and structures of all ocular segments.
5. Apply general anatomical and physiological knowledge to the study of ocular anatomy and physiology.
6. Extend knowledge of ocular anatomy and physiology to pathological and pathophysiological eye conditions.

Required literature:

1. Rotim, K. et al. Anatomy and Physiology of the Eye, University of Applied Sciences Velika Gorica, Velika Gorica, 2009.
2. Rotim, K. et al. Anatomy, University of Applied Health Sciences Zagreb, Zagreb, 2017.
3. Anatomy of the Eye, video recording, University of Applied Health Sciences Zagreb, Zagreb, 202

VELEUČILIŠTE VELIKA GORICA
UNIVERSITY of APPLIED SCIENCES VELIKA GORICA

Course title: English Language I

Course Code:
OPT105

Semester:	Lectures + Exercises + Seminar:	Total Hours:	ECTS Credits:
1	1 + 1 + 0	30	3

Course Objective:
To acquire fundamental knowledge of English grammar for effective comprehension of written and spoken language. To expand existing linguistic knowledge and develop language skills for professional communication in English. To improve knowledge of professional terminology and the use of specialized manuals, general and technical dictionaries, and professional literature in the field of eye optics.

Course Content:
Linguistic structures: Verb tenses, active and passive voice, parts of speech, word formation, verbs (auxiliary, irregular, modal, infinitive), numbers, dates, and titles.
General language content: Business letters, e-mails, CVs, basic communication, simple dialogues in real-life situations, and presentations of a person or a company.
Professional content: Optometric terminology, optical and optometric instruments, visual aids, expressions and collocations related to the eye, terminology of eye anatomy and visual systems.

General and Specific Competences (Knowledge and Skills):
Students will acquire essential knowledge for writing letters and messages, reading, understanding, and using English professional literature, as well as communicating with clients in English.

Learning Outcomes:
After successfully completing this course, students will be able to:
1. Correctly use grammatical structures, including present and past tenses, adjective comparison, and definite and indefinite articles.
2. Form new words using prefixes and suffixes and correctly pluralize nouns.
3. Use professional terminology and phrases in the field, with emphasis on eye anatomy and optometric instruments.
4. Explain basic professional concepts using the English language of the profession.
5. Present their own opinions on selected topics in the field of eye optics and optometry.
6. Write a CV and job application in English using standard formats.

Required literature:
1. Vojniković, B. (2006). Croatian-English Dictionary of Optometry with Optical Formulas. Croatian Association of Opticians and University of Applied Sciences Velika Gorica, Velika Gorica.

Course title: English Language II

Course Code:
OPT205

Semester:	Lectures + Exercises + Seminar:	Total Hours:	ECTS Credits:
2	2 + 1 + 0	45	3

Course objective:
To acquire fundamental knowledge of English grammar for the purpose of successful comprehension of written and spoken language. To expand and develop language skills acquired in previous education for effective communication in English. To enhance knowledge of professional terminology (eye – parts and functions, refractive errors, astigmatism, blindness, eye diseases). To use professional manuals, general and technical dictionaries, and specialized literature in the field of eye optics.

Course content:
Linguistic structures: Modal verbs, collocations, agreement, techniques of translating compounds and multiword expressions.
General language content: Communication, describing research, dialogues in real-life situations, explaining problems and solutions.
Professional content: Optometric terminology, expressions, collocations, and terminology related to eye diseases, refractive errors, and visual conditions.

General and specific competences (knowledge and skills):
Students will acquire essential English language knowledge for reading, understanding, and using professional English literature, and will be able to communicate with clients in English by describing and analyzing the condition of the eye, eye diseases, and refractive errors.

Learning outcomes:
After successfully completing this course, students will be able to:
1. Apply professional terminology related to refractive errors and eye diseases in spoken and written communication.
2. Correctly use grammatical structures such as conditionals, imperatives, and gerunds.
3. Present their own opinions on selected topics in the field of eye optics and optometry.
4. Write simple texts using newly acquired professional expressions.

Required literature:
1. Vojniković, B. (2006). Croatian-English Dictionary of Optometry with Optical Formulas. Croatian Association of Opticians and University of Applied Sciences Velika Gorica, Velika Gorica.

VELEUČILIŠTE VELIKA GORICA
UNIVERSITY of APPLIED SCIENCES VELIKA GORICA

Course title: English Language III

Course Code:
OPT306

Semester:	Lectures + Exercises + Seminar:	Total Hours:	ECTS Credits:
3	1 + 1 + 0	30	3

Course objective:
To acquire fundamental knowledge of English grammar for the purpose of successful comprehension of written and spoken language. To expand and develop language skills acquired in previous education for effective communication in English. To enhance knowledge of professional terminology (contact lenses, biomicroscope, illumination techniques). To use professional manuals, and general and specialized dictionaries and literature in the field of eye optics.

Course content:
Linguistic structures: Techniques of translating compounds and multiword expressions, modal verbs.
General language content: Communication, giving instructions to patients, dialogues in real-life situations, explaining problems and solutions.
Professional content: Optometric terminology, expressions, and collocations related to eye examination, biomicroscope, illumination techniques, fluorescein testing, and contact lenses (maintenance, handling, types of lenses).

General and specific competences (knowledge and skills):
Students will acquire essential English language knowledge for reading, understanding, and using professional English literature, and will be able to communicate with clients in English by describing and analyzing biomicroscopic examination and the selection of contact lenses.

Learning outcomes:
After successfully completing this course, students will be able to:
1. Correctly use grammatical structures: future tenses, active and passive voice.
2. Use professional terminology and phrases related to the field (types of contact lenses, biomicroscopic examination) in spoken and written communication.
3. Argue opinions on topics within the field of eye optics and optometry.
4. Present their own critical reflections on topics related to eye optics and optometry.
5. Write simple professional texts in English.

Required literature:
1. Vojniković, B. (2006). Croatian-English Dictionary of Optometry with Optical Formulas. Croatian Association of Opticians and University of Applied Sciences Velika Gorica, Velika Gorica.

VELEUČILIŠTE VELIKA GORICA
UNIVERSITY of APPLIED SCIENCES VELIKA GORICA

Course title: English Language IV

Course Code:
OPT406

Semester:	Lectures + Exercises + Seminar:	Total Hours:	ECTS Credits:
4	1 + 1 + 0	30	2

Course objective:
To acquire fundamental knowledge of English grammar for the purpose of successful comprehension of written and spoken language. To expand and develop language skills acquired in previous education for communication in English. To enhance knowledge of professional terminology and use professional manuals for the purpose of preparing PowerPoint presentations. To use general and professional dictionaries and specialized literature in the field of eye optics.

Course content:
Linguistic structures: Definitions, relative clauses, and cause-and-effect relationships.
General language content: Communication, writing business letters and emails, and preparing documentation.
Professional content: Optometric terminology related to spectacles, spectacle lenses, frames, types and materials, and sunglasses.

General and specific competences (knowledge and skills):
Students will acquire essential English language skills for reading, understanding, and using professional English literature, as well as for oral and written communication with clients in English. They will be able to present reading materials and discuss assigned topics, conduct meetings, and take minutes.

Learning outcomes:
After successfully completing this course, students will be able to:
1. Design and present a professional topic of their own choice.
2. Correctly apply grammatical structures such as relative clauses and recognize differences between British and American spelling standards.
3. Use professional terminology and phrases related to the covered professional fields (types and parts of spectacles, sunglasses) in spoken and written communication.
4. Write simple professional texts in English.
5. Argue opinions on topics related to the field of eye optics and optometry.

Required literature:

1. Vojniković, B. (2006). Croatian-English Dictionary of Optometry with Optical Formulas. Croatian Association of Opticians and University of Applied Sciences Velika Gorica, Velika Gorica.
2. Čemerin Dujmić, V. (2023). Optometry – English IV Lecture Notes.

Course title: Ergonomics of Vision

Course Code:
OPT305

Semester:	Lectures + Exercises + Seminar:	Total Hours:	ECTS Credits:
2	2 + 1 + 0	45	5

Course objective:
To understand the relationship between an individual, the workplace, and the surrounding environment, as well as the process of adaptation.

Course content:
A brief review of previous knowledge from courses such as Physics and Geometrical Optics, particularly from the aspect of macular degeneration. The nature of light with emphasis on wavelengths and energy activity in the photochemistry of the retina. Measurement of light quantities, photometry, natural and artificial light sources, and workplace illumination design. Theoretical and laboratory measurements, visual acuity and contrast, glare, reflection, and absorption of viewing and working surfaces. Color vision. Eye fatigue caused by various forms of improper workplace illumination. Vision and driving. Individual approach to workplace lighting. Special requirements of visual ergonomics and body posture when working on a computer. Eye protection in the workplace and related legal standards. Visual ergonomics and computer use in childhood.

General and specific competences (knowledge and skills):
Upon passing the exam, students will acquire fundamental knowledge in ergo-optometry, which includes workplace analysis from the aspect of lighting, recommendations for proper illumination, and protection from radiation within the optical spectrum, with particular emphasis on children.

Learning outcomes:
After successfully completing this course, students will be able to:

1. Justify the importance of workplace illumination.
2. Calculate the illumination of a workplace.
3. Evaluate workplace and individual protection from excessive optical radiation.
4. Explain the functionality, conditions, and requirements of the work environment.
5. Recommend appropriate protective measures for children using computers.

Required literature:

1. Vojniković, B. (2005). Einstein's Law of Elementary Photochemical Reaction. Rijeka: University of Applied Sciences Velika Gorica and Studio Optika Einstein.

Course title: Ethics in Optics

Course Code:
OPT710

Semester:	Lectures + Exercises + Seminar:	Total Hours:	ECTS Credits:
0	2 + 0 + 0	30	3

Course objective:
To introduce students to the fundamental principles of ethics, with special emphasis on professional and business ethics, and to develop awareness of the moral and professional standards that must be followed in optometric practice.

Course content:
Introduction to ethics and basic ethical concepts. Historical development of ethical theories. Professional ethics. Medical ethics. Business ethics – virtue ethics. Business ethics – ethics of principles. Rights and codes of conduct. Ethical relationship between medicine and optometry. Professional ethics in everyday optometric practice. Relationships with clients, colleagues, and professional organizations and bodies. Business etiquette. Bioethics.

General and specific competences (knowledge and skills):
Students will acquire the necessary knowledge of professional ethics, enabling them to maintain appropriate and respectful relationships with all individuals they interact with during their professional activities.

Learning outcomes:
After successfully completing this course, students will be able to:

1. Explain and compare basic ethical concepts and ethical theories throughout history.
2. Evaluate the fundamental principles of professional ethics.
3. Identify the main characteristics of medical ethics.
4. Critically discuss fundamental human rights and ethical codes.
5. Analyze the similarities and differences between the principles of medical ethics and those of optometric ethics, and apply them independently in practice.
6. Integrate the basic principles of professional ethics into optometric practice.

Required literature:

1. Talanga, J. (1999). Introduction to Ethics. Croatian Studies – Studia Croatica, Zagreb.
2. Fatović-Ferenčić, S., Tucak, A. (2011). Medical Ethics. Medicinska naklada, Zagreb.

VELEUČILIŠTE VELIKA GORICA
UNIVERSITY of APPLIED SCIENCES VELIKA GORICA

Course title: Physics

Course Code:
OPT102

Semester:	Lectures + Exercises + Seminar:	Total Hours:	ECTS Credits:
1	2 + 1 + 0	45	4

Course objective:
To acquire knowledge of physics necessary for understanding the fundamental physical processes and their application in subsequent courses within the study program.

Course content:
Introduction. Physical quantities. SI system of units. Basics of mechanics. Oscillations, waves, and sound: harmonic oscillator. Energy and intensity of waves. Transverse and longitudinal waves. Reflection and superposition of waves. Sound waves. Shock waves. Electromagnetic phenomena: current, resistance, work, and power. Electric circuits. Alternating current. Equations of magnetostatics and electrodynamics. Electromagnetic waves. Fluid dynamics: hydrostatics and hydrodynamics. Thermodynamics: ideal gas. Thermal properties of substances. Gas mixtures. Phase diagrams. Heat and energy during transitions. The first, second, and third laws of thermodynamics. Heat transfer. Carnot cycle. Fundamentals of geometrical and physical optics.

General and specific competences (knowledge and skills):
Students gain an overview of basic physical concepts at a level appropriate to higher education, deepen their understanding of physical principles through a variety of real-world examples relevant to their field of study, and develop organizational and problem-solving skills. The course prepares students to independently analyze practical problems in their profession through physical reasoning and mathematical interpretation, as well as to engage in lifelong learning by following relevant scientific literature and publications.

Learning outcomes:
Upon successful completion of the course, students will be able to:

1. Describe and apply physical measurement units, perform approximate calculations, and understand the importance of calibration in practice.
2. Recognize and interpret different types of motion.
3. Apply the principles of classical mechanics to practical problems.
4. Analyze the concept of thermal energy, energy transformation, and the efficiency of thermodynamic machines in practical applications.
5. Apply knowledge of electrostatics, electrodynamics, and electromagnetism in practice.
6. Apply the principles of geometrical and physical optics to practical examples within the field.

Required literature:

1. Tamajo, E. (2019). Physics for Eye Opticians. Zagreb.
2. Cindro, N. (1988). Physics I & II. Školska knjiga, Zagreb.
3. Tamajo, E. (2021). Practicum in Geometrical and Physical Optics for Eye Opticians. Zagreb.
4. Supek, I. (1993). Theoretical Physics I. Školska knjiga, Zagreb.
5. Supek, I. (1990). Theoretical Physics II. Školska knjiga, Zagreb.

VELEUČILIŠTE VELIKA GORICA
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Course title: Physical Optics

Course Code:
OPT104

Semester:	Lectures + Exercises + Seminar:	Total Hours:	ECTS Credits:
2	2 + 2 + 0	60	5

Course objective:
The aim of this course is to acquire knowledge of physical optics necessary for understanding its applications in physiological optics.

Course content:
Introduction. Wave optics: properties of wave motion, electromagnetic spectrum, properties of electromagnetic waves.
Interference: coherence of waves (constructive, destructive, and partial), devices (thin films, semi-transparent surfaces, holograms, Newton's rings), bright and dark fringes and their intensities.
Diffraction: diffraction on small objects (obstacles, particles), diffraction on a slit and circular aperture.
Interaction of light and matter: ideal black bodies and absorption, reflection and transmission factors, Beer–Lambert law.
Black-body radiation: discrete energy states of harmonic oscillators, continuous emission spectra, gray body.
Electronic energy states in atoms: line and band emission spectra, spontaneous and stimulated emission, lasers and their applications, resonant and non-resonant light absorption (classical and quantum models).
Color perception: color sensation, dispersion of light, reflection of visible light from colored surfaces, transmission through colored transparent systems (filters, lenses), physical and psychophysical representation of color sensation, psychophysical characteristics of colors, colorimetric measurements.
Color in the three-color linear combination model: standard observer, primary colors and corresponding trichromatic values (CIE standard), spectral characteristics of color (reflective and transmissive), additive and subtractive color mixing.
Vector analysis in Euclidean space: scalar, vector, and mixed product of two vectors; graphical representation of vector products and their application in physical polarization.

General and specific competences (knowledge and skills):
Students will acquire knowledge of the fundamental laws of physical optics, necessary for understanding the nature of light and the function of lenses in practical applications.

Learning outcomes:
Upon successful completion of the course, students will be able to:
1. Identify and define problems and phenomena in the field of physical optics.
2. Analyze specific optical phenomena, and graphically represent wave-mechanical effects.
3. Calculate physical quantities related to given optical problems.
4. Illustrate and explain physical situations to visualize the electromagnetic field vector.
5. Compare the nature of different light effects and phenomena in physical optics.
6. Describe the operation and function of optical lenses.

Required literature:

1. Tamajo, E. (2019). Physics for Eye Opticians. Zagreb.
2. Tamajo, E. (2021). Practicum in Geometrical and Physical Optics for Eye Opticians. Zagreb.
3. Henč-Bartolić, V., & Kulušić, P. (1989). Waves and Optics: Physics Textbook for Students of Electrical Engineering. Školska knjiga, Zagreb.

VELEUČILIŠTE VELIKA GORICA
UNIVERSITY of APPLIED SCIENCES VELIKA GORICA

Course title: Geometrical Optics

Course Code:
OPT201

Semester:	Lectures + Exercises + Seminar:	Total Hours:	ECTS Credits:
1	2 + 2 + 0	60	5

Course objective:
The aim of this course is to acquire knowledge of geometrical optics necessary for understanding and application in the courses Optical and Optometric Instruments, Eye Optics, Refraction and Binocular Vision, Contact Lenses, and Optometric Practice.

Course content:
General overview of optics: historical development, nature and propagation of light in geometrical optics, light sources, fundamental laws of geometrical optics, Fermat's principle of light propagation.
Reflection of light: types of reflection, law of reflection, diffuse light, types of mirrors.
Refraction of light: types of refraction, law of refraction, total internal reflection and its applications.
Imaging in geometrical optics: unambiguous mapping, Gaussian approximation conditions, imaging equation, linear and angular magnification, optical imaging systems and image errors (spherical aberration, astigmatism, field curvature, distortion): mirrors, plane diopter, prism and plane-parallel plate, spherical diopter, thin and thick lenses, and systems of thin lenses.
Imaging in real optical systems.
Lens aberrations: spherical and chromatic aberration, coma, distortion, astigmatism, and lens aberration correction.
Gullstrand's schematic eye.
Explanation and graphing of trigonometric functions. Application of trigonometry to right triangles and problem-solving in physical light refraction.

General and specific competences (knowledge and skills):
Students become familiar with the nature and propagation of light, the fundamental laws of geometrical optics, and the optical elements and systems used in image formation of distant objects. This provides the foundation for understanding the properties and practical use of optical instruments and for applying the principles of applied geometrical optics in professional practice.

Learning outcomes:
Upon successful completion of the course, students will be able to:
1. Analyze optical systems and calculate physical refraction in various configurations.
2. Identify and define problems related to optical parameters and setups.
3. Calculate required physical quantities and construct mathematical graphs of different functions.
4. Sketch and interpret physical situations for different phase and amplitude values.
5. Compare the efficiency and performance of different optical devices and instruments.
6. Explain the principles and laws of geometrical optics and their practical relevance.

Required literature:

1. Tamajo, E. (2019). Physics for Eye Opticians. Zagreb.
2. Tamajo, E. (2021). Practicum in Geometrical and Physical Optics for Eye Opticians. Zagreb.
3. Parizoski, M. (1996). Geometrical Optics: Lecture Notes. Faculty of Mechanical Engineering and Naval Architecture, University of Zagreb.

VELEUČILIŠTE VELIKA GORICA
UNIVERSITY of APPLIED SCIENCES VELIKA GORICA

Course title: Informatics I

Course Code:
ZAJ1065

Semester:	Lectures + Exercises + Seminar:	Total Hours:	ECTS Credits:
1	2 + 2 + 0	60	5

Course objective:
To acquire fundamental knowledge of computers and develop practical skills in using essential office applications.

Course content:
Basic concepts of information technology; structure of personal computers in terms of hardware and software; operating systems; use and importance of computer applications; data security and virus protection.
Computer use and file management: adjusting basic settings, using built-in help functions, managing and organizing files and folders, data storage.
Word processing: creating, editing, and preparing smaller documents for distribution; duplicating and transferring text within and between multiple documents; integrating other applications within the word processor.
Spreadsheets: using spreadsheet applications; creating, copying, moving, and organizing worksheets and workbooks; using basic formulas and functions; creating and formatting charts, graphs, and pivot tables.
Presentations: creating, formatting, modifying, and preparing presentations.
Information and communication: using information networks, browsing the Internet, and understanding and using electronic mail.

General and specific competences (knowledge and skills):
Upon completion of the course, students will be capable of independent computer work using applications designed for modern office operations — including document creation and editing, spreadsheet use, Internet research, presentation design, and e-mail communication.

Learning outcomes:
Upon successful completion of the course, students will be able to:
1. Define key concepts and components of information and communication technology.
2. Use the main user functions of the Windows operating system.
3. Create and format text documents of varying size, content, and complexity.
4. Apply spreadsheet formulas and functions to solve numerical tasks.
5. Organize relevant information from various sources into an appropriate presentation.
6. Interpret data processing results using advanced spreadsheet functions.

Required literature:
1. Srnec, T. et al. (2011). ECDL 5.0 (Windows 7, Office 2010). PRO-MIL. ISBN: 978-953-7156-34-3.

VELEUČILIŠTE VELIKA GORICA
UNIVERSITY of APPLIED SCIENCES VELIKA GORICA

Course title: Informatics II

Course Code:
ZAJ114

Semester:	Lectures + Exercises + Seminar:	Total Hours:	ECTS Credits:
2	2 + 1 + 0	45	3

Course objective:
To acquire knowledge and skills in using applications for performing calculations, working with databases, graphical modeling, drawing, sketching, and project management.

Course content:
Spreadsheets in MS Excel: data storage organization; navigating through tables and worksheets; editing worksheets; data types; entering, editing, and deleting data; basic arithmetic operations and formula input; working with columns, rows, and cell ranges; linear and growth series; graphical data representation and chart editing; creating formulas and correcting calculation errors; function types; working with data lists; calculation analysis and data summarization.
Databases in MS Access: basic database objects and data organization; data types; creating and updating data tables; creating forms, queries, and reports; setting indexes and keys; establishing relationships between tables.
Graphical modeling and drawing: introduction to and use of available software for graphical modeling, drawing, and sketching (MS Visio).
Project management software: defining tasks, time, task duration, resources (human, material, financial); critical path; interdependencies; project creation and monitoring.

General and specific competences (knowledge and skills):
Students will be qualified to:
- Use spreadsheets and graphical data presentations
- Create plans and technical sketches
- Develop databases and design queries for data retrieval
- Prepare and use project management programs to plan and track project implementation

Learning outcomes:
Upon successful completion of the course, students will be able to:
1. Critically analyze the need for and suitability of specific software tools for solving complex problems.
2. Design document templates, calculation models, and database structures for practical problem-solving.
3. Identify properties and methods of objects from object models in Word, Excel, Access, PowerPoint, Visio, and Project necessary for task implementation.
4. Present the results of developed solutions.
5. Integrate solutions using multiple software programs.

Required literature:

1. Srnec, T. et al. (2011). ECDL 5.0 (Windows 7, Office 2010). PRO-MIL. ISBN: 978-953-7156-34-3.
2. Gvozdanović, T., Ikica, Z., Kos, I., Srnec, T., Zvonarek, Lj. (2005). E-Citizen. PRO-MIL. ISBN: 953-7156-17-6.

VELEUČILIŠTE VELIKA GORICA
UNIVERSITY of APPLIED SCIENCES VELIKA GORICA

Course title: Contact Lenses I

Course Code:
OPT401

Semester:	Lectures + Exercises + Seminar:	Total Hours:	ECTS Credits:
4	2 + 3 + 0	75	7

Course objective:
To train students in the use of the biomicroscope and corneal topographer, to conduct preliminary measurements required for fitting contact lenses, and to understand the materials, manufacturing processes, and corrective effects of contact lenses.

Course content:
History of contact lenses. Classification of contact lenses. Materials used in the production of contact lenses. Manufacturing technology and standards for contact lenses. Examination of the eye using a biomicroscope. Corneal topography. Relationship between the corneal curvature and the contact lens. Anatomical and physiological characteristics of the eye and their influence on lens selection. Steps in contact lens fitting, lens selection, optical calculations, and identification of lens parameters.

General and specific competences (knowledge and skills):
After successfully completing the course, students will be able to assess the appropriateness of using contact lenses for vision correction, determine the type of contact lenses, perform examinations using the biomicroscope and corneal topographer, and measure corneal parameters accurately.

Learning outcomes:
Upon successful completion of the course, students will be able to:
1. Analyse the anterior segment of the eye using a biomicroscope.
2. Measure corneal topography.
3. Determine corneal parameters.
4. Evaluate and select appropriate contact lens parameters based on measurements.

Required literature:
1. Cerovski, B. et al. (2015). Oftalmologija i optometrija. Zagreb: Stega tisak.

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Course title: Contact Lenses II

Course Code:
OPT501

Semester:	Lectures + Exercises + Seminar:	Total Hours:	ECTS Credits:
5	2 + 2 + 0	60	6

Course objective:
To train students in handling, inserting, and removing soft contact lenses; performing preliminary measurements necessary for fitting soft contact lenses; fitting soft contact lenses; and conducting refraction through a contact lens on the eye.

Course content:
Spherical, toric, and multifocal/bifocal soft contact lenses. Videokeratometry. Maintenance of soft contact lenses and regular monitoring of contact lens users. Physical properties of soft contact lenses. Complications related to the fitting and wearing of soft contact lenses and documentation procedures.

General and specific competences (knowledge and skills):
Upon successful completion of the course, students will be able to assess the appropriateness of using soft contact lenses for vision correction, determine the type of soft contact lenses, perform fitting procedures, explain the risks associated with the use and handling of soft contact lenses, and provide guidance on proper and safe lens maintenance as well as the importance of regular eye and lens check-ups.

Learning outcomes:
Upon successful completion of the course, students will be able to:
1. Analyse videokeratometry results.
2. Recommend appropriate soft contact lenses.
3. Evaluate complications arising from fitting or wearing soft contact lenses and propose appropriate solutions.
4. Recommend procedures for the maintenance of soft contact lenses.

Required literature:
1. Cerovski, B. et al. (2015). Oftalmologija i optometrija. Zagreb: Stega tisak.

VELEUČILIŠTE VELIKA GORICA
UNIVERSITY of APPLIED SCIENCES VELIKA GORICA

Course title: Contact Lenses III

Course Code:
OPT601

Semester:	Lectures + Exercises + Seminar:	Total Hours:	ECTS Credits:
6	2 + 2 + 0	60	6

Course objective:
To teach students how to handle, insert, and remove GP (gas permeable) contact lenses, to perform preliminary measurements necessary for fitting GP contact lenses, to fit GP lenses, and to acquire theoretical knowledge of refractive surgical procedures and irregular corneal conditions, as well as possibilities for correction with GP contact lenses.

Course content:
Indications and fitting of spherical, toric, and multifocal/bifocal GP contact lenses. Maintenance of GP contact lenses and regular control of lens wearers. Complications during fitting and wearing GP contact lenses and documentation. Fitting GP lenses for irregular corneas. Fitting after refractive surgical procedures, therapeutic lenses. Orthokeratology.

General and specific competencies (knowledge and skills):
After passing the exam, students will be able to evaluate the justification for the use of GP contact lenses for vision correction, determine the type of GP lenses, fit GP lenses, explain the risks of wearing and maintaining lenses, provide instructions on proper and safe maintenance, and recognize the need for regular eye and lens check-ups. They will also acquire theoretical knowledge about irregular corneal conditions.

Learning outcomes:
After passing this course, students will be able to:
1. Recommend appropriate GP contact lenses.
2. Evaluate GP contact lenses and possible complications during fitting or wearing.
3. Classify contact lenses for irregular corneas.
4. Discuss orthokeratology contact lenses.
5. Recommend proper GP contact lens maintenance.

Required literature:
1. Cerovski, B. et al. Ophthalmology and Optometry, Stega tisak, Zagreb, 2015.

VELEUČILIŠTE VELIKA GORICA
UNIVERSITY of APPLIED SCIENCES VELIKA GORICA

Course title: Mathematics

Course Code:
ZAJ105

Semester:	Lectures + Exercises + Seminar:	Total Hours:	ECTS Credits:
1	2 + 2 + 0	60	6

Course objective:
To adopt a mathematical way of thinking, reinforce the key elements of secondary school mathematics, and acquire the basics of differential and integral calculus as well as fundamentals of vector and matrix calculus.

Course content:
NUMBERS. MATHEMATICAL LANGUAGE. Arithmetic expressions. Algebraic expressions. Equations and their applications. Coordinate system. Sets.
FUNCTIONS. Concept of a function – functional rule, graph, domain, and range. Continuity. Sign of a function. Growth, decrease, and extrema. Inflection points. Limit behavior and the concept of limits.
ELEMENTARY FUNCTIONS. Linear, quadratic, polynomial, and rational functions. Roots and powers. Exponential and logarithmic functions. Trigonometric and inverse trigonometric functions.
DERIVATIVES. Concept and computation of derivatives. Mechanical applications of differentiation.
INTEGRALS. Concept of the indefinite integral and basic rules of integration. Mechanical applications of indefinite integrals. Concept of the definite integral, calculation rules, and mechanical applications.
DIFFERENTIAL EQUATIONS. Basic concepts and the method of separation of variables.
VECTORS. Definition of vectors, vector operations, geometric meaning, and computation.
MATRICES. Systems of linear equations. Matrix algebra and geometry of matrices.

General and specific competencies (knowledge and skills):
Use of mathematical language. Understanding and applying the concept of a function. Knowledge of elementary functions and application of their properties in context. Application of differential and integral calculus to analyze non-uniform processes. Application of differential equations in modeling continuous deterministic processes. Use of vectors in geometry and physics. Use of matrices to solve systems of linear equations and represent affine transformations.

Learning outcomes:
After passing this course, students will be able to:
1. Select and critically evaluate systems of equations in mathematical problem modeling.
2. Select and critically evaluate functions in mathematical problem modeling.
3. Select and critically evaluate derivatives or integrals in mathematical problem modeling.
4. Select and critically evaluate vector expressions in mathematical problem modeling.
5. Select and critically evaluate matrix expressions in mathematical problem modeling.

Required literature:
1. Čulina, B., Zlopaša, S. Mathematics for Technical Colleges, Parts I, II, and III, University of Applied Sciences Velika Gorica, 2010.

Course title: Occupational Medicine

Course Code:
OPT318

Semester:	Lectures + Exercises + Seminar:	Total Hours:	ECTS Credits:
3	2 + 2 + 0	60	4

Course objective:
To acquire knowledge about the role and functions of occupational medicine in protecting workers' health, and to apply that knowledge and related skills in preventing health impairments that may arise from working conditions.

Course content:
Functions and organization of occupational medicine. Structure and function of the human body. Hazards and their harmful effects on health. Mechanisms of action of harmful substances on the human body. Chemical hazards and their health impacts. Physical and biological hazards and their health impacts. Workload and its effects on health. Principles of health risk assessment. Participation in assessing health risks in various industries and professions. Implementation of the national first aid training program — training and practicing first aid procedures for injured workers.

General and specific competencies (knowledge and skills):
Students will acquire knowledge of legal regulations in the field of occupational health protection to enable them to recognize problems in time and find possible solutions related to the impact of work and working conditions on workers' health.

Learning outcomes:
After passing this course, students will be able to:

1. Explain the legal framework and processes in the occupational health protection system.
2. Critically assess the basic features of physiological and pathophysiological functioning of the human body.
3. Evaluate the effects of workplace hazards on the human body.
4. Examine the harmful effects of chemical, physical, and biological agents on human health.
5. Identify the effects of workload on the human body.
6. Assess potential health impairments in specific working conditions.

Required literature:

1. Mustajbegović, J., Milošević, M., Brborović, H. Occupational and Sports Medicine, University of Zagreb, School of Medicine, Zagreb, 2016.
2. Bogadi Šare, A. Occupational Medicine, College of Safety, IPROZ, Zagreb, 2012.
3. Grba-Bujević, M., Tomljanović, B., Bošan-Kilibarda, I., Važanić, D. First Aid Skills for Emergency Services, Croatian Institute for Emergency Medicine, Zagreb, 2015.

VELEUČILIŠTE VELIKA GORICA
UNIVERSITY of APPLIED SCIENCES VELIKA GORICA

Course title: Management and Entrepreneurship

Course Code:
OPT704

Semester:	Lectures + Exercises + Seminar:	Total Hours:	ECTS Credits:
3	2 + 1 + 0	45	3

Course objective:
To acquire knowledge and develop skills that will enable students to successfully initiate and implement their own entrepreneurial and other projects, and to operate according to the principles of economic and social responsibility, whether as future employees or entrepreneurs.

Course content:
Definition of management and its core functions, with emphasis on planning (strategy, vision, mission, SWOT analysis), human resource management, and control (use of individual indices, absolute and relative rates of change). Corporate Social Responsibility (CSR). Entrepreneurship. Marketing strategies (generic strategies) and competitive advantage. Entrepreneurial project — purpose, project structure, and presentation.

General and specific competencies (knowledge and skills):
Development of organizational and entrepreneurial abilities, as well as analytical reasoning, problem-solving, presentation, and teamwork skills. These competencies strengthen the students' ability to create and implement business plans, preparing them for future roles as entrepreneurs or intrapreneurs.

Learning outcomes:
After passing this course, students will be able to:

1. Apply knowledge of planning, human resource management, and control in creating and managing business operations.
2. Calculate and interpret performance indicators for business dynamics (individual indices, absolute and relative rates of change).
3. Diagnose and present business conditions using SWOT or PESTLE analysis.
4. Develop a mission and vision statement and create a marketing strategy for an entrepreneurial idea.
5. Design a project proposal and assemble a team to implement it.
6. Present the project effectively.

Required literature:

1. Belak, V. Management in Theory and Practice, Zagreb: Belak excellens d.o.o., 2015.
2. Golob, B. Innovation from Idea to Market, Rijeka: Dragon d.o.o., 2009. (free e-book, contact: een@bicro.hr

VELEUČILIŠTE VELIKA GORICA
UNIVERSITY of APPLIED SCIENCES VELIKA GORICA

Course title: Neurology

Course Code:
OPT718

Semester:	Lectures + Exercises + Seminar:	Total Hours:	ECTS Credits:
0	2 + 0 + 0	30	3

Course objective:
To familiarize students with the nature, recognition, diagnosis, treatment, and possible consequences of neuro-ophthalmological diseases and conditions that affect vision. To introduce students to the significance and performance of essential neuro-ophthalmological examinations such as testing pupillary reactions, perimetry, and imaging diagnostic methods of the posterior eye segment using specialized instruments.

Course content:
Basics of retinal and optic nerve anatomy. Overview of sensory-motor impairments: optic neuropathies, motor impairments, and the basics of sensory-motor diagnostics. Visual field perception. Characteristics of the human visual system. Differential vulnerability of visual pathways. Optimal conditions for visual field testing. Units of measurement in perimetry. The importance of cooperation during perimetry, the influence of age, pupil size, and background illumination. The significance of adequate optical correction and refractive errors. Accuracy and fixation control. Effects of fatigue and subject experience. Functional visual field defects and adaptation. Principles of computerized perimetry — reliability control, strategies, Octopus programs and phases, visual field display forms, and kinetic perimetry. Imaging diagnostic methods of the posterior eye segment: Optical Coherence Tomography (OCT), fluorescein angiography / OCT angiography, and fundus photography. Optic neuropathies: optic neuritis, ischemic optic neuropathy, toxic, metabolic, and hereditary optic neuropathies, congenital optic nerve anomalies, traumatic optic neuropathy. Oculomotor impairments: diplopia (monocular, binocular, transient, or intermittent), and oculomotor paresis.

General and specific competencies (knowledge and skills):
Students will acquire the ability to independently determine the appropriate optical correction required for visual field testing, to position the client correctly on the testing device, to ensure optimal environmental conditions for testing, and to clearly explain the testing procedure to the client. They will also gain the ability to determine pupil size and shape, and to examine pupillary reactions to light and accommodation. Students will acquire basic knowledge and skills needed to conduct visual field testing using an automatic perimeter and to perform OCT examinations.

Learning outcomes:
After passing this course, students will be able to:
1. Select appropriate optical correction for visual field testing.
2. Assess the optimal environmental conditions for visual field testing.
3. Evaluate the accuracy of client fixation during testing.
4. Demonstrate basic knowledge and skills in conducting automated perimetry.
5. Apply basic knowledge and skills in performing OCT testing.
6. Analyze pupil size and shape, differentiate between pupillary reflexes, and discuss the clinical significance of findings.

Required literature:

1. Cerovski, B. Ophthalmology and Optometry, Textbook for Medical Students, Stega Tisak, Zagreb, 2015.
2. Cerovski, B., Vidović, T. Perimetry, Cerovski: Zagreb, 2018.

VELEUČILIŠTE VELIKA GORICA
UNIVERSITY of APPLIED SCIENCES VELIKA GORICA

Course title: Ophthalmic Optics

Course Code:
OPT203

Semester:	Lectures + Exercises + Seminar:	Total Hours:	ECTS Credits:
2	2 + 4 + 0	90	6

Course objective:
The aim of the course is to provide students with knowledge in ophthalmic optics necessary for understanding and applying concepts in courses such as Refraction and Binocular Vision I–IV, Contact Lenses I–III, Pediatric Refraction and Amblyopia, and Ocular Aging and Refraction.

Course content:
Optical system of the eye – schematic eye according to Gullstrand; cornea – refractive power of anterior and posterior surfaces and total refractive power. Lens – refractive power during accommodation for distance. Vitreous body – composition and refractive index. Refractive power of the optical system of the eye, focal length, positions of principal planes, nodal points, accommodation axis, anatomical axis, and visual axis. Sensitivity to light, light adaptation, and dark adaptation.
Emmetropic eye: image formation in the emmetropic eye, far and near points, refraction at far and near points.
Myopia: refractive and axial myopia, refraction of the myopic eye, far and near points, accommodative amplitude and range, image size, and image construction in a myopic eye.
Hyperopia: refractive and axial hyperopia, refraction of the hyperopic eye, visual acuity, far and near point refraction, accommodative amplitude, image size, refractive deficit, and image construction in the hyperopic eye.
Astigmatic errors: regular and irregular astigmatism, types of astigmatic errors, principal meridians, focal lines, refraction of the astigmatic eye, visual acuity, refractive deficit, far and near point refraction, image size, keratoconus, and its correction.
Accommodation: physiological basis, near and far accommodation, external and internal accommodation, accommodative range, amplitude, required and expended accommodation, image construction in the emmetropic eye for objects at infinity and finite distances, and image size calculations.
Presbyopia: accommodative amplitude in presbyopic eyes, correction methods, optical effects of near-vision spectacles, determination of refractive deficit, working distance with monofocal, bifocal, and trifocal lenses, and image construction in a corrected presbyopic eye.
Aphakia: optical characteristics, far-point refraction, focal length, corrective lenses, retinal image size, near vision in aphakia, correction with spectacles and intraocular lenses (IOLs), fixation possibilities, and IOL fixation types.
Correction of refractive errors: correction of rotationally symmetric errors, astigmatism, and strabismus; vertex distance; retinal image size; accommodation through spectacles; visual field; visual angle; aniseikonia and its correction. Interpretation of the thick lens model—what defines a thick lens in the human eye compared to a thin lens.
Cardinal points: drawing diagrams with focal, principal, and nodal points.

General and specific competencies (knowledge and skills):
Students will acquire essential knowledge of the optics of the human eye, enabling them to predict and calculate image formation in eyes corrected with spectacles, contact lenses, and intraocular lenses. They will understand all types of refractive errors and their optical correction.

Learning outcomes:

After passing this course, students will be able to:

1. Calculate image dimensions formed in the eye.
2. Construct object images depending on viewing distance.
3. Distinguish between different types of spectacle lenses and apply them appropriately.
4. Sketch corrective lenses based on the eye's far-point position.
5. Assess the mechanism of accommodation and the effects of reduced lens accommodation.
6. Evaluate lower-order optical aberrations in ophthalmic optics.

Required literature:

1. Tamajo, E. Physics for Ophthalmic Opticians, University of Applied Sciences Velika Gorica, 2019. ISBN 978-953-7716-85-1
2. Physiological Optics of the Eye for Ophthalmologists and Optometrists, Manualia Societatis, Chirurgia Ophthalmo-cranio-orofacialis Croatica, Zanatgrafika Delnice, 1991.
3. Keating, M. P. Geometric, Physical, and Visual Optics, 2nd ed., Butterworth & Heinemann, 2002.

VELEUČILIŠTE VELIKA GORICA
UNIVERSITY of APPLIED SCIENCES VELIKA GORICA

Course title: Optical and Optometric Instruments

Course Code:
OPT204

Semester:	Lectures + Exercises + Seminar:	Total Hours:	ECTS Credits:
2	2 + 2 + 0	60	5

Course objective:
The aim of the course is to introduce students to optical instruments essential for the courses Refraction and Binocular Vision I–IV, Contact Lenses I–III, Ophthalmic Optics, and Technology of Optical Materials and Frames I.

Course content:
Classification of instruments: subjective and objective; visual field and visual angle.
Microscope: components, image formation, magnification, resolving power, aperture, UV microscopes, ultramicroscopes (Tyndall effect). Schematic representation of the optical systems of microscopes and telescopes of different types. The meaning of refraction and reflection in such instruments.
Telescope: parts and types, image formation, magnification.
Pupillary distance meter: types, components, and working principle.
Lensmeter (lensometer): types, components, and working principle.
Skiaskope (retinoscope): types, components, and working principle.
Keratometer (ophthalmometer): types, components, and working principle.
Refractometer: types, components, and working principle.
Ophthalmoscope: types, components, and working principle.
Phoropter, keratoscope, and biomicroscope: types, components, and working principles.
Perimeter: structure and application.

General and specific competencies (knowledge and skills):
Students will gain essential knowledge of the characteristics and functionality of the instruments used in optometric practice, including correct instrument handling and understanding of safety conditions required for proper operation.

Learning outcomes:
After successfully completing this course, students will be able to:

1. Relate the operating principles of various optical and optometric instruments to their practical applications.
2. Assess the functional characteristics of optical and optometric instruments based on their construction and components.
3. Classify optical and optometric instruments according to their purpose and field of use.
4. Compare the efficiency of different instruments in relation to the type of measurement and accuracy of results.
5. Identify and describe the components of optical microscopes and telescopes and explain their functions.
6. Evaluate the accuracy of optical measurements according to the instrument's purpose and technical capabilities.

Required literature:

1. Tamajo, E. Physics for Ophthalmic Opticians, University of Applied Sciences Velika Gorica, 2019. ISBN 978-953-7716-85-1
2. Cerovski, B., Vidović, T. Perimetry, Cerovski, Zagreb, 2018.
3. Contact Lens Practicum, University of Applied Sciences Velika Gorica, 2022.
4. Eye Refraction Practicum 1, University of Applied Sciences Velika Gorica, 2022.

VELEUČILIŠTE VELIKA GORICA
UNIVERSITY of APPLIED SCIENCES VELIKA GORICA

Course title: Optometric Practice I

Course Code:
OPT405

Semester:	Lectures + Exercises + Seminar:	Total Hours:	ECTS Credits:
4	0 + 4 + 0	60	5

Course objective:
To acquire practical skills and methods for conducting eye examinations on clients under the supervision of a clinical practice instructor.

Course content:
Conducting patient interviews to determine current and past vision problems, family ocular and systemic diseases, and the client's general health status. Measuring objective refraction. Performing and discussing subjective refraction using the following methods: NSL method, cross-cylinder technique, fogging method for cylindrical correction, monocular spherical balancing, binocular spherical balancing, and measurement and correction of heterophorias. Measuring the lens power of existing eyeglasses.

General and specific competencies (knowledge and skills):
Students will develop the ability to communicate effectively with clients, collect detailed visual and medical information, and perform accurate objective and subjective refraction measurements.

Learning outcomes:
After successfully completing this course, students will be able to:
1. Measure intraocular pressure using a non-contact tonometer.
2. Measure refraction and corneal topography using an autorefractor.
3. Interpret and discuss measured refractive errors.
4. Justify the selected method of vision correction.

Required literature:

1. Cerovski, B. et al. Ophthalmology and Optometry – University Textbook, Medicinska naklada, Zagreb, 2015.
2. Cerovski, B. et al. Clinical Optometry – University Textbook, Medicinska naklada, Zagreb, 2013.

VELEUČILIŠTE VELIKA GORICA
UNIVERSITY of APPLIED SCIENCES VELIKA GORICA

Course title: Optometric Practice II

Course Code:
OPT505

Semester:	Lectures + Exercises + Seminar:	Total Hours:	ECTS Credits:
5	0 + 6 + 0	90	7

Course objective:
To further develop and apply previously acquired practical skills through supervised clinical practice with clients in an optometric setting.

Course content:
Taking patient history and identifying the reason for the visit. Measuring objective and subjective refraction. Measuring amplitude of accommodation and determining near addition. Recommending appropriate corrective visual aids for distance and near vision.

General and specific competencies (knowledge and skills):
Students will develop the ability to communicate effectively with clients, collect comprehensive information, and perform accurate objective and subjective refraction measurements.

Learning outcomes:
After successfully completing this course, students will be able to:
1. Measure the client's objective refraction.
2. Measure the client's subjective refraction.
3. Recommend appropriate corrective visual aids for distance vision.
4. Recommend appropriate corrective visual aids for near vision.

Required literature:

1. Cerovski, B. et al. Ophthalmology and Optometry – University Textbook, Medicinska naklada, Zagreb, 2015.
2. Cerovski, B. et al. Clinical Optometry – University Textbook, Medicinska naklada, Zagreb, 2013.

VELEUČILIŠTE VELIKA GORICA
UNIVERSITY of APPLIED SCIENCES VELIKA GORICA

Course title: Optometric Practice III

Course Code:
OPT603

Semester:	Lectures + Exercises + Seminar:	Total Hours:	ECTS Credits:
6	0 + 7 + 0	105	8

Course objective:
To apply previously acquired practical knowledge through hands-on clinical work with clients under the supervision of a practice instructor.

Course content:
Taking patient history and determining the reason for the visit. Performing eye health screening using a biomicroscope and videokeratometer. Measuring corneal topography. Fitting spherical, toric, and multifocal soft and GP contact lenses. Evaluating contact lens fitting. Providing advice on the use, cleaning, disinfection, and maintenance of contact lenses.

General and specific competencies (knowledge and skills):
Students will develop the ability to communicate effectively with clients, collect detailed case histories, and perform precise objective and subjective refraction measurements.

Learning outcomes:
After successfully completing this course, students will be able to:

1. Assess the anterior segment of the eye using a biomicroscope.
2. Independently organize the fitting of contact lenses.
3. Recommend appropriate solutions for the disinfection, cleaning, and maintenance of contact lenses.
4. Select the most suitable visual correction option based on the client's needs.

Required literature:

1. Cerovski, B. et al. Ophthalmology and Optometry – University Textbook, Medicinska naklada, Zagreb, 2015.
2. Cerovski, B. et al. Clinical Optometry – University Textbook, Medicinska naklada, Zagreb, 2013.

VELEUČILIŠTE VELIKA GORICA
UNIVERSITY of APPLIED SCIENCES VELIKA GORICA

Course title: Fundamentals of Anatomy and Physiology

Course Code:
OPT103

Semester:	Lectures + Exercises + Seminar:	Total Hours:	ECTS Credits:
1	3 + 1 + 0	60	5

Course objective:
To acquire fundamental knowledge about the structure and vital functions of the human body in order to provide a foundation for understanding and studying the courses Anatomy and Physiology of the Eye and Basics of General Pathology and Eye Diseases.

Course content:
Organization of the human body. Basics of microscopic anatomy. Skeleton and musculature. Heart and cardiac physiology. Blood and lymphatic vessels, and circulation physiology. Central and peripheral nervous system. Functions of the nervous system. Sensory organs and skin. Respiratory system and its functions. Digestive system and its functions. Urinary and reproductive systems and their functions. Metabolism and energy exchange, fluid balance, vitamins. Blood, blood cells, blood groups, immune system. Endocrine glands and hormones.

General and specific competencies (knowledge and skills):
Mastery of basic concepts of morphology and structure of anatomical systems, organs, and tissues represents the essential knowledge required for further study. Knowledge of anatomy serves as the foundation for subsequent preclinical and clinical subjects necessary for professional work in the field of eye optics.

Learning outcomes:
After successfully completing this course, students will be able to:

1. Describe all human organ systems.
2. Explain the interconnection between anatomical and physiological systems of the human body.
3. Describe the anatomical and physiological relationships between the human eye and other body systems.
4. Assess the role of human anatomy and physiology in the context of biotechnological sciences.
5. Logically evaluate key questions from human anatomy and physiology.
6. Present the role of the nervous system within the overall functioning of the organism.

Required literature:

1. Rotim, K. et al. Anatomy, Zagreb: University of Applied Health Sciences, 2017.

VELEUČILIŠTE VELIKA GORICA
UNIVERSITY of APPLIED SCIENCES VELIKA GORICA

Course title: Fundamentals of Pharmacology

Course Code:
OPT301

Semester:	Lectures + Exercises + Seminar:	Total Hours:	ECTS Credits:
3	2 + 0 + 0	30	3

Course objective:
Students will acquire basic knowledge of pharmacology with a particular focus on the fundamentals of drugs used in the diagnosis and treatment of eye diseases. They will also become familiar with drugs used for other medical conditions that may affect ocular function.

Course content:
Fundamentals of pharmacology; basics of pharmacodynamics and pharmacokinetics; pharmaceutical forms of drugs and methods of administration; principles of pharmacotherapy; drugs specifically used for various eye diseases; drugs used for other diseases that influence eye function; adverse and toxic effects of drugs; drug interactions; basics of clinical drug testing.

General and specific competencies (knowledge and skills):
Students will master fundamental pharmacological concepts and understand the characteristics of different routes of drug administration. They will learn about drugs used in ophthalmology and their potential side effects.

Learning outcomes:
After successfully completing this course, students will be able to:
1. Critically interpret pharmacological terminology.
2. Classify pharmaceutical forms and appropriate methods of administration.
3. Critically assess and justify correct drug and medical product dosage.
4. Identify side effects and drug interactions, especially ocular symptoms.
5. Explain drug and medical product therapy used in the treatment of eye diseases.

Required literature:

1. Čulig, J. Ocular Pharmacology. Klinpharma, Zagreb, 2019.
2. Katzung, B.G. et al. Basic and Clinical Pharmacology, Medicinska naklada, Zagreb, 2011.

Course title: Fundamentals of Physics, Radiology and Radiation Protection

Course Code:
OPT720

Semester:	Lectures + Exercises + Seminar:	Total Hours:	ECTS Credits:
3	2 + 0 + 0	30	3

Course objective:
Students will become familiar with the basic principles of mechanics and statics through examples found in the human body, as well as with the fundamentals of radiological techniques and radiation protection. The course aims to enable students to understand the essential physical principles within the human body as a foundation for comprehending more complex future topics.

Course content:
Force and energy. Hydrodynamics and hydrostatics. Electromagnetic radiation. Radioactivity. Organization of radiation protection in the Republic of Croatia. Radiological devices and techniques used in optometry.

General and specific competencies (knowledge and skills):
Students will acquire knowledge necessary to connect fundamental physical principles with processes in the human body.

Learning outcomes:
After successfully completing this course, students will be able to:
1. Integrate basic principles of mechanics, hydrodynamics, and hydrostatics in relation to the human body.
2. Classify fundamental radiological equipment and explain their application.
3. Interpret radiation protection laws and assess their importance.

Required literature:

1. Brnjas Kraljević, J. Physics for Medical Students. Medicinska naklada, Zagreb, 2001.
2. Janković, S., Eterović, D. Physical Principles and Clinical Aspects of Imaging Diagnostics. Medicinska naklada, Zagreb, 2000.

VELEUČILIŠTE VELIKA GORICA
UNIVERSITY of APPLIED SCIENCES VELIKA GORICA

Course title: Fundamentals of Chemistry and Chemistry of Contact Lenses

Course Code:
OPT302

Semester:	Lectures + Exercises + Seminar:	Total Hours:	ECTS Credits:
3	2 + 1 + 0	45	4

Course objective:
To acquire fundamental knowledge of chemistry as a basis for understanding chemical processes in the human body and pharmacology, and to learn about the chemical processes occurring in contact lenses and in cleaning, disinfection, and storage solutions.

Course content:
Fundamentals of inorganic and organic chemistry. Contact lens materials – key requirements, mixture composition, properties, chemical and physical processes, and their effects on lens surface characteristics. Analysis of processes and determination of materials. Chemistry in contact lenses: deposits, interactions between deposits and microorganisms, cleaning and storage agents, and other components of contact lens solutions. Drug–contact lens interactions. Contact lens solutions and ecology.

General and specific competencies (knowledge and skills):
Students will be able to understand the processes involved in lens production as well as the chemical reactions that occur during lens wear and maintenance.

Learning outcomes:
After successfully completing this course, students will be able to:

1. Identify and explain basic chemical concepts.
2. Correlate causes and effects of chemical changes in matter using information from various sources.
3. Explain the importance of fundamental chemical reactions in the production of contact lenses and present them independently.
4. Recognize the advantages of intermolecular bonding in the creation of polymer materials.
5. Describe different types of chemical bonds in polymer materials.
6. Critically analyze the importance of selecting appropriate cleaning agents for contact lenses through group work.

Required literature:

1. Kalambura, S. Fundamentals of Chemistry and Chemistry of Contact Lenses, Veleučilište Velika Gorica, 2012.
2. Kalambura, S. Peer-reviewed PowerPoint Lectures in Chemistry, Veleučilište Velika Gorica, 2011.

VELEUČILIŠTE VELIKA GORICA
UNIVERSITY of APPLIED SCIENCES VELIKA GORICA

Course title: Fundamentals of General Pathology and Eye Diseases

Course Code:
OPT304

Semester:	Lectures + Exercises + Seminar:	Total Hours:	ECTS Credits:
3	3 + 1 + 0	60	5

Course objective:
To provide students with foundational knowledge of general diseases and eye diseases, enabling them to recognize and distinguish whether visual problems are caused by ocular disease or by refractive and heterophoric errors of a healthy eye.

Course content:
General pathology:
Microbiology – definition and classification; bacteriology, virology, mycology, and parasitology; immunity.
Cell injury and death – causes, mechanisms, and morphology of cell injury; cellular aging.
Inflammation – acute, chronic, purulent, fibrinous, and gangrenous inflammation.
Regeneration mechanisms – cell and connective tissue regeneration; wound healing.
Hemodynamic disorders – edema, hyperemia, anemia, hemorrhage, thrombosis, and shock.
Immune system disorders – cells of the immune system, hypersensitivity reactions, tissue transplantation, autoimmune diseases, and immunodeficiency.
Tumor formation – definition, types, characteristics of benign and malignant tumors, tumor progression, host-tumor interaction.
Genetic and environmental disorders – pollution, chemicals, physical injury, and nutritional diseases.
Systemic diseases – cardiovascular, pulmonary, digestive, hepatic, endocrine, musculoskeletal, and neurological disorders.
Metabolic disorders – of carbohydrates, lipids, proteins, calcium, and pigments.
Eye diseases:
Anamnesis, eye pain, redness, and visual disturbances.
Eye examination techniques: inspection of ocular position and lids, gonioscopy, ophthalmoscopy, visual acuity, accommodation, light and color sensitivity, tonometry, electroretinography, visual evoked potentials, ultrasonography, and radiological imaging.
Eyelids – position, ptosis, inflammation, tumors, trauma.
Lacrimal apparatus – inflammation, tumors, Sjögren's syndrome.
Conjunctiva – inflammation, tumors, cysts, degeneration.
Cornea – inflammation, tumors, degenerations.
Sclera – inflammation, tumors, degenerations.
Uveal tract – inflammation (uveitis, iridocyclitis), and pupillary disorders.
Lens – anomalies, luxation, cataract.
Vitreous body – opacities and hemorrhages.
Retina – inflammation, vascular disorders, degeneration, detachment, tumors, macular degeneration, low vision.
Neuro-ophthalmology – papilledema, optic neuritis, optic atrophy.
Glaucoma – causes, intraocular pressure, and treatment.
Refraction and refractive errors, strabismus.
Orbit – developmental anomalies, inflammation, tumors.
Congenital and genetic eye disorders.
Eye injuries – mechanical, thermal, chemical, and radiation injuries; foreign bodies.
Infectious eye diseases – including trachoma.
Ophthalmic drugs, occupational eye diseases, and ocular protection.

General and specific competencies (knowledge and skills):

Students will acquire essential knowledge of general pathological processes and eye diseases, enabling them to distinguish whether visual disturbances are caused by ocular disease or refractive/heterophoric errors of a healthy eye.

Learning outcomes:

After successfully completing this course, students will be able to:

1. Assess pathological conditions and eye diseases.
2. Differentiate physiological from pathological changes of the eye.
3. Classify eye diseases that affect vision and visual acuity.
4. Classify eye diseases that cause refractive errors.
5. Identify ocular changes requiring ophthalmologic evaluation and monitoring.
6. Prioritize eye diseases that require ophthalmologic treatment.

Required literature:

1. Teaching materials available on the Gaudeamus platform.

VELEUČILIŠTE VELIKA GORICA
UNIVERSITY of APPLIED SCIENCES VELIKA GORICA

Course title: Fundamentals of Law and Legal Regulations

Course Code:
OPT706

Semester:	Lectures + Exercises + Seminar:	Total Hours:	ECTS Credits:
0	2 + 1 + 0	45	3

Course objective:
To interpret, understand, and apply laws and legal regulations relevant to performing activities in the field of eye optics and managing a commercial enterprise or optical business. Students will become familiar with and learn to apply basic patient rights, enabling them to understand the complexity of administrative and legal procedures in exercising those rights, both from the perspective of the patient and the service provider.

Course content:
Introduction to law – the concept of legal norms, legal subjects, legal, business, and procedural capacity, legal science, and the practical application of legal regulations.
Constitutional rights and freedoms of citizens.
Fundamentals of property law and real rights.
Employment law – rights and obligations arising from employment relationships.
Protection of patients' rights and the application of these laws in real-life professional situations.

General and specific competencies (knowledge and skills):
Upon successful completion of the course, students will gain knowledge necessary to understand the application of legal regulations, both as employees or employers, and as providers or recipients of healthcare services.

Learning outcomes:
After successfully completing this course, students will be able to:
1. Identify situations that require legal or administrative decision-making.
2. Define necessary actions and procedures while considering the competencies of all entities involved in healthcare service provision.
3. Manage and organize their own business (trade or limited liability company) and cooperate with other legal entities.
4. Determine the normative framework for providing healthcare services within the system.

Required literature:

1. Zakon o zdravstvenoj zaštiti (Law on Health Care), NN 100/2018
2. Fatović-Ferenčić, S., Tucak, A. (eds.) Medicinska etika, Medicinska naklada, Zagreb, 2011.
3. Ustav Republike Hrvatske (Constitution of the Republic of Croatia)
4. Zakon o zaštiti prava pacijenata (Law on the Protection of Patients' Rights)

Course title: Refraction in Childhood and Amblyopia

Course Code:
OPT404

Semester:	Lectures + Exercises + Seminar:	Total Hours:	ECTS Credits:
4	1 + 1 + 0	30	3

Course objective:
To provide students with fundamental knowledge about the development of the child's eye, the anomalies and deviations that occur during the development of the eye and binocular vision, and the tests and techniques used for vision correction. Students will learn to detect, assess, and explain deviations from normal eye and vision development.

Course content:
Development of the eye: normal prenatal and postnatal development; anomalies during prenatal development. Objective measurements of ametropia. Measuring visual acuity adapted to children. Measuring accommodation. Binocular vision testing. Color vision testing. Visual aids for children. Requirements for children's spectacles. Fitting contact lenses in children. Aids for low vision. Treatment of secondary anomalies. Amblyopia. Fixation disorders. Treatment of abnormal retinal correspondence. Treatment of fusion and accommodation deficiencies. Treatment of paralytic strabismus. Nystagmus.

General and specific competencies (knowledge and skills):
Students will acquire knowledge about the normal development of the eye and vision in children and will be able to assess deviations from normal development, as well as understand and apply techniques for the correction of visual irregularities.

Learning outcomes:
After successfully completing this course, students will be able to:
1. Examine the development and epidemiology of refractive errors in children
2. Evaluate binocular vision, its development, and quality
3. Select appropriate procedures for measuring visual acuity in children
4. Compare and describe concomitant and paralytic strabismus
5. Assess the causes of amblyopia and define its clinical features
6. Evaluate nystagmus

Required literature:

1. Cerovski, B., et al. Ophthalmology and Optometry, Zagreb: Stega tisak, 2015.
2. Cerovski, B., et al. Clinical Optometry, Zagreb: Stega tisak, 2013.

Course title: Refraction and Binocular Vision I

Course Code:
OPT303

Semester:	Lectures + Exercises + Seminar:	Total Hours:	ECTS Credits:
3	2 + 5 + 0	105	7

Course objective:
To familiarize students with basic refraction procedures and to develop their monocular refraction skills.

Course content:
Basic concepts and definitions. Visual acuity and optotypes. Visual acuity curves. The ametropic eye – myopia, hyperopia, astigmatism. Visual acuity and ametropia. Color vision. Subjective refraction: determination of the best spherical lens (BSL), determination of astigmatism using the cross-cylinder (CC) and the cylindrical blur method (CBM). Vertex and cylindrical effect calculation. Objective refraction: autorefraction and retinoscopy.
General and specific competencies (knowledge and skills):
Students acquire the ability to independently assess visual acuity (visus), convert visual acuity data for visus chart construction, and determine spherical and astigmatic correction values using both objective and subjective principles.

Learning outcomes:
After successfully completing this course, students will be able to:
1. Identify refractive errors of the eye (myopia, hyperopia, astigmatism)
2. Propose subjective methods for determining monocular correction for myopia, hyperopia, and astigmatism
3. Select appropriate objective methods for assessing visual acuity
4. Examine and interpret color vision

Required literature:

1. Cerovski, B., et al. Clinical Optometry, Medicinska naklada, Zagreb, 2013.
2. Cerovski, B., Drugović, S., Domnik, M. Refraction Practice 1, University of Applied Sciences Velika Gorica, 2022.

Course title: Refraction and Binocular Vision II

Course Code:
OPT423

Semester:	Lectures + Exercises + Seminar:	Total Hours:	ECTS Credits:
4	2 + 3 + 0	75	5

Course objective:
To familiarize students with the principles of analysis and correction of binocular vision.

Course content:
Binocular vision. Procedures for binocular balancing. Ocular motility, heterophoria, heterotropia, fixation disparity. Testing of ocular motility. Stereoscopic vision. Methods for measuring heterophoria. The MKH (Measuring and Correcting Methodology according to Haase) procedure and correction.

General and specific competencies (knowledge and skills):
Students will acquire the ability to detect abnormalities of the oculomotor system, differentiate between heterophoria and heterotropia, and master the procedures for binocular balancing and achieving refractive equilibrium. They will understand the function of stereoscopic vision and gain the ability to perform related tests. Students will also develop skills for measuring heterophoria and heterotropia using different tests and for distinguishing motor and sensory compensation of heterophoria through specific procedures.

Learning outcomes:
After successfully completing this course, students will be able to:
1. Examine binocular vision and balance
2. Evaluate ocular motility
3. Classify heterophoria and heterotropia
4. Determine the presence of heterophoria and heterotropia

Required literature:

1. Cerovski, B., et al. Clinical Optometry, Medicinska naklada, Zagreb, 2013.
2. Refraction Practice 1, University of Applied Sciences Velika Gorica, 2022.

Course title: Refraction and Binocular Vision III

Course Code:
OPT502

Semester:	Lectures + Exercises + Seminar:	Total Hours:	ECTS Credits:
5	2 + 3 + 0	75	6

Course objective:
To introduce students to the principles of analysis and correction of near vision.

Course content:
Accommodation; measurement and calculation of the maximum accommodative effect. Convergence and its components. Determination of near addition and accommodative balance. Near vision astigmatism. Prismatic correction for near vision. Additional procedures for near vision analysis: MEM dynamic retinoscopy, fused cross-cylinder, von Graefe test. Graphical analysis, prismatic correction rules according to Sheard and Percival, AC/A ratio determination, alternative spherical correction. Special anomalies of binocular vision. Anisometropia. Aniseikonia – measurement and calculation.

General and specific competencies (knowledge and skills):
Students will understand the functioning of accommodation and the principles of its measurement. They will learn and master procedures for determining near vision correction. They will be able to use graphical analysis to resolve complex binocular vision problems and to measure and calculate iseikonic lenses in cases of aniseikonia.

Learning outcomes:
After successfully completing this course, students will be able to:
1. Assess accommodative function
2. Recommend an appropriate near addition
3. Evaluate prismatic correction
4. Analyze anisometropia and aniseikonia
5. Critically evaluate binocular vision anomalies

Required literature:

1. Cerovski, B., et al. Clinical Optometry, Medicinska naklada, Zagreb, 2013.
2. Refraction Practice 2, University of Applied Sciences Velika Gorica, 2022.

Course title: Refraction and Binocular Vision IV

Course Code:
OPT602

Semester:	Lectures + Exercises + Seminar:	Total Hours:	ECTS Credits:
6	1 + 3 + 0	60	5

Course objective:
To introduce students to the integration of refraction procedures into a comprehensive examination of visual function and the differentiation of approaches based on various client case histories. To develop communication skills in discussing professional dilemmas and practical cases.

Course content:
Contrast vision function and contrast sensitivity testing. Night myopia and its testing. Refractive effects of ocular pathology. Procedures for analyzing visual function and ruling out ocular pathology. High ametropia. Low vision. Procedures in refractive surgery. Progressive lenses.

General and specific competencies (knowledge and skills):
Students will develop the ability to integrate findings from individual examination procedures into a unified vision correction solution. They will understand the function and measurement of contrast and night vision and will be able to perform lens centering. They will also understand binocular difficulties caused by incorrect lens centering and acquire the ability to detect abnormal ocular conditions using diagnostic exclusion tests.

Learning outcomes:
After successfully completing this course, students will be able to:
1. Assess contrast vision
2. Evaluate refractive effects of ocular pathology
3. Detect abnormal ocular conditions using diagnostic exclusion tests
4. Discuss refractive surgery procedures

Required literature:

1. Cerovski, B., et al. Clinical Optometry, Medicinska naklada, Zagreb, 2013.
2. Refraction Practice 2, University of Applied Sciences Velika Gorica, 2022.

Course title: Aging and Refraction of the Eye

Course Code:
OPT503

Semester:	Lectures + Exercises + Seminar:	Total Hours:	ECTS Credits:
5	1 + 1 + 0	30	3

Course objective:
To review prior knowledge from Anatomy and Physiology of the Eye, Basics of General Pathology and Eye Diseases, and Refractive Systems. The course aims to highlight the processes of development and aging in different ocular structures, presenting these changes within the clinical framework of age-related eye conditions. Special attention is given to vision correction in older adults and the conditions that contribute to better visual function in later life.

Course content:
The course examines how aging affects each part of the eye, along with an evaluation of natural visual changes occurring prior to the aging process. It connects knowledge from ergo-ophthalmology to the needs of elderly individuals. Emphasis is placed on refraction in older age, with particular focus on concurrent retinal changes such as macular degeneration. Age-related changes of the eyelids and surrounding ocular structures are also studied.

General and specific competencies (knowledge and skills):
Upon completion, students will be able to apply appropriate optical corrections for older individuals, recognize age-related changes in the eye and its adnexa, and distinguish them from pathological conditions.

Learning outcomes:
After successfully completing this course, students will be able to:
1. Recommend appropriate visual correction and optical aids for elderly patients
2. Correlate aging-related changes in ocular adnexa with systemic aging
3. Assess age-related changes in the eye that lead to optical alterations and reduced vision
4. Differentiate between age-related ocular changes and pathological eye conditions
5. Evaluate ocular changes caused by UVA and UVB radiation

Required reading:
1. Cerovski, B., et al. Ophthalmology and Optometry, Stega tisak, Zagreb, 2015.

VELEUČILIŠTE VELIKA GORICA
UNIVERSITY of APPLIED SCIENCES VELIKA GORICA

Course title: Statistics

Course Code:
OPT109

Semester:	Lectures + Exercises + Seminar:	Total Hours:	ECTS Credits:
6	2 + 1 + 0	45	5

Course objective:
To introduce students to the fundamental concepts and methods of statistics and to develop skills for applying statistical techniques in the field of optics.

Course content:
Introduction: Population, random sample, and random phenomena.
Probability models: Random events and probability.
Variables: Concept and classification. Discrete variables. Binomial variable. Continuous variables. Normal variable.
Two categorical variables: Joint, marginal, and conditional distributions.
Two quantitative variables: Linear model, correlation, and regression.
Random sample: Point estimates, plug-in model.
Inferential statistics: Interval estimation of the expected value. Hypothesis testing for the expected value. Hypothesis testing for distribution. Hypothesis testing for the independence of two variables. Hypothesis testing for the difference between the means of two quantitative variables. Linear model – model testing and interval estimation of predictions.

General and specific competencies (knowledge and skills):
Ability to understand and apply statistical concepts and methods in practice.

Learning outcomes:
After successfully completing this course, students will be able to:
1. Critically evaluate the results of statistical analyses
2. Select and critically assess a probabilistic model in mathematical problem modeling
3. Select and critically assess interval estimation of parameters in mathematical problem modeling
4. Select and critically assess hypothesis testing in mathematical problem modeling

Required literature:
1. Čulina, B., Čulina, D. Elementary Probability and Statistics Using Excel, Velika Gorica University of Applied Sciences, 2010.

VELEUČILIŠTE VELIKA GORICA
UNIVERSITY of APPLIED SCIENCES VELIKA GORICA

Course title: Technology of Optical Materials and Frames I

Course Code:
OPT402

Semester:	Lectures + Exercises + Seminar:	Total Hours:	ECTS Credits:
4	2 + 2 + 0	60	5

Course objective:
To provide students with knowledge of modern spectacle frames and lenses, enabling them to apply optical aids efficiently while gaining a solid theoretical foundation for their use. The course also aims to encourage self-education and continuous learning through professional literature in the field of optical materials and frame technology.

Course content:
Definition and classification of technical materials. Metallic materials and alloys (iron, copper, aluminum, zinc, tin, titanium, chromium, lead, special materials, requirements for metal frames, precious metals, gold doublet, galvanic coating). Polymeric and natural materials for frames (definitions and classifications, plastomers and duromers). Recognition of materials and frames by manufacturing type. Composite materials (definition, classification, properties, and applications).
Materials for organic spectacle lenses: coating of organic lenses, organic glass with reduced reflection. Glass: glass state, optical properties, production of glass for mineral lenses, materials for mineral glasses, coating of mineral lenses, hardening of mineral lenses. Materials for contact lenses: rigid (shape-stable) and soft materials, contact lens manufacturing, maintenance, and hygiene (soft and hard lenses).
Testing techniques: length, surface, marking, and labeling. Shaping through joining and bonding: machining of metals and polymers, manual glass edge processing. Assembly: screw and rivet joints, soldering materials. Grinding technology with diamond wheels: types and properties of diamond wheels, automatic grinding machines, mold plates, grinding profiles, care, and cooling. Other devices and materials: ultrasonic cleaners, frame heating devices.

General and specific competencies (knowledge and skills):
Students will be able to identify different materials, use tables, technical documentation, and standards. They will understand the properties and characteristics of primary material types and their practical application in optical workshops and laboratories.

Learning outcomes:
After successfully completing this course, students will be able to:
1. Assess the properties of technical materials and their suitability for the production of optical lenses and frames
2. Classify technical materials based on composition, structure, and functional properties
3. Analyze the structure and characteristics of technical materials used in optics
4. Relate types of technical materials to appropriate manufacturing processes
5. Evaluate technical and functional criteria when selecting materials for optical lenses and frames
6. Compare manufacturing processes for frames and lenses based on the materials used

Required literature:
1. Hrvatska enciklopedija, Leksikografski zavod Miroslav Krleža, www.enciklopedija.hr

VELEUČILIŠTE VELIKA GORICA
UNIVERSITY of APPLIED SCIENCES VELIKA GORICA

Course title: Introduction to Professional and Scientific Work

Course Code:
OPT605

Semester:	Lectures + Exercises + Seminar:	Total Hours:	ECTS Credits:
6	2 + 1 + 0	45	3

Course objective:
This course is intended for students who wish to acquire the necessary skills and knowledge for writing professional and scientific papers, particularly their final thesis. The aim is to familiarize students with the basic principles of searching for and critically evaluating professional and scientific literature, academic reading and writing, and scientific research. Additionally, the course prepares students to design, write, and defend their final thesis proposal and final thesis.

Course content:
Fundamental principles of the philosophy of science and scientific research. Specific research methods and examples applicable in optometry, vision science, and related fields. Experimental, quasi-experimental, and non-experimental research designs. Correlational studies. Surveys, interviews, and focus groups. Ethical aspects of research. Rules and guidelines for preparing and defending the final thesis. Structure and content of research and review papers. Academic communication and academic writing style. Literature search and selection of relevant sources. Prevention of plagiarism. Source referencing: citation, paraphrasing, and interpretation of literature. Preparation and defense of one's final thesis proposal, communication with mentors.

General and specific competencies (knowledge and skills):
- Understanding of fundamental scientific concepts, methods, and techniques, with emphasis on their application in optometry, vision science, and related disciplines.
- Ability to search for and critically evaluate scientific and professional sources.
- Proficiency in professional written and oral expression, including proper source referencing.
- Knowledge of procedures for proposing, writing, and defending the final thesis applicable in professional and scientific communication (e.g., publishing papers, presenting at conferences).

Learning outcomes:
After successfully completing this course, students will be able to:
1. Explain the fundamental concepts, principles, methods, and techniques of science necessary for understanding professional and scientific literature in optometry, vision science, and related fields.
2. Critically evaluate the relevance of searched literature for the chosen final thesis topic.
3. Apply academic writing principles and correct referencing in professional and scientific papers through the development of a final thesis proposal.
4. Propose a topic for their final thesis, including structure, abstract, and relevant literature from the selected professional area.
5. Justify the proposed thesis topic with appropriate arguments.

Required literature:

1. Čendo Metzinger, T., & Toth, M. (2020). Metodologija istraživačkog rada za stručne studije. Veleučilište Velika Gorica.
2. URL

VELEUČILIŠTE VELIKA GORICA
UNIVERSITY of APPLIED SCIENCES VELIKA GORICA

Course title: Occupational Safety

Course Code:
OPT707

Semester:	Lectures + Exercises + Seminar:	Total Hours:	ECTS Credits:
0	2 + 1 + 0	45	3

Course objective:
To familiarize students with occupational safety regulations, potential hazards and harmful factors in the work environment, and methods of protection against them.

Course content:
Organization and implementation of occupational safety. Employer obligations in occupational safety (risk assessment, fire protection, first aid in the workplace, inspection of machines and equipment, testing of microclimatic conditions in the work environment, employee education and training, safety signs and safety instructions, occupational safety documentation).

General and specific competencies (knowledge and skills):
By mastering the content of this course, students acquire the knowledge and skills necessary for every employer (entrepreneur or craftsman) to comply with the Occupational Safety Act and related regulations.

Learning outcomes:
After successfully completing this course, students will be able to:
1. Evaluate the implementation of occupational safety within an organization
2. Apply occupational safety legislation in small-scale organizations
3. Analyze key factors that threaten human life and health
4. Develop and present a workplace risk assessment
5. Interpret the results of a risk assessment and create an action plan to eliminate hazards

Required literature:
1. Zakon o zaštiti na radu (Occupational Safety Act) – Official Gazette NN 71/14, 118/14, 94/18, 96/18

Course title: Final Thesis

Course Code:
OPT604

Semester:	Lectures + Exercises + Seminar:	Total Hours:	ECTS Credits:
6	0 + 6 + 0	90	8

Course Objectives:
The final thesis demonstrates the student's professional knowledge and independence in work.

Course Content:
Preparations for the final thesis include literature collection, basic computer skills, introduction to professional and scientific work, ethical principles in research, and critical evaluation (10 hours). The preparation and writing of the final thesis account for 80 hours.

General and Specific Competencies (Knowledge and Skills):
Students will evaluate the assigned topic area, independently collect literature in Croatian and English, write the final thesis in standard Croatian with an abstract in English.
They will independently present their work before the examination committee, answer questions, and demonstrate understanding of the professional field covered in the thesis as well as the broader study program content.

Learning Outcomes:
Upon completion of this course, students will be able to:
1. Define a professional problem and the structure of a written professional paper.
2. Use relevant literature concerning the selected final thesis topic.
3. Apply citation and referencing rules in academic writing.
4. Present ideas and professional/scientific findings from the selected field through written work.
5. Demonstrate presentation skills during the final thesis defense.

Required literature:

1. M. Marušić. Introduction to Scientific Work in Medicine. Medicinska naklada, Zagreb, 2013.
2. Regulations on Final and Graduate Thesis, University of Applied Sciences Velika Gorica.
3. Guidelines for the Preparation and Defense of Final and Graduate Theses, University of Applied Sciences Velika Gorica.

VELEUČILIŠTE VELIKA GORICA
UNIVERSITY of APPLIED SCIENCES VELIKA GORICA

Course title: Health Psychology

Course Code:
OPT701

Semester:	Lectures + Exercises + Seminar:	Total Hours:	ECTS Credits:
0	1 + 1 + 0	30	3

Course Objectives:
To acquire knowledge of psychology for application in the protection and promotion of health when working with clients.

Course Content:
General introduction to psychology. Common misconceptions and myths about psychology. Health psychology: definition, application of psychological knowledge and skills in health promotion, disease treatment, and rehabilitation. Application of the biopsychosocial approach to improve the effectiveness of health practice. Communication between professionals and patients – informational and therapeutic communication, conflict resolution. Stress and physical health – the influence of psychological states on physical illness, coping, and social support. Psychology of pain: psychological mechanisms and factors influencing pain. Eye health, visual impairments, and related psychological difficulties.

General and Specific Competencies (Knowledge and Skills):
Knowledge:
- Understanding of the biopsychosocial model of health.
- Knowledge of communication dynamics and verbal/nonverbal communication in healthcare.
- Understanding the relationship between stress and physical health, and coping mechanisms.
- Principles of empathy and ethical approaches to clients.
- Knowledge of psychosocial factors that contribute to health and disease outcomes in general and in eye health and vision.

Skills:
- Explain the interrelation of biological, psychological, and social factors determining health or disease outcomes.
- Communicate independently and responsibly with clients and colleagues, contributing to a professional atmosphere.
- Independently assess the need for stress prevention and provide support to clients in stressful situations.
- Act professionally and responsibly, focusing on client well-being.
- Recognize psychosocial factors influencing general health, eye health, and visual quality.

Learning Outcomes:
Upon completion of this course, students will be able to:
1. Explain the biopsychosocial approach to health and illness.
2. Analyze psychological factors affecting communication quality in healthcare and apply appropriate communication forms with colleagues and clients in optometric practice.
3. Analyze the relationship between stress, coping, and physical health.
4. Self-assess and apply a professional and empathetic approach to clients during optometric diagnostic and measurement procedures, aiming to reduce pain and discomfort and ensure a positive client experience.
5. Explain the influence of psychosocial factors on health and illness, emphasizing the connection between psychological states, eye health, and visual quality.

Required Reading:

1. Havelka Meštrović, A. & Havelka, M. (2020). Health Psychology: Psychosocial Foundations of Health. Jastrebarsko: Naklada Slap.