



The European Council of Optometry and Optics

**The European Diploma in Optometry
Syllabus, learning outcomes and
clinical/practical competencies**

October 2017

Competencies reviewed 2021

Learning outcome and clinical/practical competencies

Regarding leaning outcomes:

Learning outcomes can be written in many different ways and are often based on a pedagogical platform.

One of the most commonly used platforms or pedagogical taxonomies is the SOLO-taxonomy developed by Biggs and Collins (1999).

Within the SOLO-taxonomy progression in learning outcome is divided into five levels:

- 1) The student misses the point,
- 2) The student is able to identify and perform simple procedures within the area,
- 3) In addition to level 2, the student is able to name, describe, and combine topics within the area,
- 4) In addition to level 2 and 3, the student is able to compare, differentiate, explain connections, make an analysis, and put into practice the topics within the area, and
- 5) In addition to level 2, 3, and 4, the student is able to come up with new theories and hypostasis, make a general statement, and reflect about topics within the area.

In higher education, like reaching the European Diploma, the student should reach level 4 or 5 within all areas/subjects.

ATTENTION: The suggested number of European Credit Transfer and Accumulation points (ECTS) are based on a curriculum of 180 ECTS and **DOES NOT** include clinical training. These credits are based on the ECTS points of several accredited optometric institutions and serve as an indication. Furthermore, the suggested points intentionally do not add up to 180 ECTS to allow academic institutions to tailor their programme to country-specific necessities and specialisations. ECTS credits express the volume of learning and workload on the defined learning outcome for students. In most countries, 60 ECTS reflect the learning outcomes and associated workload of a full-time academic year or its equivalent. Depending on the country, **one ECTS credit point** can equal on average between **25 and 30 study hours**.

Changes regarding earlier versions of the syllabus, learning outcomes and clinical/practical competencies:

- This revised version of the syllabus, learning outcomes and clinical/practical competencies includes a recommendation for a minimum of European Credit Transfer and Accumulation points (ECTS) per subject (encompassing theoretical knowledge and the clinical/practical skills) based on a curriculum of 180 ECTS exclusive of clinical training
- Section **Investigative Techniques** was split in **Investigative Techniques Part B** and **Investigative Techniques Part C** reflecting a better representation of the scope of practices in Europe and allowing optimisation of partial accreditation.
- Updating of topics and competencies to be covered
- Addition of Integral Competencies (communication and professional conduct) to the diploma

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Overview of suggested ECTS credits per subject			
Part	Subject #	Subject name	ECTS
A	1	Geometrical Optics	6
A	2	Physical Optics	4
A	3	Visual Optics	2
A	5	Optical Appliances	12
A	6	Occupational Optics	2
		Total part A	26
C	4	Visual Perception	3
B	7	Visual Development and Aging	9
B	8	Refraction	12
B	9	Low Vision	3
B	10	Ocular Motility and Binocular Vision	9
B	11	Contact Lenses	12
B	12B	Investigative Techniques	4
B	13	Paediatrics	3
B	14B	Refractive surgery Part B	1
		Total part B	56
C	12C	Investigative Techniques	8
C	14C	Refractive Surgery Part C	1
C	15	General Anatomy and Histology	3
C	16	Neuroscience	3
C	17	General Physiology and Biochemistry	3
C	18	General Microbiology and Immunology	3
C	19	General Pharmacology	6
C	20	Pathology and General Medical Disorders	12
C	21	Epidemiology and Biostatistics	3
C	22	Ocular Anatomy and Physiology	9
C	23	Ocular Pharmacology	6
C	24	Abnormal Ocular Conditions	12
		Total part C	69
D	25	Communication	2
D	26	Professional Conduct	1
		Total Integral Competencies	3
		Total ECTS all parts	154

A.

PART A

Optics and Optical Appliances

A.1. PART A: Knowledge base for the European Diploma competencies.

A.1.1. Subject 1: Geometrical Optics

Suggested ECTS: 6

Learning outcomes: The candidates should demonstrate fundamental knowledge and insight into geometrical optics in order for the candidate to be able to understand, explain, and solve problems related to the eye and optical instruments/lenses, their function and correction. Knowledge and understanding should be demonstrated in the areas of: (1) refraction at single spherical or plane surfaces, (2) thin lenses, (3) thick lenses, (4) aberrations, (5) apertures, (6) spherо-cylindrical lenses, (7) thin prisms, (8) prismatic effect, and the manipulation of lens form and setting to obtain the desired control of prismatic effect, (9) mirrors, and (10) ophthalmic and optical instruments. The aim is to achieve knowledge of the fundamentals of geometrical optics and how they apply to the human eye.

Learning outcomes	Details of how* and where this is delivered in the programme? <i>*theoretical/practical/self-directed</i>	Contribution of this component to Credit weighting?	Method of assessment?
(1) refraction at single spherical or plane surfaces			
(2) thin lenses			
(3) thick lenses			
(4) aberrations			
(5) apertures			
(6) spherо-cylindrical lenses			
(7) thin prism			
(8) prismatic effect, and the manipulation of lens form and setting to obtain the desired control of prismatic effect			
(9) mirrors			
(10) ophthalmic and optical instruments			

A.1.1.1. Subject 1: Geometrical Optics - Topics to be covered to achieve these learning outcomes:

A.1.1.1.1. Refraction at single spherical or plane surfaces

- Curvature and sagitta
- Refractive index and rectilinear propagation
- Vergence and dioptric power
- Object-image relationships, including apparent depth
- Ray tracing, nodal point, and nodal ray
- Lateral (translinear) and angular magnification
- Snell's law of refraction

A.1.1.1.2. Thin lenses

- Vergence: dioptric and effective power
- Object-image relationships
- Lateral (translinear) and angular magnification
- Thin lens systems
- Prismatic effect (Prentice's rule and prism effectivity)
- Ray tracing, optical centre, and optic axis

A.1.1.1.3. Thick lenses

- Cardinal points
- Vertex power and equivalent power
- Lateral (translinear) and angular magnification
- Reduced systems

A.1.1.1.4. Aberrations

- Spherical
- Gamma
- Oblique astigmatism
- Curvature of field
- Distortion
- Chromatic (longitudinal and lateral)
- Higher order aberrations

A.1.1.1.5. Apertures

- Entrance and exit pupil size and location
- Depth of focus, depth of field, hyperfocal distance
- Field of view and half illumination

A.1.1.1.6. Sphero-cylindrical lenses

- Location of foci, image planes, principal meridians, and circle of least confusion
- Obliquely crossed spherocylindrical lenses
- Transposition
- Prismatic effect

A.1.1.1.7. Thin prisms

- Unit of measurement (prism dioptre)
- Prism deviation
- Combination of thin prisms
- Resolution of an oblique prism into horizontal and vertical components
- Total internal reflection

A.1.1.1.8. Mirrors

- Planar and spherical reflection
- Proportion of light reflected from a surface (Fresnel's law)

- Focal power, foacal length, and curvature
- Object-image relationships
- Magnification
- Lens / mirror systems
- Ray tracing

A.1.1.1.9. Ophthalmic and optical Instruments

- Direct and indirect ophthalmoscopes
- Retinoscope
- Focimeter
- Biomicroscope (Slit-lamp microscope)
- Radioscope (Microspherometer)
- Keratometer (Ophthalmometer)
- Diagnostic lenses (gonioscopic, fundus, etc.)

A.1.1.1.10. Wavefront technology

A.1.2. Subject 2: Physical Optics

Suggested ECTS: 4

Learning outcomes: The candidates should demonstrate fundamental knowledge and insight into physical optics in order for the candidate to be able to understand, explain, and solve problems related to the eye and optical instruments/lenses, their function and correction. Knowledge and understanding should be demonstrated in the areas of: (1) wave optics and aberrations, (2) interaction of light on matter, (3) polarization, (4) transmission through successive polarizers, (5) image quality, (6) diffraction and interference. The aim is to achieve knowledge of the fundamentals of physical optics and how they apply to the human eye.

Learning outcomes	Details of how* and where this is delivered in the programme? <i>*theoretical/practical/self-directed</i>	Contribution of this component to Credit weighting?	Method of assessment?
(1) wave optics and aberrations,			
(2) interaction of light on matter,			
(3) polarization,			
(4) transmission through successive polarizers, and			
(5) image quality			
(6) diffraction and interference			

A.1.2.1. Subject 2: Physical Optics - Topics to be covered to achieve these learning outcomes:

A.1.2.1.1. Wave optics and aberrations

- Characteristics of wave motion
- Classifications of the electromagnetic spectrum
- Total and partial coherence
- Diffraction (single slit, circular aperture, limits of resolution, zone plates)
- Interference (double slit, multiples slits, thin film, antireflective coatings, holography)
- Scattering (Rayleigh compared to Tyndall)
- Dispersion

A.1.2.1.2. Interaction of light and matter

- Atomic energy levels, absorption and emission line spectra
- Continuous spectra
- Fluorescence (photons, energy levels)
- Lasers (theory of operation, speckle pattern)
- Spectral transmission
- Light emitting diodes (LED)

A.1.2.1.3. Polarization

- Linear polarized light
- Circular and elliptical polarization
- Polarization by reflection (glare reduction, Brewster's law)
- Effect of scattering on polarization
- Transmission through successive polarizers (stress analysis, Malus' law)

A.1.2.1.4. Image quality

- Resolving power
- Point and line spread function
- Modulation transfer function (Fourier optics)

A.1.3. Subject 3: Visual Optics

Suggested ECTS: 2

Learning outcomes: The candidates should demonstrate fundamental knowledge and insight into visual optics in order for the candidate to be able to understand, explain, and solve problems related to image formation, both qualitative and quantitative, for the candidate to investigate the optics of the human visual system and refractive correction. Knowledge and understanding should be demonstrated in the areas of: (1) schematic eye models, (2) dioptrics of the eye, (3) entopic phenomena, (4) quality of retinal image, (5) radiation and the eye, (6) eye protection regulations, and relevant standards.

Learning outcomes	Details of how* and where this is delivered in the programme? <i>*theoretical/practical/self-directed</i>	Contribution of this component to Credit weighting?	Method of assessment?
(1) schematic eye models,			
(2) dioptrics of the eye,			
(3) entopic phenomena,			
(4) quality of retinal image,			
(5) radiation and the eye,			
(6) eye protection regulations, and relevant standards.			

A.1.3.1. Subject 3: Visual Optics - Topics to be covered to achieve these learning outcomes:

A.1.3.1.1. Schematic eye models

- Dioptric components
- Cardinal points, entrance and exit pupils
- Ametropia: far point, near point, correction
- Accommodation: amplitude and effectivity
- Astigmatism, including correction
- Retinal image size, spectacle magnification, and relative spectacle magnification

A.1.3.1.2. Dioptrics of the eye

- Characteristics of components (curvature, thickness, separation, refractive indices, and axial length)
- Reference angles and axes
- Catoptric (Purkinje) images
- Retinal image size
- Optical function of the pupil

A.1.3.1.3. Quality of retinal image

- Aberrations (spherical, chromatic, coma, curvature, oblique astigmatism, distortion)
- Diffraction
- Stray light
- Point and line spread functions

A.1.3.1.4. Radiation of the eye

- Radiometry (radiant, intensity, radiance, and irradiance)
- Photometry (Luminosity function, luminous intensity, luminance, and illuminance, Lambertian surfaces-cosine laws)
- Spectral transmission of the ocular media
- Retinal illuminance
- Effects of radiation (especially infrared, visible and ultraviolet)

A.1.4. Subject 5: Optical Appliances

Suggested ECTS: 12

Learning outcomes: The candidates should demonstrate knowledge and skills of optical appliances and dispensing and how visual correction interact with the eye. Knowledge and skills should be demonstrated in the areas of: (1) physical characteristics of ophthalmic lenses, (2) optical characteristics of ophthalmic lenses, (3) ophthalmic prisms and prismatic effect of lenses, (4) multifocal lenses, (5) physical characteristics and biological compatibility of frame materials, (6) specification and nomenclature of spectacle frame components, (7) optical and spectacle frame considerations of high-powered lenses, (8) spectacle magnification, (9) absorptive lenses, (10) impact resistance, (11) optical tolerances and physical requirements of ophthalmic lenses and frame materials (EN), and (12) spectacle applications.

Learning outcomes	Details of how* and where this is delivered in the programme? <i>*theoretical/practical/self-directed</i>	Contribution of this component to Credit weighting?	Method of assessment?
(1) physical characteristics of ophthalmic lenses,			
(2) optical characteristics of ophthalmic lenses,			
(3) ophthalmic prisms and prismatic effect of lenses,			
(4) multifocal lenses,			
(5) physical characteristics and biological compatibility of frame materials,			
(6) specification and nomenclature of spectacle frame components,			
(7) optical and spectacle frame considerations of high-powered lenses,			
(8) spectacle magnification,			
(9) absorptive lenses,			
(10) impact resistance,			
(11) optical tolerances and physical requirements of ophthalmic lenses and frame materials,			
(12) spectacle applications.			

A.1.4.1. Subject 5: Optical Appliances - Topics to be covered to achieve these learning outcomes:

A.1.4.1.1. Physical characteristics of ophthalmic lenses

- Geometry of lens surfaces (spherical, cylindrical, toric, aspheric)
- Lens form
- Lens thickness (centre, edge, gradients)
- Specification of lens size and shape
- Materials (index of refraction, dispersion, hardness, specific gravity)

A.1.4.1.2. Optical characteristics of ophthalmic lenses

- Locations of and relationships between the optic axis, optical centre, geometric centre, and major reference points
- Principles of corrected curve lens design
- Verification of lens prescriptions (focimeter, lens measure)
- Writing and transposing lens prescriptions
- Effect of lens tilt (spheres and spherocylinders about a principal meridian)
- Effective power (for near and for changes in vertex distances)

A.1.4.1.3. Ophthalmic prisms and prismatic effects of lenses

- Thickness differences across a prism
- Prismatic effects in the periphery of a lens (spheres, spherocylinders)
- Decentration (prism from decentration, decentering to obtain prism, interpupillary distance)
- Correction of vertical prism effect
 - Slab off (front, back, top, bottom, reverse)
 - Double slab off
 - Dissimilar segments
 - Compensated R segments
 - Prism segments
 - Multiple corrections
 - Fresnel prisms
 - Fresnel power additions

A.1.4.1.4. Multifocal lenses

- Types (fused, 1-piece, progressive power additions and blended lenses)
- Methods of producing add powers
- Segment centre location
- Image movement
- Total displacement, horizontal and vertical imbalance
- Placement of distance and multifocal optical centre
- Optical and physical characteristics of segments (design and calculations, progressive adds, aberrations, surface characteristics)
- Specifying multifocal height, size, shape and location of segment

A.1.4.1.5. Physical characteristics and biological compatibility of frame materials

A.1.4.1.6. Specification and nomenclature of frame components

A.1.4.1.7. Optical and spectacle frame considerations of high-powered lenses: spheric, aspheric, and high index materials

A.1.4.1.8. Spectacle magnification

- Shape and power factors
- Iseikonic lens designs

A.1.4.1.9. Methods of remedying reflections and secondary images

A.1.4.1.10. Absorptive lenses

- Specification of lens tints and absorptive coatings (including spectral transmission curves)
- Characteristics of photochromic lenses
- Relationship between lens thickness and spectral transmission
- Special occupational requirements

A.1.4.1.11. Optical tolerances and physical requirements of ophthalmic lenses and frame materials (EN)

A.1.4.1.12. Spectacle Applications

- Spectacle lens prescriptions for ametropia
- Lens problems of aberrations, weight, thickness, limits of field, secondary images, magnification, jump and displacement
- Frame and lens design, including types of single vision and multiple focal lenses, kinds of lens materials, base curves and cylinder forms, character and placement of multi-focals, optical centres, and frame specifications.
- Evaluation of lenses and frames, via focimeter, lens gauge, and observation, for optical centre positioning, powers, and other specifications of design
- Fitting and adjusting frames for the wearer
- Patient counselling information associated with the dispensing of prescriptions for different ametropias

A.1.5. Subject 6: Occupational Optics

Suggested ECTS: 2

Learning outcomes: The candidates should demonstrate knowledge and understanding and be able to discuss and test visual function in relation occupational optics. Knowledge, understanding and testing skills should be demonstrated in the areas of: (1) visual performance, (2) ocular injuries, (3) eye protection and its regulations, (4) lamps and lighting and regulations regarding lighting, (5) visual display units, and (6) regulations related to vision and driving.

Learning outcomes	Details of how* and where this is delivered in the programme? <i>*theoretical/practical/self-directed</i>	Contribution of this component to Credit weighting?	Method of assessment?
(1) visual performance,			
(2) ocular injuries,			
(3) eye protection and its regulations,			
(4) lamps and lighting and regulations regarding lighting			
(5) visual display units,			
(6) regulations related to vision and driving.			

A.1.5.1. Subject 6: Occupational Optics - Topics to be covered to achieve these learning outcomes:

A.1.5.1.1. Visual Performance

- Visual capability
- Visibility of tasks

A.1.5.1.2. Ocular Injuries

- Mechanical
- Non-mechanical

A.1.5.1.3. Eye-protection

- Lens materials
- Testing procedures
- Frame materials
- Regulations

A.1.5.1.4. Lamps and lighting

- Concepts
- Photometric units
- Light sources
- Luminaires
- Lighting design
- Recommendations
- Glare and its control

A.1.5.1.5. Visual display units

- Asthenopia
- Facial rash / dermatitis
- Epilepsy
- Radiation
- Regulations

A.1.5.1.6. Driving

- Visual function and driving performance
- Visual demands
- Regulations

A.2. PART A: Clinical/practical European Diploma competencies.

A.2.1. Subject 5: Optical Appliances

	<i>Clinical/practical competencies:</i>	Competency assessment		Clinical experience	
		Brief details of the assessment	Where in the programme?	Minimum number of patients a student would examine	Brief description of how evidence of clinical experience is recorded
1	The ability to advise on and to dispense the most suitable form of optical correction taking into account visual performance and comfort, durability, comfort (anatomical), cosmetic appearance and lifestyle.				
2	The ability to measure and verify optical appliances, taking into account relevant standards.				
3	The ability to fit, adjust and repair optical appliances. Identifies current and absolute frame materials and considers and applies their properties when handling, adjusting, repairing and dispensing. Demonstrates ability of frame manipulation and lens manufacturing (glazing) and the application of special lens treatments.				

4	The ability to manage non-tolerance cases (i.e., the ability to handle cases when the optical appliance due to lens design, lens fitting or frame fitting cannot be tolerated by the patient).				
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A.2.2. Subject 6: Occupational Optics

A.2.2. Subject 6: Occupational Optics					
	<i>Clinical/practical competencies:</i>	Competency assessment		Clinical experience	
		Brief details of the assessment	Where in the programme?	Minimum number of patients a student would examine	Brief description of how evidence of clinical experience is recorded
1	The ability to advise, prescribe and dispense spectacles, or fit contact lenses, for VDU users and other vocational purposes.				
2	The ability to advise, prescribe and dispense spectacles for eye protective use.				

B.

PART B

Clinical

Investigation and

Management

B.1. PART B: Knowledge base for the European Diploma competencies.

B.1.1. Subject 4: Visual Perception

Suggested ECTS: 3

Learning outcomes: The candidates should demonstrate knowledge and understanding of the physical and physiological aspects of vision including the principals of psychophysical measurements, visual detection, visual discrimination, visual search and attention, and binocular vision. Knowledge and understanding, including the ability to test and explain, should be demonstrated in the areas of: (1) visual pathways, (2) light perception, (3) colour vision, (4) space perception, (5) form perception, (6) motion perception, (7) temporal perception, and (8) basic psychophysical methods and theory.

Learning outcomes	Details of how* and where this is delivered in the programme? <i>*theoretical/practical/self-directed</i>	Contribution of this component to Credit weighting?	Method of assessment?
(1) visual pathways			
(2) light perception			
(3) colour vision			
(4) space perception			
(5) form perception			
(6) motion perception			
(7) temporal perception			
(8) basic psychophysical methods and theory.			

B.1.1.1. Subject 4: Visual Perception - Topics to be covered to achieve these learning outcomes:

B.1.1.1.1. Visual Perception

- Colour perception
- Chromatic discrimination (hue and saturation) for normal defective colour vision
- Colour mixture and appearance
- Colour contrast, constancy, and adaptation
- Colour specification and colorimetry (CIE)
- Spectral sensitivity of normal and defective colour vision
- Mechanisms of colour deficiencies

B.1.1.1.2. Space Perception

- Direction and depth discrimination (monocular and binocular cues, oculocentric and egocentric localization)
- Characteristics of sensory function (binocular interactions including summation, binocular suppression and rivalry, corresponding points including horopter criteria)
- Development of sensory fusion and binocular vision
- Disturbances of perceived direction and distance (aniseikonia and amblyopia)
- Sensory-motor interactions (fixation, disparity, past pointing, visually guided behaviour, body posture and perceived orientation, and self-motion)

B.1.1.1.3. Form Perception

- Static visual acuity (including test configuration, various acuity tasks, and factors influencing acuity including blur, intensity and contrast), specification of visual acuity
- Spatial contrast sensitivity function (including factors influencing the function)
- Illusions, constancies, and figure-ground relations
- Simultaneous contrast and spatial interactions (Mach bands)

B.1.1.1.4. Light Perception

- Detection characteristics at the absolute light threshold (including spectral, spatial, and temporal aspects)
- Brightness-difference thresholds at various adaptation levels (Weber's and DeVries-Rose Laws), specification of contrast
- Dark and light adaptation processes and theories
- Spatial and temporal summation characteristics (Ricco's, Piper's and Bloch's Laws)

B.1.1.1.5. Motion Perception

- Factors involved in the detection of real and apparent motion, detection of displacements
- Motion after-effects
- Dynamic visual acuity, visual performances with a moving object, and visual performances with a moving observer

B.1.1.1.6. Temporal Perception

- Critical flicker fusion frequency, including influencing factors (test object size, location and adaptation level)
- Sub-fusional flicker phenomena (Bartley brightness enhancement)
- Successive contrast and masking

- Temporal contrast sensitivity function
- Stabilised retinal images and monocular suppression (Troxler effect)
- Saccadic suppression

B.1.1.1.7.

Entoptic Phenomena

- Characteristics and origin of various phenomena (involving the cornea, lens, and vitreous)
- Vascular and circulatory phenomena (Purkinje tree, capillary circulation)
- Phenomena associated with central vision (Maxwell's spot, Haidinger's brushes)
- Phenomena associated with retinal distention or other forms of retinal activity (Moore's lightning streaks, blue arcs of the retina, phosphenes)

B.1.1.2.

Psychophysical Methodology

B.1.1.2.1.

Basic psychophysical methods and theory

- Measurement of absolute and difference thresholds
- Methods of limits, adjustment, and constant stimuli

B.1.2. Subject 7: Vision Development and Ageing

Suggested ECTS: 9

Learning outcomes: The candidates should demonstrate knowledge and understanding and be able to discuss, test, explain, and advise on the human development of the visual system and its response to ageing. Knowledge, understanding and testing skills should be demonstrated in the areas of: (1) normal vision development in the infant and child, (2) normal motor development in the infant and child, (3) normal cognitive and social development in the infant and child, (4) effects of early environmental restrictions, (5) normal changes in vision with ageing, (6) anomalies of child development, (7) clinical techniques and tests to assess the development of children at various ages, (8) clinical characteristics of children who deviate from normal patterns of development, and epidemiology of developmental disorders (9) tests that diagnose vision problems which may be associated with deviations from normal patterns of development, (10) tests used by optometrists to determine a child's level of visual-perceptual development, (11) role of the optometrist and other disciplines in screening, evaluating, managing and referring children who deviate from normal patterns of development, including anomalies of binocular vision, (12) anomalies of the ageing adult, (13) clinical characteristics of changes in perceptual function (non-visual) associated with ageing, (14) symptom profiles, clinical procedures, and tests identifying changes in vision, (15) clinical management of ageing patients with multisensory loss, (16) assessment of the need for referral and consultation with other disciplines, (17) colour vision anomalies by type and prevalence, (18) colour vision tests used for both screening and diagnosis of congenital colour vision anomalies, (19) conditions for colour vision testing, (20) societal implications of colour vision anomalies, (21) patient management strategies including assessment of the need for referral and consultation with other disciplines, (22) the special examination needs of patients with learning- and other disabilities, (23) the special examination needs of patients with severe visual field defects, (24) the application of complex low vision aids, e.g., spectacle-mounted telescopes, CCTV, (25) the techniques used in fitting contact lenses to patients requiring complex visual correction, (26) the assessment of visual function, including the use of specialist charts for distance and near vision, and the effects of lighting, contrast and glare.

Learning outcomes	Details of how* and where this is delivered in the programme? <i>*theoretical/practical/self-directed</i>	Contribution of this component to Credit weighting?	Method of assessment?
(1) normal vision development in the child,			
(2) normal motor development in the infant and child,			
(3) Normal cognitive and social development in the infant and child,			
(4) effects of early environmental restrictions,			
(5) normal changes in vision with ageing,			
(6) anomalies of child development,			

(7) clinical techniques and tests to assess the development of children at various ages,			
(8) clinical characteristics of children who deviate from normal patterns of development, and epidemiology of developmental disorders,			
(9) tests that diagnose vision problems which may be associated with deviations from normal patterns of development,			
(10) tests used by optometrists to determine a child's level of visual-perceptual development			
(11) role of the optometrist and other disciplines in screening, evaluating, managing and referring children who deviate from normal patterns of development, including anomalies of binocular vision,			
(12) anomalies of the ageing adult,			
(13) clinical characteristics of changes in perceptual function (non-visual) associated with ageing,			
(14) symptom profiles, clinical procedures, and tests identifying changes in vision,			
(15) clinical management of ageing patients with multisensory loss,			
(16) assessment of the need for referral and consultation with other disciplines,			
(17) colour vision anomalies by type and prevalence,			
(18) colour vision tests used for both screening and diagnosis of congenital colour vision anomalies,			
(19) conditions for colour vision testing,			
(20) societal implications of colour vision anomalies,			

(21) patient management strategies including assessment of the need for referral and consultation with other disciplines,			
(22) the special examination needs of patients with learning and other disabilities,			
(23) the special examination needs of patients with severe visual field defects,			
(24) the application of complex low vision aids, e.g., spectacle-mounted telescopes, CCTV,			
(25) the techniques used in fitting contact lenses to patients requiring complex visual correction,			
(26) the assessment of visual function, including the use of specialist charts for distance and near vision, and the effects of lighting, contrast and glare.			

B.1.2.1. Subject 7: Vision Development and Ageing - Topics to be covered to achieve these learning outcomes:

B.1.2.1.1. Human Development

B.1.2.1.1.1. Normal vision development in the infant and child

- Visual acuity
- Contrast sensitivity
- Refractive error
- Colour vision
- Spectral transmission of the ocular media
- Light sensitivity
- Form reproduction and perception
- Accommodation and convergence
- Stereopsis

B.1.2.1.1.2. Normal motor development in the infant and child

- Gross motor/language development milestones
- Oculomotor system
- Visual perceptual-motor abilities

B.1.2.1.1.3. Normal cognitive and social development in the infant and child

B.1.2.1.1.4. Effects of early environmental restrictions

- Plasticity of the system
- Animal models
- Light and pattern deprivation
- Monocular and binocular deprivation
- Refractive error
- Cataract
- Strabismus

B.1.2.1.1.5. Normal changes in vision with ageing

- Visual acuity
- Contrast sensitivity
- Refractive error
- Colour vision
- Spectral transmission of the ocular media
- Light sensitivity
- Glare (disability and discomfort)
- Dark adaptation, glare recovery
- Visual fields
- Critical flicker fusion frequency
- Accommodation and convergence
- Oculomotor system

B.1.2.1.2. Anomalies of Child Development

B.1.2.1.2.1. Epidemiology; history and signs/symptoms manifest by patients in the age ranges noted

B.1.2.1.2.2. Clinical techniques and tests to assess the development of children at various ages

- Physical status
- Fine and gross motor development
- Personal-social development
- Speech-language development

- B.1.2.1.2.3. Clinical characteristics of children who deviate from normal patterns of development, and epidemiology of developmental disorders**
- Mental abilities
 - Sensory abilities (vision and hearing handicaps)
 - Neuromuscular and physical abilities
 - Personal-social behaviours
 - Speech and language abilities
 - Multiple handicaps
 - Specific learning disabilities
- B.1.2.1.2.4. Tests that diagnose vision problems which may be associated with deviations from normal patterns of development**
- Mental abilities
 - Sensory abilities (vision and hearing handicaps)
 - Neuromuscular and physical abilities
 - Personal-social behaviours
 - Speech and language abilities
 - Multiple handicaps
 - Specific learning disabilities
- B.1.2.1.2.5. Tests used by optometrists to determine a child's level of visual-perceptual development**
- Visual attention and discrimination
 - Visual-motor integration
 - Intersensory integration
 - Bilateral integration and laterality
- B.1.2.1.2.6. Role of optometrists and other disciplines in screening, evaluating, managing and referring children who deviate from normal patterns of development**
- Mental abilities
 - Sensory abilities (vision and hearing handicaps)
 - Neuromuscular and physical abilities
 - Personal-social behaviours
 - Speech and language abilities
 - Multiple handicaps
 - Specific learning disabilities
- B.1.2.1.3. Anomalies of the Ageing Adult**
- B.1.2.1.3.1. Clinical characteristics of changes in perceptual function (non-visual) associated with ageing**
- Hearing
 - Coordination
 - Cognition
 - Social status
- B.1.2.1.3.2. Symptoms profiles, clinical procedures, and tests identifying changes in vision function of the ageing patient**
- B.1.2.1.3.3. Clinical management of ageing patients with multisensory loss**
- B.1.2.1.3.4. Assessment of the need for referral and consultation with other disciplines**

- B.1.2.1.4. Anomalies of Colour Vision (congenital, inherited)**
- B.1.2.1.4.1. Colour vision anomalies by types and prevalence**
- Anomalous trichromacy
 - Dichromacy
 - Monochromacy
- B.1.2.1.4.2. Colour vision tests used for both screening and diagnosis of congenital colour vision anomalies**
- Pseudoisochromatic tests
 - Arrangement tests (Farnsworth Panel 0-15, Farnsworth-Munsell 100-Hue)
 - Anomaloscopic matching
- B.1.2.1.4.3. Conditions for Colour vision testing**
- B.1.2.1.4.4. Social implications of colour vision anomalies**
- School
 - Vocational requirements
 - Patient interest
- B.1.2.1.4.5. Patient management strategies**
- Counselling
 - Special aids
- B.1.2.1.5. Anomalies of Child Development**
- B.1.2.1.5.1. Clinical characteristics of children who deviate from normal patterns of development, and epidemiology of development disorders**
- Sensory abilities (vision and hearing handicaps)
- B.1.2.1.5.2. Tests that diagnose vision problems which may be associated with deviations from normal patterns of development**
- Sensory abilities (vision and hearing handicaps)
- B.1.2.1.5.3. Tests used by optometrists to determine a child's level of visual perceptual development**
- Visual attention and discrimination
 - Visual-motor integration
 - Intersensory integration
 - Bilateral integration and laterality
- B.1.2.1.6. Age-Related Changes**
- B.1.2.1.6.1. Symptom profiles, clinical procedures, and tests identifying changes in vision function of the ageing patient**
- B.1.2.1.6.2. Clinical management of ageing patients with multisensory loss**
- B.1.2.1.6.3. Assessment of the need for referral and consultations with other disciplines**

B.1.3. Subject 8: Refraction (European Diploma Section B1)

Suggested ECTS: 12

Learning outcomes: The candidates should demonstrate knowledge, understanding and skills, and be able to discuss, explain, and refract patients in the most suitable way. Knowledge, understanding and testing skills should be demonstrated in the areas of: (1) different refractive states of the eye, (2) mechanisms of presbyopia, (3) anamnesis, (4) preliminary testing, (5) objective static and dynamic refractive status, including automatic refractive devices, (6) standard subjective refraction procedures, including astigmatic axis, crossed cylinders, stenopaic slit, fogging methods and equalisation (duo chrome) techniques, (7) binocular subjective refraction procedures, including accommodation binocular balancing methods, (8) cycloplegic subjective and objective techniques, (9) automatic computer assisted subjective procedures, laser refraction and variations in procedures for the various ametropias, (10) identification, treatment and management using spectacle and contact lenses and prognosis, and (11) observation and recognition of clinical signs, and techniques and skills for determining the near add.

Learning outcomes	Details of how* and where this is delivered in the programme? <i>*theoretical/practical/self-directed</i>	Contribution of this component to Credit weighting?	Method of assessment?
(1) different refractive states of the eye,			
(2) mechanisms of presbyopia,			
(3) anamnesis,			
(4) preliminary testing,			
(5) objective static and dynamic refractive status, including automatic refractive devices,			
(6) standard subjective refraction procedures, including astigmatic axis, crossed cylinders, stenopaic slit, fogging methods and equalisation (duo chrome) techniques,			
(7) binocular subjective refraction procedures, including accommodation binocular balancing methods,			
(8) cycloplegic subjective and objective techniques,			
(9) automatic computer assisted subjective procedures, laser refraction and variations in procedures for the various ametropias,			
(10) identification, treatment and management using spectacle and contact lenses and prognosis,			
(11) observation and recognition of clinical signs, and techniques and skills for determining the near add.			

B.1.3.1. Subject 8: Refraction - Topics to be covered to achieve these learning outcomes:

B.1.3.1.1. Refractive state of the eye

- Emmetropia
- Myopia
- Hyperopia
- Astigmatism
- Anisometropia and aniseikonia
- Accommodation
- Aphakia and pseudophakia
- Empty field and night myopia

B.1.3.1.2. Mechanism of presbyopia

- Effects of ageing on the ciliary muscle and accommodation

B.1.3.1.3. Human Development

B.1.3.1.3.1. Normal changes in vision with ageing

- Accommodation and convergence

B.1.3.1.4. Anomalies of Refraction/Ametropia

B.1.3.1.4.1. Epidemiology, history and symptoms

B.1.3.1.4.2. Observation and recognition of clinical signs, and techniques and skills including determination of:

- Interpupillary distance
- Visual acuity
- Objective static and dynamic refractive status, including automatic refractive devices
- Standard subjective refraction procedures, including astigmatic dials, crossed cylinders, stenopaic slit, fogging methods and equalisation (duochrome) techniques
- Binocular subjective refraction procedures, incl. accommodation binocular balancing methods
- Cycloplegic subjective and objective techniques
- Automatic computer assisted subjective procedures, laser refraction and variations in procedures for the various ametropias

B.1.3.1.4.3. Identification, treatment and management using spectacle and contact lenses and prognosis

B.1.3.1.5. Anomalies of Refraction/Presbyopia

B.1.3.1.5.1. Epidemiology, history and symptoms

B.1.3.1.5.2. Observation and recognition of clinical signs, and techniques and skills for determining the near add including:

- Amplitude of accommodation
- Crossed cylinders
- Trial lenses
- NRA/PRA

- B.1.3.1.5.3. Identification, treatment and management with spectacle and contact lenses and prognosis**
- B.1.3.1.6. Anomalies of Refraction/Aphakia and Pseudophakia**
- B.1.3.1.6.1. Epidemiology, history and symptoms**
- B.1.3.1.6.2. Observation and recognition of clinical signs and phenomena associated with aphakia and pseudophakia:**
- Magnification
 - Field of view
 - Spatial distortion
 - Convergence requirements
 - Sensitivity to glare and techniques
- B.1.3.1.6.3. Skills for determining, evaluating and/or verifying:**
- Types and characteristics of intraocular lenses and aphakic spectacle and contact lenses
 - Intraocular lens power
 - Special refraction techniques
 - Lens prescriptions for aphakia
- B.1.3.1.6.4. Diagnosis, treatment and management with spectacle and contact lenses and prognosis**
- B.1.3.1.7. Anomalies of Refraction/Aniseikonia**
- B.1.3.1.7.1. Epidemiology, history and symptoms**
- B.1.3.1.7.2. Observation and recognition of clinical signs, and techniques and skills including:**
- Detection of aniseikonia
 - Measurement of aniseikonia
- B.1.3.1.7.3. Identification, treatment and management with spectacle and contact lenses and prognosis**

B.1.4. Subject 9: Low Vision

Suggested ECTS: 3

Learning outcomes: The candidates should demonstrate knowledge, understanding and skills, and be able to discuss, explain, and manage patients whose vision cannot be improved significantly using conventional spectacles or contact lenses, in order to make the most of their residual vision using magnifying systems and imaging technology. Knowledge, understanding and testing skills should be demonstrated in the areas of: (1) definitions and regulations of low vision, (2) incidence and causes, (3) measurement of visual performance, including the use of specialist charts, (4) magnification, non-optical aids, (5) illumination and lighting, (6) aids for peripheral field, (7) eccentric viewing and steady eye strategy, (8) environmental modification, and (9) clinical procedures.

Learning outcomes	Details of how* and where this is delivered in the programme? <i>*theoretical/practical/self-directed</i>	Contribution of this component to Credit weighting?	Method of assessment?
(1) definitions and regulations of low vision,			
(2) incidence and causes,			
(3) measurement of visual performance, including the use of specialist charts,			
(4) magnification, non-optical aids,			
(5) illumination and lighting,			
(6) aids for peripheral field,			
(7) eccentric viewing and steady eye strategy,			
(8) environmental modification			
(9) clinical procedures.			

B.1.4.1. Subject 9: Low Vision - Topics to be covered to achieve these learning outcomes:

- B.1.4.1.1. Defining low vision**
 - Disorder, impairment, disability and handicap
 - WHO definitions
- B.1.4.1.2. Incidence and causes**
 - Prevalence
 - Causes
 - Visual impairment in children
- B.1.4.1.3. Measuring visual performance**
 - Visual acuity
 - Contrast
 - Glare and its effect
 - Reading
 - Quality of life
- B.1.4.1.4. Magnification**
 - Increasing object size
 - Decreasing viewing distance
 - Real image magnification
 - Telescopic magnification
- B.1.4.1.5. Non-optical aids**
- B.1.4.1.6. Illumination and lighting**
- B.1.4.1.7. Aids for peripheral field**
- B.1.4.1.8. Eccentric viewing and Steady eye strategy**
- B.1.4.1.9. Environmental modification**
- B.1.4.1.10. Clinical procedures**
 - The initial assessment
 - Examination routine
 - Prescribing
 - Training

B.1.5. Subject 10: Ocular Motility and Binocular Vision

Suggested ECTS: 10

Learning outcomes: The candidates should demonstrate knowledge, understanding and skills, and be able to discuss, explain, and manage patients who suffer from binocular vision problems and who are at risk of developing binocular vision problems. Knowledge, understanding and testing skills should be demonstrated in the areas of: (1) nature of binocular vision anomalies, (2) binocular vision routine examination, (3) examination of young children, (4) evaluation and management of heterophoria, (5) evaluation and management of heterotropia (strabismus), and (6) examination and management of incomitant deviations and nystagmus.

Learning outcomes	Details of how* and where this is delivered in the programme? <i>*theoretical/practical/self-directed</i>	Contribution of this component to Credit weighting?	Method of assessment?
(1) nature of binocular vision anomalies,			
(2) binocular vision routine examination,			
(3) examination of young children,			
(4) evaluation and management of heterophoria,			
(5) evaluation and management of heterotropia (strabismus)			
(6) examination and management of incomitant deviations and nystagmus.			

B.1.5.1. Subject 10: Ocular Motility and Binocular Vision - Topics to be covered to achieve these learning outcomes:

B.1.5.1.1. General ocular motility (Ocular motility)

B.1.5.1.1.1. Intraocular musculature (iris and ciliary)

- Purposes and roles for vision
- Dynamics of muscle action
- Biomechanics and neurological control of pupillary reflexes and accommodation
- Interrelationships between pupillary changes, accommodation, and convergence (the near reflex)
- Factors affecting pupil size

B.1.5.1.1.2. Extraocular musculature

- Purposes and roles for vision
- Dynamics and kinematics of eye movements
- Specification of direction of gaze and ocular orientation (torsion)
- Agonist-antagonist relationships
- Primary action, and secondary and tertiary actions
- Fields of action

B.1.5.1.1.3. Characteristics and control of the various eye movements

- Reflex eye movements, including compensatory movements
- Small eye movements associated with steady fixation
- Versional eye movements (pursuits and saccades)
- Vergence eye movements (tonic, accommodative including models of accommodative/ vergence interaction, fusional, and proximal)

B.1.6. Subject 11: Contact Lenses

Suggested ECTS: 12

Learning outcomes: The candidates should demonstrate knowledge, understanding and skills, and be able to discuss and undertake examinations and management of patients wanting to wear or who are already wearing contact lenses. Knowledge, understanding and testing skills should be demonstrated in the areas of: (1) treatment and management of refractive/oculomotor/sensory integrative conditions using contact lenses, (2) lens types and materials: hard lenses; haptics; lathecut, moulded, and spincast soft lenses, (3) optics of contact lenses: curves, zones, widths and tear lens effects, sagittal depth; centre and edge thickness; flex, asphericity and toric designs and quadrantic specific designs, and oblong geometries with reverse curves, (4) theories and methods of fitting: lens design, specifications of orders, lens verification and evaluation, insertion and removal techniques, design of wearing schedules, fluorescein evaluation and fitting criteria, (5) patient selection based upon history, analysis of primary care data, correlations of data, facial physiognomy, and contraindications; and management based upon education and patient handling and control, (6) the examination of a new prospective contact lens patient, the anterior segment examination and measurement, (7) contact lens selection from presently available types and forms of lenses, (8) care of lenses; handling; cleaning; preservatives available; disinfection methods and solutions, (9) follow-up care; adaptation, physiologic and post-fitting complications, allergic responses, lens changes and mechanical problems, (10) bifocal and astigmatic contact lenses; types, basis of selection and adaptation, techniques of fitting, and care for each, (11) specially designed lenses and fitting procedures for keratoconus and irregular corneas, for keratoplastic and after refractive surgeries, sports vision, diseased and traumatic corneas, cosmetic (prosthetic) use, iris colour changes and colour vision deficiencies, (12) specially designed lenses and fitting procedures for orthokeratology, and (13) parameter modification in theory and practice. (14) fitting procedures for myopia control

Learning outcomes	Details of how* and where this is delivered in the programme? <i>*theoretical/practical/self-directed</i>	Contribution of this component to Credit weighting?	Method of assessment?
(1) treatment and management of refractive/oculomotor/sensory integrative conditions using contact lenses,			
(2) lens types and materials: hard lenses; haptics; lathecut, moulded, and spincast soft lenses,			
(3) optics of contact lenses: curves, zones, widths and tear lens effects, sagittal depth; centre and edge thickness; flex, asphericity and toric designs and quadrantic specific designs, and oblong geometries with reverse curves,			
(4) theories and methods of fitting: lens design, specifications of orders, lens verification and evaluation,			

insertion and removal techniques, design of wearing schedules, fluorescein evaluation and fitting criteria,			
(5) patient selection based upon history, analysis of primary care data, correlations of data, facial physiognomy, and contraindications; and management based upon education and patient handling and control,			
(6) the examination of a new prospective contact lens patient, the anterior segment examination and measurement,			
(7) contact lens selection from presently available types and forms of lenses, (
(8) care of lenses; handling; cleaning; preservatives available; disinfection methods and solutions,			
(9) follow-up care; adaptation, physiologic and post-fitting complications, allergic responses, lens changes and mechanical problems,			
(10) bifocal and astigmatic contact lenses; types, basis of selection and adaptation, techniques of fitting, and care for each,			
(11) specially designed lenses and fitting procedures for keratoconus and irregular corneas, for keratoplastic and after refractive surgeries, sports vision, diseased and traumatic corneas, cosmetic (prosthetic) use, iris colour changes and colour vision deficiencies,			
(12) specially designed lenses and fitting procedures for orthokeratology,			
(13) parameter modification in theory and practice.			
(14) Fitting procedures for myopia control			

B.1.6.1. Subject 11: Contact Lenses - Topics to be covered to achieve these learning outcomes:

B.1.6.1.1. Anomalies of Refraction/Ametropia

B.1.6.1.1.1. Observation and recognition of clinical signs, and techniques and skills including determination of:

- Corneal curvature and thickness

B.1.6.1.2. Contact Lens Applications

B.1.6.1.2.1. Treatment and management of refractive/oculomotor/sensory integrative conditions using contact lenses

B.1.6.1.2.2. Lens types and materials:

- Hard lenses
- Haptics
- Lathecut
- Moulded
- Spincast soft lenses

B.1.6.1.2.3. Optics of contact lenses:

- Curves
- Zones
- Widths and tear lens effects
- Sagittal depth
- Centre and edge thickness
- Flex
- Asphericity and toric designs
- Quadrantic specific designs
- Oblique geometrics with reverse curves

B.1.6.1.2.4. Theories and methods of fitting:

- Lens design
- Specifications of orders
- Lens verification and evaluation
- Insertion and removal techniques
- Design of wearing schedules
- Fluorescein evaluation and fitting criteria

B.1.6.1.2.5. Patient selection based upon:

- History
- Analysis of primary care data
- Correlations of data
- Facial Physiognomy
- Contraindications
- Management based upon education
- Patient handling and control

B.1.6.1.2.6. The examination of a new prospective contact lens patient including

- History
- Anterior segment examination
- Measurement of anterior segment

- B.1.6.1.2.7. Contact lens selection from presently available types and forms of lenses**
- B.1.6.1.2.8. Care of lenses:**
- Handling
 - Cleaning
 - Preservatives available
 - Disinfection methods
 - Solutions
- B.1.6.1.2.9. Follow-up care**
- Adaptation
 - Physiologic and post-fitting complications
 - Allergic responses
 - Lens changes
 - Mechanical problems
- B.1.6.1.2.10. Bifocal, multifocal and astigmatic contact lenses:**
- Types
 - Basis of selection and adaptation
 - Techniques of fitting
- B.1.6.1.2.11. Specially designed lenses and fitting procedures for:**
- Keratoconus
 - Irregular corneas
 - Keratoplastic
 - After refractive surgeries
 - Sports vision
 - Diseased and traumatic corneas
 - Cosmetic (prosthetic) use
 - Iris colour changes
 - Colour vision deficiencies
- B.1.6.1.2.12. Specially designed lenses and fitting procedures for orthokeratology**
- B.1.6.1.2.13. Fitting procedures for myopia control**
- B.1.6.1.2.14. Parameter modification in theory and practice**
- B.1.6.1.2.15. Wavefront technology and contact lenses**

B.1.7. Subject 12B: Investigative Techniques PART B

Suggested ECTS: 4

Learning outcomes: The candidates should demonstrate knowledge, understanding and skills, and be able to discuss and undertake examinations of patients using investigative techniques. Knowledge, understanding and testing skills should be demonstrated in areas of (1) colour vision investigation, (2) keratometry, (3) retinoscopy, (4) automatic objective refraction, (5) slit lamp examination of the external and internal eye, (6) pachymetry (non-contact), and (7) tonometry (non-contact).

Learning outcomes	Details of how* and where this is delivered in the programme?	Contribution of this component to Credit weighting?	Method of assessment?
	<i>*theoretical/practical/self-directed</i>		
(1) colour vision investigation,			
(2) keratometry,			
(3) retinoscopy,			
(4) automatic objective refraction,			
(5) slit lamp examination of the external and internal eye,			
(6) pachymetry (non-contact),			
(7) tonometry (non-contact)			

B.1.7.1. Subject 12B: Investigative Techniques - Topics to be covered to achieve these learning outcomes:

B.1.7.1.1. Colour vision investigation

- Clinical use
- Instrumentation
- Clinical procedure
- Clinical implications

B.1.7.1.2. Keratometry

- Clinical use
- Instrumentation
- Clinical procedure
- Clinical implications

B.1.7.1.3. Retinoscopy

- Clinical use
- Instrumentation
- Clinical procedure
- Clinical implications

B.1.7.1.4. Automatic objective refraction

- Clinical use
- Instrumentation
- Clinical procedure
- Clinical implications

B.1.7.1.5. Slit lamp examination

- Clinical use
- Instrumentation
- Clinical procedure
- Clinical implications
- Clinical implications

B.1.7.1.6. Pachymetry (non-contact)

- Clinical use
- Instrumentation
- Clinical procedure
- Clinical implications

B.1.7.1.7. Tonometry (non-contact)

- Clinical use
- Instrumentation
- Clinical procedure
- Clinical implications

B.1.8. Subject 13: Paediatrics

Suggested ECTS: 3

Learning outcomes: The candidates should demonstrate knowledge, understanding and skills, and be able to discuss, explain, and manage children in an optometric setting. Knowledge, understanding and testing skills should be demonstrated in the areas of: (1) paediatric communication skills, (2) assessment of visual acuity, (3) refractive examination, (4) myopia, (5) binocular vision disorders, (6) paediatric eye disorders, (7) spectacle dispensing, (8) contact lenses, and (9) low vision assessment and management.

Learning outcomes	Details of how* and where this is delivered in the programme? <i>*theoretical/practical/self-directed</i>	Contribution of this component to Credit weighting?	Method of assessment?
(1) paediatric communication skills,			
(2) assessment of visual acuity,			
(3) refractive examination,			
(4) myopia,			
(5) binocular vision disorders,			
(6) paediatric eye disorders,			
(7) spectacle dispensing,			
(8) contact lenses,			
(9) low vision assessment and management.			

B.1.8.1. Subject 13: Paediatrics - Topics to be covered to achieve these learning outcomes:

B.1.8.1.1. Paediatric communication

B.1.8.1.2. Assessment of visual acuity

B.1.8.1.3. Refractive examination

B.1.8.1.4. Myopia

- Prevalence
- Progression
- Management

B.1.8.1.5. Binocular vision disorders

- Aetiology
- Pathophysiology
- Clinical characteristics
- Clinical investigation
- Diagnosis
- Management

B.1.8.1.6. Paediatric eye disorders

- Genetics
- Cataracts
- Retinopathy
- Visual dysfunction
- Congenital
- Neuromuscular

B.1.8.1.7. Spectacle dispensing

B.1.8.1.8. Paediatric contact lenses

B.1.8.1.9. Low vision assessment and management

B.1.9. Subject 14B: Refractive Surgery PART B

Suggested ECTS: 1

Learning outcomes: The candidates should demonstrate knowledge, understanding and skills, and be able to discuss, explain, and undertake examinations and management of patients wanting to undergo or who have undergone refractive surgery. Knowledge, understanding and testing skills should be demonstrated in the areas of (1) patient counselling and (2) pre- and post-operative assessments.

Learning outcomes	Details of how* and where this is delivered in the programme?	Contribution of this component to Credit weighting?	Method of assessment?
	<i>*theoretical/practical/self-directed</i>		
(1) patient counselling,			
(2) pre- and post-operative assessments,			

B.1.9.1. Subject 14: Refractive Surgery - Topics to be covered to achieve these learning outcomes:

B.1.9.1.1. Biology and biomechanics of corneal refractive surgery

- Corneal wound healing
- Munnerlyn's formula

B.1.9.1.2. Referrals

- Absolute and relative general health contraindications
- Absolute and relative ocular health contraindications

B.1.9.1.3. Pre-operative assessment

- History and symptoms
- Vision assessment (high and low contrast)
- Ocular examination
- Pachymetry
- Keratometry
- Topography
- Tomography
- Pupilometry
- Wavefront aberrometry

B.1.9.1.4. Patient counselling

- Patient expectations: dispelling the myths
- Vision after treatment
- Risk and complications
- Informed consent

B.1.9.1.5. Precautions

- Ectasia
- Corneal dystrophies
- Keratitis

B.1.9.1.6. Postoperative assessment

- Follow-up schedule
- Typical symptoms
- Vision assessment
- Ocular examination
- Typical early postoperative signs

B.2. PART B: Clinical/practical European Diploma competencies.

B.2.1. Subject 8: Refraction

	<i>Clinical/practical competencies:</i>	Competency assessment		Clinical experience	
		Brief details of the assessment	Where in the programme?	Minimum number of patients a student would examine	Brief description of how evidence of clinical experience is recorded
1	The ability to take an accurate history from patients with a range of optometric conditions.				
2	The ability to obtain and interpret information on significant symptoms and patient's concerns.				
3	The ability to obtain and interpret information on relevant family history.				
4	The ability to obtain and interpret information on issues pertaining to the patient's general health, medication, work, sports, hobbies, lifestyle and special needs.				
5	The ability to explore the patient's understanding of their visual problems and impart to patients an explanation of their physiological or pathological eye condition.				

6	An ability to understand and recognise a patient's fears, anxieties and concerns about their visual welfare, the eye examination and the possible ocular side effects of medication.				
7	An ability to understand and recognise the patient's expectations and aspirations and manage empathetically situations where these cannot be met.				
8	The ability to communicate with patients who have poor, or non-verbal, communication skills, or those who are confused, reticent or who might mislead.				
9	The ability to communicate bad news to patients in an empathetic and understandable way.				
10	The ability to manage patients in a safe, ethical and confidential fashion.				
11	The ability to create and to keep clear, accurate and contemporaneous patient records.				
12	The ability to interpret and respond appropriately to existing records.				
13	The ability to make a judgement regarding referral and an understanding of referral pathways.				
14	The ability to demonstrate an understanding of the legal, professional and ethical obligations of a registered optometrist.				
15	The ability to refract patients by appropriate objective and subjective means.				

16	The ability to make appropriate prescribing and management decisions based on the refractive and oculomotor status.				
17	The ability to use appropriate ocular diagnostic drugs to aid refraction if and when needed.				
18	An understanding of the special examination needs of patients with learning and other disabilities.				
19	An understanding of the special examination needs of patients with severe visual field defects.				
20	The ability to manage non-tolerance cases (including referral when appropriate)				

B.2.2. Subject 9: Low Vision

<i>Clinical/practical competencies:</i>		Competency assessment		Clinical experience	
		Brief details of the assessment	Where in the programme?	Minimum number of patients a student would examine	Brief description of how evidence of clinical experience is recorded
1	The ability to take an accurate history from patients with a range of low vision conditions.				
2	The ability to obtain and interpret information on significant symptoms pertinent to low vision conditions and patient's concerns.				
3	The ability to obtain and interpret information on relevant family history pertinent to low vision conditions.				
4	The ability to assess patients with impaired visual function.				
5	The ability to advise visually impaired patients about their impairment, disability or handicap.				
6	The ability to advise on the use of, and to dispense simple low vision aids including: hand and stand magnifiers, typoscopes and hand held telescopes.				
7	The ability to advise on the use of and to dispense complex spectacle lens forms, including: multifocals, high corrections, and their applications to specific patient needs.				

8	The ability to advise on the use of optical and non-optical aids to achieve object enlargement types of magnification (e.g., CCTV or digital tablets).				
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B.2.3. Subject 10: Ocular Motility and Binocular Vision

	<i>Clinical/practical competencies:</i>	Competency assessment		Clinical experience	
		Brief details of the assessment	Where in the programme?	Minimum number of patients a student would examine	Brief description of how evidence of clinical experience is recorded
1	The ability to assess binocular status (accommodation, vergence and motility/eye movement) using objective and subjective tests.				
2	The ability to manage a patient presenting with an incomitant deviation (i.e., an anomaly of the extra-ocular muscles).				
4	The ability to investigate and manage adult patients presenting with heterophoria.				
5	The ability to manage an adult patient with heterotropia.				
6	The ability to manage children at risk of developing an anomaly of binocular vision.				
7	The ability to manage patients presenting with an anomaly of binocular vision.				

B.2.4. Subject 11: Contact Lenses

Clinical/practical competencies:					
		Competency assessment		Clinical experience	
		Brief details of the assessment	Where in the programme?	Minimum number of patients a student would examine	Brief description of how evidence of clinical experience is recorded
1	The ability to insert and remove rigid gas permeable and soft contact lenses and instruct patients in these procedures.				
2	The ability to fit soft contact lenses.				
3	The ability to manage the aftercare of patients wearing soft contact lenses.				
4	The ability to advise on contact lens materials and care regimes.				
5	The ability to manage the aftercare of patients wearing rigid gas permeable contact lenses.				
6	The ability to fit rigid gas permeable contact lenses.				
7	The ability to fit contact lenses to patients with astigmatism.				
8	The ability to fit contact lenses to patients with presbyopia.				
9	The ability to manage non-tolerance cases (including referral when appropriate).				
10	The ability to manage patients in a safe, ethical, and confidential fashion.				

11	The ability to create and keep clear, accurate, and contemporaneous patient records				
12	The ability to interpret and respond appropriately to existing records.				
13	The ability to make a judgement regarding referral and an understanding of referral pathways.				
14	The ability to demonstrate an understanding of the legal, professional, and ethical obligations of an optician/ optometrist				
15	The ability to fit contact lenses for myopia control				

B.2.5. Subject 12B: Investigative Techniques PART B

In addition to the clinical/practical competencies listed below the candidate should be able to use, interpret, and explain the results of (at least) the following ophthalmic instruments:					
<ul style="list-style-type: none"> - Retinoscope - Ophthalmoscope - Keratometer - Pachymeter - Slit-lamp (including the use of an extra lens to evaluate the fundus) - Non-contact tonometry 					
<i>Clinical/practical competencies:</i>		Competency assessment		Clinical experience	
		Brief details of the assessment	Where in the programme?	Minimum number of patients a student would examine	Brief description of how evidence of clinical experience is recorded
1	The ability to assess a patient's colour vision and to determine whether it achieves the standards required by various vocational groups and whether there is a macular problem.				
2	The ability to use instruments in ocular examination and to understand the implications of the findings in terms of subsequent examination techniques.				
3	The ability to assess the external eye and adnexa.				
4	The ability to assess the tear film				
5	The ability to assess pupil reactions.				

6	The ability to use instruments to measure central and peripheral corneal curvature and thickness.				
7	The ability to assess the internal eye				
8	The ability to detect anterior chamber signs of ocular inflammation.				
9	The ability to use non-contact tonometers to measure intraocular pressure and analyse and interpret the results				

B.2.6. Subject 13: Paediatrics

<i>Clinical/practical competencies:</i>		Competency assessment		Clinical experience	
		Brief details of the assessment	Where in the programme?	Minimum number of patients a student would examine	Brief description of how evidence of clinical experience is recorded
1	The ability to take an accurate history from patients with a range of optometric conditions specific to children and infants.				
2	The ability to obtain and interpret information on significant symptoms pertinent to paediatric conditions and patient's or parent's concerns.				
3	The ability to obtain and interpret information on relevant family history pertinent to paediatric conditions.				
4	The ability to obtain and interpret information on patient's general health, medication, school work, sports, hobbies, lifestyle, and special needs pertinent to children and infants.				
5	Demonstrate an understanding of techniques for assessment of vision in infants.				
6	The ability to assess children's (not infants) visual function using appropriate techniques.				
7	The ability to manage (or treat) children (not infants) with impaired visual function (using appropriate techniques or referral).				

B.2.7. Subject 14: Refractive Surgery

<i>Clinical/practical competencies:</i>		Competency assessment		Clinical experience	
		Brief details of the assessment	Where in the programme?	Minimum number of patients a student would examine	Brief description of how evidence of clinical experience is recorded
1	The ability to properly advise on refractive surgery options and possible outcomes.				
2	The ability to identify corneal ectasia and dystrophies and other contraindications to refractive surgery.				
3	The ability to perform the techniques used in the pre-operative assessments.				
4	The ability to manage the aftercare of patients having undergone refractive surgery.				
5	The ability to identify post-operative complications.				
6	The ability to manage refractive surgery patients in a safe, ethical, and confidential fashion.				
7	The ability to create and keep clear, accurate, and contemporaneous patient records.				
8	The ability to interpret and respond appropriately to existing records.				
9	The ability to make a judgement regarding referral and an understanding of referral pathways.				

10	The ability to demonstrate an understanding of the legal, professional, and ethical obligations of an optician / optometrist.				
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C.

PART C

Biological and Medical Sciences

C.1. PART C: Knowledge base for the European Diploma competencies.

C.1.1. Subject 12C: Investigative Techniques PART C

Suggested ECTS: 8 ECTS

Learning outcomes: The candidates should demonstrate knowledge, understanding and skills, and be able to discuss and undertake examinations of patients using investigative techniques. This covers all procedures and topics covered in subject 12 of Part B. Furthermore, knowledge, understanding and testing skills should be demonstrated in the areas of: (1) slit lamp examination of the external and internal eye, (2) pachymetry (contact and non-contact), (3) tonometry (contact and non-contact), (4) direct ophthalmoscopy, (5) monocular indirect ophthalmoscopy, (6) binocular indirect ophthalmoscopy, (7) gonioscopy, (8) lacrimal system evaluation, (9) fundus evaluation with different ophthalmic instruments (including but not limited to OCT, SLO, FAF, etc), and (10) quantitative perimetry.

Learning outcomes	Details of how* and where this is delivered in the programme? <i>*theoretical/practical/self-directed</i>	Contribution of this component to Credit weighting?	Method of assessment?
(1) slit lamp examination of the external and internal eye,			
(2) pachymetry (contact and non-contact),			
(3) tonometry (contact and non-contact),			
(4) direct ophthalmoscopy,			
(5) monocular indirect ophthalmoscopy,			
(6) binocular indirect ophthalmoscopy,			
(7) gonioscopy,			
(8) lacrimal system evaluation,			
(9) fundus evaluation with different ophthalmic instruments (including but not limited to OCT, SLO, FAF etc),			
(10) quantitative perimetry.			

C.1.1.1. Subject 12C: Investigative Techniques PART C - Topics to be covered to achieve these learning outcomes:

C.1.1.1.1. All items and topics listed in Subject 12: Investigative Techniques PART B

- Clinical use
- Instrumentation
- Clinical procedure
- Clinical implications

C.1.1.1.2. Slit lamp examination

- Clinical use
- Instrumentation
- Clinical procedure
- Clinical implications

C.1.1.1.3. Pachymetry (contact and non-contact)

- Clinical use
- Instrumentation
- Clinical procedure
- Clinical implications

C.1.1.1.4. Tonometry (contact and non-contact)

- Clinical use
- Instrumentation
- Clinical procedure
- Clinical implications

C.1.1.1.5. Direct ophthalmoscopy

- Clinical use
- Instrumentation
- Clinical procedure
- Clinical implications

C.1.1.1.6. Monocular indirect ophthalmoscopy

- Clinical use
- Instrumentation
- Clinical procedure
- Clinical implications

C.1.1.1.7. Binocular indirect ophthalmoscopy

- Clinical use
- Instrumentation
- Clinical procedure
- Clinical implications

C.1.1.1.8. Gonioscopy

- Clinical use
- Instrumentation
- Clinical procedure
- Clinical implications

C.1.1.1.9. Lacrimal system evaluation

- Clinical use
- Instrumentation

- Clinical procedure
- Clinical implications

C.1.1.1.10. Fundus biomicroscopy

- Clinical use
- Instrumentation
- Clinical procedure
- Clinical implications

C.1.1.1.11. Quantitative perimetry

- Clinical use
- Instrumentation
- Clinical procedure
- Clinical implications

C.1.1.1.12. Imaging instruments (OCT, SLO, FAF)

- Clinical use
- Instrumentation
- Clinical procedure
- Clinical implications

C.1.2. Subject 14C: Refractive Surgery PART C

Suggested ECTS: 1

Learning outcomes: The candidates should demonstrate knowledge, understanding and skills, and be able to discuss, explain, and undertake examinations and management of patients wanting to undergo or who have undergone refractive surgery. Knowledge, understanding and testing skills should be demonstrated in the areas of (1) referrals and patient counselling and (2) pre- and post-operative assessments. Knowledge and understanding should be demonstrated in the (3) different treatment options and (4) postoperative complications and care.

Learning outcomes	Details of how* and where this is delivered in the programme? <i>*theoretical/practical/self-directed</i>	Contribution of this component to Credit weighting?	Method of assessment?
(1) referrals and patient counselling,			
(2) pre- and post-operative assessments,			
(3) different treatment options,			
(4) postoperative complications and care.			

C.1.2.1. Subject 14C: Refractive Surgery PART C - Topics to be covered to achieve these learning outcomes:

C.1.2.1.1. Biology and biomechanics of corneal refractive surgery

- Corneal wound healing
- Munnerlyn's formula

C.1.2.1.2. Referrals

- Absolute and relative general health contraindications
- Absolute and relative ocular health contraindications

C.1.2.1.3. Pre-operative assessment

- History and symptoms
- Vision assessment (high and low contrast)
- Ocular examination
- Pachymetry
- Keratometry
- Topography
- Tomography
- Pupillometry
- Wavefront aberrometry

C.1.2.1.4. Patient counselling

- Patient expectations: dispelling the myths
- Vision after treatment
- Risk and complications
- Informed consent

C.1.2.1.5. Precautions

- Ectasia
- Corneal dystrophies
- Keratitis

C.1.2.1.6. Treatment options

- Incisional keratotomy (RK, AK)
- Surface ablation: Photorefractive Keratectomy (PRK) and Laser epithelial keratomileusis (LASEK)
- Laser in-situ keratomileusis (LASIK)
- Clear lens extraction and intraocular lens (IOL) implant
- Phacic intraocular lens implant
- Implantable contact lens (ICL)
- Intrastromal corneal implants

C.1.2.1.7. Postoperative assessment

- Follow-up schedule
- Typical symptoms
- Vision assessment
- Ocular examination
- Typical early postoperative signs

C.1.2.1.8. Postoperative complications

- Keratitis
- Diffuse lamellar keratitis
- Steroid response and elevated IOP

- Haze and regression
- Microkeratome-related and other flap related complications
- Dry eye and neurotrophic epitheliopathy
- Epithelial ingrowth
- Visual complications
- Ectasia
- Endophthalmitis

C.1.2.1.9.

Postoperative care

- Discharge criteria
- Considerations for re-treatment

C.1.3. Subject 15: General Anatomy and Histology

Suggested ECTS: 3

Learning outcomes: The candidates should demonstrate fundamental knowledge and insight into general anatomy and histology to be able to understand and explain anatomy and histology. Knowledge and understanding should be demonstrated in the areas of: (1) head and skull (muscles, arteries, veins, lymphs, cranial nerves, sinuses, vestibular system, (2) cells (membranes, compartments, organelles, stem cells, cell differentiation), and (3) tissues (epithelium, glands, connective tissue, muscle, blood, nerves).

Learning outcomes	Details of how* and where this is delivered in the programme? <i>*theoretical/practical/self-directed</i>	Contribution of this component to Credit weighting?	Method of assessment?
(1) head and skull (muscles, arteries, veins, lymphs, cranial nerves, sinuses, vestibular system,			
(2) cells (membranes, compartments, organelles, stem cells, cell differentiation),			
(3) tissues (epithelium, glands, connective tissue, muscle, blood, nerves).			

C.1.3.1. Subject 15: General Anatomy and Histology - Topics to be covered to achieve these learning outcomes:

C.1.3.1.1.

Head

- Skull
- Muscles of facial expression
- Superficial and deep arteries, veins and lymphatics
- Peripheral cranial nerve distribution
- Paranasal sinuses
- Ear and vestibulum

C.1.3.1.2.

Cells

- Cell membrane
- Cell compartments
- Cell organelles
- Stem cells and cell differentiation

C.1.3.1.3.

Tissues

- Epithelium
- Glands
- Connective tissues
- Muscles
- Blood and blood vessels
- Nerve

C.1.4. Subject 16: Neuroscience

Suggested ECTS: 3

Learning outcomes: The candidates should demonstrate fundamental knowledge and insight into the area of neuroscience to be able to understand and explain the nervous system. Knowledge and understanding should be demonstrated in the areas of: (1) electrophysiology of the nerve cells (resting and action potential, synapses, receptors), (2) neuroanatomy (brain, cranial nerves, spinal cord, autonomic nervous system), and (3) neurophysiology (reflexes, pain and sensation, vestibular system, proprioceptive sensation, autonomic nervous system).

Learning outcomes	Details of how* and where this is delivered in the programme? <i>*theoretical/practical/self-directed</i>	Contribution of this component to Credit weighting?	Method of assessment?
(1) electrophysiology of the nerve cells (resting and action potential, synapses, receptors),			
(2) neuroanatomy (brain, cranial nerves, spinal cord, autonomic nervous system),			
(3) neurophysiology (reflexes, pain and sensation, vestibular system, proprioceptive sensation, autonomic nervous system).			

C.1.4.1. Subject 16: Neuroscience - Topics to be covered to achieve these learning outcomes:

C.1.4.1.1. Electrophysiology of the nerve cell

- Resting and action potential
- Synapses
- Receptors

C.1.4.1.2. Neuroanatomy

- Brain
- Cranial nerves
- Spinal cord
- Autonomic nervous system

C.1.4.1.3. Neurophysiology

- Reflexes
- Pain and pain sensation
- Vestibular system, proprioceptive sensations
- Autonomic nervous system

C.1.5. Subject 17: General Physiology and Biochemistry

Suggested ECTS: 3

Learning outcomes: The candidates should demonstrate fundamental knowledge and insight into physiology and biochemistry to be able to understand and explain general anatomy and physiology. Knowledge and understanding should be demonstrated in the areas of: (1) respiration, (2) gastrointestinal activity, (3) muscles, (4) body fluids, (5) renal system, (6) circulatory system including gas exchanges, (7) endocrine system, (8) proteins, (9) carbohydrates, (10) lipids, (11) molecular biology, (12) bioenergetics, and (13) genetics and hereditary patterns.

Learning outcomes	Details of how* and where this is delivered in the programme? <i>*theoretical/practical/self-directed</i>	Contribution of this component to Credit weighting?	Method of assessment?
(1) respiration,			
(2) gastrointestinal activity,			
(3) muscles,			
(4) body fluids,			
(5) renal system,			
(6) circulatory system including gas exchanges,			
(7) endocrine system,			
(8) proteins,			
(9) carbohydrates,			
(10) lipids,			
(11) molecular biology, and			
(12) bioenergetics.			
(13) genetics and hereditary patterns.			

C.1.5.1. Subject 17: General Physiology and Biochemistry - Topics to be covered to achieve these learning outcomes:

C.1.5.1.1. General Physiology

C.1.5.1.1.1. Respiration

C.1.5.1.1.2. Gastrointestinal system and activity (ex. Liver)

C.1.5.1.1.3. Muscles

C.1.5.1.1.4. Body fluid

C.1.5.1.1.5. Renal system

C.1.5.1.1.6. Circulatory system including gas exchanges

C.1.5.1.1.7. Endocrine system

C.1.5.1.2. General Biochemistry

C.1.5.1.2.1. Proteins

- Structure
- Types
- Enzymes
- Collagen

C.1.5.1.2.2. Carbohydrates

- Structure
- Mono- and polysaccharides
- Glycosaminoglycans and Proteoglycans
- Mucins
- Glycogen

C.1.5.1.2.3. Lipids

- Structure
- Fatty acids, triacylglycerols, sphingolipids, phospholipids, cholesterol
- VDL and HDL cholesterol
- Steroid hormones
- Membrane biochemistry

C.1.5.1.2.4. Molecular Biology

- DNA, RNA
- Genetic code
- DNA replication
- Protein synthesis

C.1.5.1.2.5. Bioenergetics

- ATP and ADP
- Free energy
- Glycolysis
- Krebs cycle
- Oxidative phosphorylation
- Role of oxygen

C.1.6. Subject 18: General Microbiology and Immunology

Suggested ECTS: 3

Learning outcomes: The candidates should demonstrate fundamental knowledge and insight into general microbiology and immunology. Knowledge and understanding should be demonstrated in the areas of: (1) virology, (2) bacteriology, (3) mycology, (4) parasitology, (5) antigens and antibodies, (6) complement system, (7) non-specific immunity, (8) specific immunity, (9) hypersensitivity response, and (10) autoimmunity.

Learning outcomes	Details of how* and where this is delivered in the programme? <i>*theoretical/practical/self-directed</i>	Contribution of this component to Credit weighting?	Method of assessment?
(1) virology,			
(2) bacteriology,			
(3) mycology,			
(4) parasitology,			
(5) antigens and antibodies,			
(6) complement system,			
(7) non-specific immunity,			
(8) specific immunity,			
(9) hypersensitivity response, and			
(10) autoimmunity.			

C.1.6.1. Subject 18: General Microbiology and Immunology - Topics to be covered to achieve these learning outcomes:

C.1.6.1.1. General Microbiology

C.1.6.1.1.1. Virology

- Structure and morphology
- Classification
- Viral diseases
- Immunity
- Laboratory diagnosis

C.1.6.1.1.2. Bacteriology

- Structure and morphology
- Gram staining
- Anaerobic and aerobic bacteria
- Physiological processes of bacterial growth
- Bacterial diseases
- Pathological mechanisms of bacterial infection
- Immunity
- Laboratory diagnosis

C.1.6.1.1.3. Mucology

- Biology of fungi
- Mycotic diseases
- Laboratory diagnosis

C.1.6.1.1.4. Parasitology

- Acanthamebia
- Toxoplasma
- Onchocercus
- Toxicariasis
- Phtiriasis

C.1.6.1.2. General Immunology

C.1.6.1.2.1. Antigen and antibodies

C.1.6.1.2.2. Complement system

C.1.6.1.2.3. Non-specific immunity

C.1.6.1.2.4. Specific immunity

C.1.6.1.2.5. Hypersensitivity responses

- Anaphylactic hypersensitivity
- Cytotoxic hypersensitivity
- Complex-mediated hypersensitivity
- Delayed hypersensitivity

C.1.6.1.2.6. Autoimmunity

C.1.7. Subject 19: General Pharmacology

Suggested ECTS: 6

Learning outcomes: The candidates should demonstrate fundamental knowledge and insight into general pharmacology to be able to understand and explain general pharmacology. Knowledge and understanding should be demonstrated in the areas of: (1) pharmacokinetics, (2) pharmacodynamics, (3) drugs acting on the autonomic nervous system, (4) analgetics and local anaesthetics, (5) antipyretics and anti-inflammatory drugs, (6) antibiotics, (7) antiviral drugs, (8) antiallergic drugs, (9) drugs affecting respiratory and cardiovascular systems, (10) antiseptics, disinfectants, preservatives, (11) common systemic side effects of medications, and (12) general health.

Learning outcomes	Details of how* and where this is delivered in the programme? <i>*theoretical/practical/self-directed</i>	Contribution of this component to Credit weighting?	Method of assessment?
(1) pharmacokinetics,			
(2) pharmacodynamics,			
(3) drugs acting on the autonomic nervous system,			
(4) analgetics and local anaesthetics,			
(5) antipyretics and anti-inflammatory drugs,			
(6) antibiotics,			
(7) antiviral drugs,			
(8) antiallergic drugs,			
(9) drugs affecting respiratory and cardiovascular systems,			
(10) antiseptics, disinfectants, preservatives,			
(11) common systemic side effects of medications,			
(12) general health.			

C.1.7.1. Subject 19: General Pharmacology - Topics to be covered to achieve these learning outcomes:

C.1.7.1.1. Pharmacokinetics

C.1.7.1.2. Pharmacodynamics

C.1.7.1.3. Drugs acting on the autonomic nervous system

- Cholinergic agonists and antagonists
- Adrenergic agonists and antagonists

C.1.7.1.4. Analgesics and local anaesthetics

C.1.7.1.5. Antipyretics and anti-inflammatory drugs

C.1.7.1.6. Antibiotics

C.1.7.1.7. Antiviral drugs

C.1.7.1.8. Antiallergic drugs

C.1.7.1.9. Drugs affecting respiratory and cardiovascular system

C.1.7.1.10. Antiseptics, disinfectants, preservatives

C.1.7.1.11. Common systemic side effects of medications

C.1.7.1.12. General health

- History with regards to differential diagnosis of fatigue, weight loss, fever, headache, and dizziness and malaise
- Deviations from physical development norms
- Principle of basic cardiac life-support

C.1.8. Subject 20: Pathology and General Medical Disorders

Suggested ECTS: 12

Learning outcomes: The candidates should demonstrate fundamental knowledge and insight into general pathology and general medical disorder and how they can affect the eye to be able to understand and explain pathology and general medical disorders. Knowledge and understanding should be demonstrated in the areas of: (1) inflammation and repair, (2) cardiovascular diseases and the eye, (3) blood diseases and the eye, (4) endocrine diseases and the eye, (5) neurological diseases and the eye, (6) nutritional disorders, (7) rheumatoid disorders, vasculitis and collagenosis, (8) infectious diseases, (9) tumours, and (10) congenital and hereditary conditions.

Learning outcomes	Details of how* and where this is delivered in the programme? <i>*theoretical/practical/self-directed</i>	Contribution of this component to Credit weighting?	Method of assessment?
(1) inflammation and repair,			
(2) cardiovascular diseases and the eye,			
(3) blood diseases and the eye,			
(4) endocrine diseases and the eye,			
(5) neurological diseases and the eye,			
(6) nutritional disorders			
(7) rheumatoid disorders, vasculitis and collagenosis			
(8) infectious diseases,			
(9) tumours,			
(10) congenital and hereditary conditions.			

C.1.8.1. Subject 20: Pathology and General Medical Disorders - Topics to be covered to achieve these learning outcomes:

C.1.8.1.1. Inflammation and repair

C.1.8.1.1.1. Cardiovascular diseases and the eye

- Hypertension
- Atherosclerosis
- Carotis stenosis
- Aneurysma
- Stroke

C.1.8.1.1.2. Blood diseases and the eye

- Anemia
- Leucemia
- Lymphoma

C.1.8.1.1.3. Endocrine diseases and the eye

- Diabetes
- Grave's disease and endocrine orbitopathy

C.1.8.1.1.4. Neurologic diseases and the eye

- Headache
- Multiple sclerosis
- Brain tumors
- Intracranial pressure
- Neuromuscular diseases

C.1.8.1.1.5. Nutritional disorders

- Malabsorption
- Alcoholism
- Vitamin deficiencies

C.1.8.1.1.6. Rheumatoid disorders, Vasculitis and Collagenosis

- Rheumatoid polyarthritis
- Morbus Bechterew
- Reiters Syndrome
- Sjogren Syndrom
- Giant cell arteriitis

C.1.8.1.1.7. Infectious diseases

- Viral diseases
- Bacterial diseases
- Fungal diseases
- Parasitic diseases

C.1.8.1.1.8. Tumours

- Brain tumours and vision
- Ocular metastasis of primary tumours

C.1.8.1.1.9. Congenital and hereditary conditions

- Symptoms and signs of common genetic disorders
- Symptoms and signs of common congenital disorders (foetal alcohol syndrome, rubella, syphilis, toxoplasmosis)

C.1.9. Subject 21: Epidemiology and Biostatistics

Suggested ECTS: 3

Learning outcomes: The candidates should demonstrate fundamental knowledge and insight into epidemiology and biostatistics, not only for application in laboratory experiments and research, but also for understanding how to interpret clinical evidence in optometric practice. Knowledge and understanding should be demonstrated in the areas of: (1) epidemiological data (incidence and prevalence, odds, relative risk, central tendency and variability), (2) screening concepts (sensitivity and specificity, predictive value, yield), (3) major epidemiological studies, (4) research design, and (5) morbidity and mortality.

Learning outcomes	Details of how* and where this is delivered in the programme? <i>*theoretical/practical/self-directed</i>	Contribution of this component to Credit weighting?	Method of assessment?
(1) epidemiological data (incidence and prevalence, odds, relative risk, central tendency and variability),			
(2) screening concepts (sensitivity and specificity, predictive value, yield),			
(3) major epidemiological studies			
(4) research design,			
(5) morbidity and mortality.			

C.1.9.1. Subject 21: Epidemiology and Biostatistics - Topics to be covered to achieve these learning outcomes:

C.1.9.1.1. Epidemiological data

- Incidence and prevalence
- Odds ratio
- Relative risk
- Indices of health

C.1.9.1.2. Screening Concepts

- Sensitivity and specificity
- Predictive value
- Yield

C.1.9.1.3. Major epidemiological studies

C.1.9.1.4. Research design

- Descriptive and experimental studies
- Case-control studies
- Cross-sectional studies
- Cohort studies (prospective and retrospective)

C.1.9.1.5. Morbidity and mortality

- General morbidity and mortality patterns
- General distribution of eye and vision disorders
- Legal blindness (age-specific causes, age-specific rates)

C.1.10. Subject 22: Ocular Anatomy and Physiology

Suggested ECTS: 9

Learning outcomes: The candidates should demonstrate knowledge, understanding and skills, and be able to discuss and explain in detail the anatomy and physiology of the eye. Knowledge and understanding regarding structure and function, and development and ageing, should be demonstrated in the areas of: (1) orbit, (2) extraocular muscles, (3) ocular blood supply, (4) ocular and orbital nerves, (5) eyelid, (6) eyebrow, (7) conjunctiva, (8) lacrimal system, (9) cornea, (10) sclera and episclera, (11) anterior chamber and angle, (12) iris, (13) pupil and posterior chamber, (14) ciliary body, (15) lens and zonules, (16) choroid, (17) vitreous, (18) retina (including its layers and anatomical landmarks, e.g., macula, fovea, foveola etc.), (19) optic nerve, and (20) visual pathways.

Learning outcomes	Details of how* and where this is delivered in the programme? <i>*theoretical/practical/self-directed</i>	Contribution of this component to Credit weighting?	Method of assessment?
(1) orbit,			
(2) extraocular muscles,			
(3) ocular blood supply,			
(4) ocular and orbital nerves,			
(5) eyelid,			
(6) eyebrow,			
(7) conjunctiva,			
(8) lacrimal system,			
(9) cornea,			
(10) sclera and episclera,			
(11) anterior chamber and angle,			
(12) iris,			
(13) pupil and posterior chamber,			
(14) ciliary body,			
(15) lens and zonules,			
(16) choroid,			
(17) vitreous,			

(18) retina (including its layers and anatomical landmarks, e.g., macula, fovea, foveola, etc.),			
(19) optic nerve, and			
(20) visual pathways.			

C.1.10.1. Subject 22: Ocular Anatomy and Physiology - Topics to be covered to achieve these learning outcomes:

C.1.10.1.1. Anatomy of the Eye, Ocular Adnexa and Visual Pathways

C.1.10.1.1.1. Orbit

- Location of bones and openings
- Anatomical relationships among orbital structures (extraocular muscles, nerves, blood vessels, fat compartments, fascia)

C.1.10.1.1.2. Extraocular muscles

- Names, origins, insertions
- Innervation, blood supply

C.1.10.1.1.3. Ocular blood supply

- Branches of internal and external carotid arteries related to the orbit, eyelid and upper face
- Branches of the internal and external jugular veins
- Dural sinuses

C.1.10.1.1.4. Ocular and orbital nerves

- Intracranial and extracranial course, branches and functions of cranial nerve I, III, IV, V, VI, VII
- Parasympathetic and sympathetic nerves (course, branches, tissue innervated)

C.1.10.1.1.5. Eyelid

- Structures of the layers, muscles and glands
- Blood supply and drainage, lymphatic drainage
- Innervation

C.1.10.1.1.6. Eyebrow (structure and function)

C.1.10.1.1.7. Conjunctiva

- Structures of the layers, cell types and glands
- Blood supply and drainage, lymphatic drainage
- Innervation
- Composition of plica semilunaris and caruncle
- Relationship with adjacent structures

C.1.10.1.1.8. Lacrimal system

- Lacrimal gland (structure, innervation, blood supply)
- Accessory lacrimal glands (location, function)
- Composition and structure of the tear film
- Drainage of tears
- Location of lacrimal fossa and nasolacrimal canal

C.1.10.1.1.9. Cornea

- Normal dimensions
- Temperature
- Composition and ultrastructure of epithelium, Bowmans's membrane, stroma, Descemet's membrane and endothelium
- Innervation
- Wound healing and regeneration

- C.1.10.1.1.10. Sclera**
- Dimensions and colour
 - Relationship to adjacent structures
 - Composition of layers
 - Location and content emissaria
 - Structure of lamina cribrosa
- C.1.10.1.1.11. Anterior chamber and angle**
- Shape and dimensions
 - Composition of ultrastructure of the trabecular meshwork, juxtacanalicular tissue, Schlemm's canal, the scleral spur and Schwalbe's ring
- C.1.10.1.1.12. Iris**
- Dimensions, zones and coloration
 - Composition and ultrastructure of anterior border, anterior epithelium, stroma and posterior epithelium
 - Composition and ultrastructure of sphincter and dilatator muscles
 - Blood supply, venous drainage
 - Innervation
- C.1.10.1.1.13. Pupil and posterior chamber**
- Locations and dimensions
- C.1.10.1.1.14. Ciliary body**
- Dimensions and relationship to adjacent structures
 - Locations and components of pars plana and pars plicata
 - Ultrastructure of the epithelium and stroma and the ciliary muscle
 - Blood supply, venous drainage
 - Innervation
- C.1.10.1.1.15. Lens and zonules**
- Ultrastructure and composition of capsule, epithelium and cortex
 - Location of nuclei and sutures
- C.1.10.1.1.16. Choroid**
- Extent and thickness
 - Ultrastructure of choriocapillaris
 - Composition of stroma
 - Blood supply, venous drainage
 - Innervation
 - Location and composition of Bruch's membrane
- C.1.10.1.1.17. Vitreous**
- Composition, ultrastructure, volume and shape
 - Attachments to retina and lens (ultrastructure)
 - Locations of patellar fossa, anterior and posterior hyaloids
 - Location and origin of hyaloid canal
- C.1.10.1.1.18. Retina**
- Components and ultrastructure of each layer
 - Relationship between retinal pigment epithelium and Bruch's membrane and photoreceptor outer segments
 - Synaptic connections within retina
 - Location, names and function of glial cells
 - Blood supply, venous drainage

- Attachments to retina and lens (ultrastructure)
- Location, size and ultrastructure of area centralis, parafovea, fovea, foveola, macula lutea, ora serrata

C.1.10.1.1.19.

Optic nerve

- Composition and blood supply of the prelaminar, laminar and retrolaminar portion
- Location of central retinal artery and vein
- Normal surface and optic disc/cup features

C.1.10.1.1.20.

Visual pathway

- Localisation of retinal fibres along visual pathway, optic nerve, chiasm, optic tract, lateral geniculate body, optic radiations, visual cortex
- Layers of lateral geniculate body
- Layers of visual cortex, areas
- Blood supply
- Anatomy related to visual pathology

C.1.10.1.2.

Ocular and Visual Pathway Development

C.1.10.1.2.1.

Orbit

- Development of bones, closure of sutures, abnormalities

C.1.10.1.2.2.

Extraocular muscles

- Tissue origin and development
- Motor innervation development
- Late development

C.1.10.1.2.3.

Eyelid

- Tissue origin and development
- Ectodermal and mesodermal derivatives

C.1.10.1.2.4.

Conjunctiva

- Tissue origin and development

C.1.10.1.2.5.

Lacrimal apparatus

- Tissue origin of lacrimal glands (main, accessory)
- Appearance of tearing and weeping (reflexes)
- Tissue origin of lacrimal and nasal passages

C.1.10.1.2.6.

Cornea

- Tissue origin and development
- Origin and development of nerves
- Factors affecting corneal size, curvature, transparency

C.1.10.1.2.7.

Sclera

- Tissue origin and development

C.1.10.1.2.8.

Anterior and posterior chamber

- Creation of anatomical space and angle
- Factors that promote growth of anterior chamber
- Differentiation of Canal of Schlemm, scleral spur, trabecular meshwork
- Endothelial membrane

C.1.10.1.2.9.

Iris/Pupil

- Tissue origin and development

- Development of dilator and sphincter muscles
- Pupillary membrane
- Cilioiridic circulation

C.1.10.1.2.10.

Ciliary body

- Tissue origin
- Development of pars ciliaris retinae
- Development of ciliary processes, ciliary muscles, ciliary vessels

C.1.10.1.2.11.

Lens and zonules

- Tissue origin and development
- Effect on development of vitreous, iris, cornea, retina
- Mechanism of lens fibre orientation
- Stages of lens vesicle and lens fibre development
- Developmental nuclei
- Zones of development of lens epithelium

C.1.10.1.2.12.

Choroid

- Tissue origin
- Development of choroidal vasculature and Bruch's membrane

C.1.10.1.2.13.

Vitreous

- Tissue origin and characteristics of primary, secondary and tertiary vitreous

C.1.10.1.2.14.

Retina

- Development of optic cup
- Analogies between development of retina and central nervous system
- Formation and fusion of foetal fissure
- Retinal and macular differentiation
- Retinal circulation development
- Postnatal events

C.1.10.1.2.15.

Optic nerve and visual pathway

- Development of lower visual pathway
- Myelination
- Relationship between development of upper visual pathway and central vision

C.1.10.1.3.

Ocular Physiology / Neurophysiology

C.1.10.1.3.1.

Circulation

- Haemodynamic patterns (resistance, transmural pressure, flow rate, critical closing pressures)
- Autoregulation
- Autonomic nervous system control
- Unique environment of the eye (high extravascular pressure)
- Uveal blood flow: choroid, ciliary body, iris (unique characteristics of each, functions of each)
- Retinal blood flow (unique characteristics, dual supply, functions)

C.1.10.1.3.2.

Eyelids

- Blink reflexes and protective functions
- Role in production, distribution and drainage of tears

C.1.10.1.3.3.

Tears

- Physical characteristics
- Function of tears

- Source and function of each layer of tears
- Basic and reflex tear secretion

C.1.10.1.3.4.

Cornea

- Physical characteristics (water content, protein content, cells, resistance to trauma)
- Permeability characteristics of various layers
- Metabolic characteristics of various layers
- Factors influencing corneal thickness/hydration and theories of transparency
- Physiological parameters, necessary to maintain corneal integrity
- Physiological characteristics of corneal nerves
- Ageing changes of the cornea

C.1.10.1.3.5.

Intraocular pressure

- Mean values and diurnal variation
- Association to corneal thickness
- Factors controlling aqueous production and outflow
- Nervous system regulation of IOP
- Systemic factors influencing IOP

C.1.10.1.3.6.

Aqueous

- Function of aqueous
- Physical characteristics
- Formation (ultrafiltration, active transport)
- Factors influencing rate of flow
- Composition
- Blood aqueous barriers location, ultrastructure, function)

C.1.10.1.3.7.

Lacrimal apparatus

- Regulation of basic and reflex tear secretion

C.1.10.1.3.8.

Pupillary pathways

- Sympathetic and parasympathetic pathway to iris
- Functional relationship between pupillary pathways and central nervous system

C.1.10.1.3.9.

Lens

- Function and physical characteristics
- Metabolism
- Lens proteins
- Theories of transparency
- Regeneration
- Ageing changes in composition

C.1.10.1.3.10.

Choroid

- Functions
- Physiological relationships with retina

C.1.10.1.3.11.

Vitreous

- Function and physical characteristics
- Metabolism
- Ageing changes in composition

C.1.10.1.3.12.

Retina

- Composition and formation of disc outersegments
- Composition and formation visual pigments
- Stages of visual cycle
- Photoreceptor electrophysiology
- Retinal neurotransmitters
- Function of bipolar, horizontal, amacrine and ganglion cells (receptive fields)
- Retinal neural mechanisms of colour vision (spatial, temporal and chromatic)

C.1.10.1.3.13.

Visual pathway

- Function of lateral geniculate body
- Receptive fields of cells in lateral geniculate body (relationship to colour vision, binocularity, space perception, etc.)
- Function of visual cortex
- Receptive field properties (single cell properties)
- Functional organisation of visual cortex
- Physiology of binocular vision
- Mechanism of feature detection

C.1.10.1.3.14.

Extraocular muscles

- Visual-vestibular interactions (vestibulo-ocular reflex, optokinetic reflex)
- Supranuclear control of eye movements

C.1.11. Subject 23: Ocular Pharmacology

Suggested ECTS: 6

Learning outcomes: The candidates should demonstrate knowledge, understanding and skills, and be able to discuss and manage patients when diagnostic drugs are indicated. Knowledge, understanding and testing skills should be demonstrated in the areas of: (1) general principles including factors affecting drug absorption and autonomic drugs, (2) cycloplegics, (3) mydriatics, (4) miotics, (5) local anaesthetics, (6) vital staining agents, (7) antimicrobial agents, (8) contact lens solutions, (9) decongestants, antihistamines, anti-inflammatory components and hyperosmotic agents, (10) lubricants and tear film substitutes including preparations used with contact lenses, (11) ocular effects of local and systemic drugs, (12) first-aid and emergency measures used by optometrists and (13) toxicology and handling of side-effects of diagnostic drugs.

Learning outcomes	Details of how* and where this is delivered in the programme? <i>*theoretical/practical/self-directed</i>	Contribution of this component to Credit weighting?	Method of assessment?
(1) general principles including factors affecting drug absorption and autonomic drugs,			
(2) cycloplegics,			
(3) mydriatics,			
(4) miotics,			
(5) local anaesthetics,			
(6) vital staining agents,			
(7) antimicrobial agents,			
(8) contact lens solutions,			
(9) decongestants, antihistamines and anti-inflammatory components,			
(10) lubricants and tear film substitutes including preparations used with contact lenses,			
(11) ocular effects of local and systemic drugs ,			
(12) first-aid and emergency measures used by optometrists			
(13) toxicology and handling of side-effects of diagnostic drugs			

C.1.11.1. Subject 23: Ocular Pharmacology - Topics to be covered to achieve these learning outcomes:

C.1.11.1.1. General Principles

- Factors affecting ocular drug bioavailability
- Routes of ocular drug administration

C.1.11.1.2. Autonomic Drugs

- Functional concepts and ocular receptor types
- Ocular cholinergic agents
- Ocular adrenergic agents

C.1.11.1.3. Local anaesthetics

- Properties of topical ocular anaesthetics (non-injectable)

C.1.11.1.4. Antihistamines

C.1.11.1.5. Anti-inflammatory agents

- Steroid
- Non-steroids (including mast cell stabilizers)

C.1.11.1.6. Chemotherapeutic agents

- Antimicrobials
- Antivirals
- Antifungals

C.1.11.1.7. Dyes

- Topical diagnostic agents
- Oral and intravenous agents

C.1.11.1.8. Hyperosmotic agents

- Topical diagnostic agents

C.1.11.1.9. Lubricants and tear substitutes

C.1.11.1.10. Preparations used with contact lenses

C.1.11.1.11. Toxicology

- Ocular effects from topical ocular drug administration
- Ocular effects from systemic drug administration
- Systemic effects from ocular drug administration

C.1.12. Subject 24: Abnormal Ocular Conditions

Suggested ECTS: 12

Learning outcomes: The candidates should demonstrate knowledge, understanding and skills, and be able to detect and manage patients presenting with abnormal ocular conditions. Knowledge and understanding of risk factors and treatment should be demonstrated of ocular pathology affecting: (1) orbit, (2) ocular adnexa, (3) lacrimal system, (4) conjunctiva, (5) cornea, (6) sclera and episclera, (7) anterior uvea (iris and ciliary body), (8) pupillary, accommodative and refractive pathology, (9) anterior chamber, angle structures and IOP, (10) lens, (11) vitreous, (12) choroid, (13) retina (including abnormal ocular conditions affecting its different layers and anatomical landmarks, e.g., macula, fovea, foveolar, mid-periphery, periphery etc.), (14) optic nerve and the optic nerve head, (15) sensory neuro-visual pathology, and (16) oculomotor neuropathology, and (17) systemic diseases affecting the eye.

Learning outcomes	Details of how* and where this is delivered in the programme? <i>*theoretical/practical/self-directed</i>	Contribution of this component to Credit weighting?	Method of assessment?
(1) orbit,			
(2) ocular adnexa,			
(3) lacrimal system,			
(4) conjunctiva,			
(5) cornea,			
(6) sclera and episclera,			
(7) anterior uvea (iris and ciliary body),			
(8) pupillary, accommodative and refractive pathology,			
(9) anterior chamber, angle structure and IOP,			
(10) lens,			
(11) vitreous,			
(12) choroid			
(13) retina (including abnormal ocular conditions affecting its different layers and anatomical landmarks, e.g., macula, fovea, foveolar, mid-periphery, periphery etc.)			
(14) optic nerve and the optic nerve head,			
(15) sensory neuro-visual pathology,			

(16) oculomotor neuropathology,			
(17) systemic diseases affecting the eye.			

C.1.12.1. Subject 24: Abnormal Ocular Conditions - Topics to be covered to achieve these learning outcomes:

C.1.12.1.1. Ocular Adnexa

C.1.12.1.1.1. Epidemiology, history and symptom inventory

C.1.12.1.1.2. Observation, inspection, recognition of signs, and techniques and skills including:

- Palpation of relevant structures
- Lid eversion
- Diagnosis and management of marginal lid disease
- Tonus and strength testing of facial and lid muscles by the third and seventh cranial nerves
- Tests for integrity of the fifth cranial nerve
- Sinus evaluation (history, discharge, fever, etc.)
- Biomicroscopic appearance of relevant structures in health and disease
- External photography and documentation
- Signs and symptoms of related systemic diseases

C.1.12.1.1.3. Pathophysiology, diagnosis, management options, and prognosis

C.1.12.1.2. Lacrimal System

C.1.12.1.2.1. Epidemiology, history and symptom inventory

C.1.12.1.2.2. Observation, inspection, recognition of signs, and techniques and skills including:

- Palpation of sac, canaliculi, and lacrimal fossa; observation of lid dynamics, punctal position
- Biomicroscopic appearance
- Use of fluorescein, rose Bengal and Lissamine green dyes
- Tests of basic and reflex secretion
- Fluorescein transit tests to nose and oropharynx
- Saccharin taste test
- Signs and symptoms of related systemic diseases
- Qualitative & quantitative tear assessment
- Punctal dilation; probing and lacrimal syringing
- Collagen punctum plugs
- Punctum/canalicular occlusion

C.1.12.1.2.3. Pathophysiology, diagnosis, management options, and prognosis

C.1.12.1.3. Conjunctiva

C.1.12.1.3.1. Epidemiology, history and symptom inventory

C.1.12.1.3.2. Observation, inspection, recognition of signs, and techniques and skills including:

- Biomicroscopy to highlight and describe morphology and location of irregularities, deposits, opacities, etc.
- Evaluation of preauricular and submandibular lymph nodes
- History and evaluation of oropharynx for associated upper respiratory illness
- History related to associated urinary tract infection

- Biomicroscopic appearance of varied appearance of the lids and cornea in primary conjunctival disease
- Swabbing, scraping; smears, stains and cultures
- Signs and symptoms of related systemic diseases

C.1.12.1.3.3. Pathophysiology, diagnosis, management options, and prognosis

C.1.12.1.3.4. Differential diagnosis of viral, bacterial and allergic conjunctivitis

- Treatment of conjunctivitis

C.1.12.1.3.5. Evaluation of regional lymph nodes

C.1.12.1.4. Cornea

C.1.12.1.4.1. Epidemiology, history and symptom inventory

C.1.12.1.4.2. Observation, inspection, recognition of signs, and techniques and skills including:

- Biomicroscopy to highlight and describe morphology and location of irregularities, deposits, opacities, etc.
- Evaluation of surface optical quality and abnormal curvature via reflections
- Corneal aesthesiometry and pachometry
- Use of anesthetics/vital dyes
- Obtaining and interpreting smears and cultures
- Slit-lamp photography
- Signs and symptoms of related systemic diseases

C.1.12.1.4.3. Pathophysiology, diagnosis, management options, and prognosis

C.1.12.1.5. Sclera / Episclera

C.1.12.1.5.1. Epidemiology, history and symptom inventory

C.1.12.1.5.2. Observation, inspection, recognition of signs, and techniques and skills including:

- Investigation of entities producing pain in or referred to eye and orbit
- Biomicroscopic techniques useful to detect episcleral and scleral inflammation deep to conjunctival injection/chemosis
- Indirect ophthalmoscopy to detect posterior scleritis
- Signs and symptoms of related systemic diseases
- Use of topical vasoconstrictor

C.1.12.1.5.3. Pathophysiology, diagnosis, management options, and prognosis

C.1.12.1.6. Anterior Uvea (Iris and Ciliary Body)

C.1.12.1.6.1. Epidemiology, history and symptom inventory

C.1.12.1.6.2. Observation, inspection, recognition of signs, and techniques and skills including:

- Biomicroscopy
- Gonioscopy
- Transillumination in albinoids
- Evaluation of pupil
- Binocular indirect ophthalmoscopy, with scleral depression

- Referral criteria for special tests
- Slit-lamp photography
- Signs and symptoms of related systemic diseases

C.1.12.1.6.3. Pathophysiology, diagnosis, management options, and prognosis

C.1.12.1.7. Pupillary, Accommodative and Refractive Pathology

C.1.12.1.7.1. Epidemiology, history and symptom inventory

C.1.12.1.7.2. Observation, inspection, recognition of signs, and techniques and skills including:

- Evaluation of the sympathetic pathway
- Evaluation of the parasympathetic pathway and surrounds in third nerve disease
- Relevant pharmacology: including diagnostic tests in Adie's and Horner's syndromes; testing for a pharmacologically blocked pupil as well as the effects of autonomically active drugs and toxicology o accommodative paresis, spasm and ciliary body oedema
- Swinging flashlight and pupil cycle tests
- Evaluation and recognition of signs of aberrant regeneration
- Evaluation of deep tendon reflexes in Adie's syndrome
- Evaluation of suspicious refractive shifts
- Signs and symptoms of related systemic diseases

C.1.12.1.7.3. Pathophysiology, diagnosis, management options, and prognosis

C.1.12.1.8. Orbit

C.1.12.1.8.1. Epidemiology, history and symptom inventory

C.1.12.1.8.2. Observation, inspection, recognition of signs, and techniques and skills including:

- Assessment of asymmetrical fissures
- Recognition of dysplasia craniofacial appearance
- General workup for periorbital ache/pain of unknown cause
- Exophthalmometry
- Palpation of orbital rim and anterior orbit
- Evaluation of episcleral venous dilation
- Assessment of periorbital oedema
- Testing for orbital bruits
- Valsalva maneuver in proptosis
- Workup for suspected blow out fracture
- Tests for restrictive myopathy
- Special tests including tomograms, ultrasound, GT-scan, venograms
- Signs and symptoms of related systemic diseases

C.1.12.1.8.3. Pathophysiology, diagnosis, management options, and prognosis

C.1.12.1.9. Anterior Chamber, Angle Structure and Abnormal IOP

C.1.12.1.9.1. Epidemiology, history and symptom inventory

- C.1.12.1.9.2. Observation, inspection, recognition of signs, and techniques and skills including:**
- Tensions
 - Biomicroscopic appearance of associated anterior segment signs of glaucomas
 - Tests for estimation of chamber depth
 - Gonioscopy, direct and indirect
 - Estimating ocular rigidity with Shiotz tonometer
 - Assessment of post surgical eyes
 - Signs and symptoms of related systemic diseases
- C.1.12.1.9.3. Pathophysiology, diagnosis, management options, and prognosis**
- C.1.12.1.10. Lens / Aphakia / Pseudophakia**
- C.1.12.1.10.1. Epidemiology, history and symptom inventory**
- C.1.12.1.10.2. Observation, inspection, recognition of signs, and techniques and skills including:**
- Lens toxicology
 - Biomicroscopy
 - Ophthalmoscopy
 - Retinal integrity testing with opaque media
 - Signs and symptoms of related systemic diseases
- C.1.12.1.10.3. Pathophysiology, diagnosis, management options, and prognosis**
- C.1.12.1.11. Posterior Pole**
- C.1.12.1.11.1. Epidemiology, history and symptom inventory**
- C.1.12.1.11.2. Observation, inspection, recognition of signs, and techniques and skills including:**
- Direct ophthalmoscopy
 - Indirect ophthalmoscopy
 - Family history
 - Biomicroscopy with fundus lenses
 - Ophthalmodynamometry
 - Colour vision testing
 - Photo stress testing
 - Amsler Grid testing
 - Visual fields
 - Dark adaptometry
 - Contrast sensitivity testing
 - Retinal hotography
 - Basic interpretation of special studies (EOG, ERG, VER, intravenous fluorescein angiography, ultrasound)
 - Retinal integrity testing with opaque media
 - Signs and symptoms of related systemic diseases
- C.1.12.1.11.3. Pathophysiology, diagnosis, management options, and prognosis**

- C.1.12.1.11.4. Methods to assess retinal function in presence of corneal irregularity and media opacities**
- C.1.12.1.12. Peripheral Fundus / Vitreous**
- C.1.12.1.12.1. Epidemiology, history and symptom inventory**
- C.1.12.1.12.2. Observation, inspection, recognition of signs, and techniques and skills including:**
- Binocular indirect ophthalmoscopy, scleral depression and retinal drawing
 - Biomicroscopy with peripheral fundus lenses
 - Signs and symptoms of related systemic diseases
- C.1.12.1.12.3. Pathophysiology, diagnosis, management options, and prognosis**
- C.1.12.1.13. Optic Nerve Pathology**
- C.1.12.1.13.1. Epidemiology, history and symptom inventory**
- C.1.12.1.13.2. Observation, inspection, recognition of signs, and techniques and skills including:**
- Nerve toxicology
 - Colour vision testing in optic nerve disorders
 - Visual field testing
 - Testing for objective and subjective afferent papillary defects
 - Pupil cycle times
 - Pulfrich phenomenon
 - Use of neutral density filters
 - Interpretation of electrodiagnostic tests, contrast sensitivity, etc.
 - Observation of nerve head and peripapillary retina with ophthalmoscope, fundus lenses and stereophotography
 - Carotid assessment
 - Plain x-rays, tomograms, CT-scans ultrasound and intravenous fluorescein
 - Signs and symptoms of related systemic diseases
- C.1.12.1.13.3. Pathophysiology, diagnosis, management options, and prognosis**
- C.1.12.1.14. Sensory Neuro-Visual Pathology**
- C.1.12.1.14.1. Epidemiology, history and symptom inventory**
- C.1.12.1.14.2. Observation, inspection, recognition of signs, and techniques and skills including:**
- Transient neuro-visual episodes
 - Detailed visual fields
 - Detailed headache workup
 - Indications, limitations, risks and costs of intravenous angiography, direct puncture angiography, plain x-rays, tomograms, CT-scan, air studies EEG, radio-nucleotide scanning, nuclear magnetic resonance scan
 - Signs and symptoms of related systemic diseases
- C.1.12.1.14.3. Pathophysiology, diagnosis, management options, and prognosis**

C.1.12.1.15. Oculomotor Neuropathology

C.1.12.1.15.1. Epidemiology, history and symptom inventory

C.1.12.1.15.2. Observation, inspection, recognition of signs, and techniques and skills including:

- Objective and subjective testing for incomitancy
- Strength and fatigue testing in myopathies
- Recognition and examination for orbital signs
- Understanding indications for intravenous tension
- Signs and symptoms of related systemic diseases and observation, inspection, recognition of signs, and techniques and skills appropriate to supranuclear oculomotor neuropathology including:
 - Observation, inspection and testing stability of eyes in fixation
 - Testing for adequacy of pursuits
 - Testing for adequacy of saccades
 - Testing for extraocular muscle reflexes
 - Assessment of "dizzy" patient

C.1.12.1.15.3. Pathophysiology, diagnosis, management options, and prognosis

C.3. PART C: Clinical/practical European Diploma competencies.

C.3.1. Subject 12C: Investigative techniques PART C

<p>In addition to the clinical/practical competencies listed below the candidate should be able to use, interpret, and explain the results of (at least) the following ophthalmic instruments:</p> <ul style="list-style-type: none"> - Retinoscope - Ophthalmoscope - Keratometer - Pachymeter - Slit-lamp (including the use of an extra lens to evaluate the fundus) - Gonioscopy - Automated visual field test - Ocular coherence tomography (OCT) - Fundus camera - Non-contact and contact applanation tonometer 					
	<i>Clinical/practical competencies:</i>	Competency assessment		Clinical experience	
		Brief details of the assessment	Where in the programme?	Minimum number of patients a student would examine	Brief description of how evidence of clinical experience is recorded
1	The ability to assess a patient's colour vision and to determine whether it achieves the standards required by various vocational groups and whether there is a macular problem.				
2	The ability to use instruments in ocular examination and to understand the implications of the findings in terms of subsequent examination techniques.				
3	The ability to assess the external eye and adnexa.				

4	The ability to assess the tear film				
5	The ability to assess pupil reactions.				
6	The ability to use diagnostic drugs to aid ocular examination.				
7	The ability to use instrument to measure central and peripheral corneal curvature and thickness (non-contact and contact)				
8	The ability to examine the central and peripheral fundus with different observation techniques				
9	The ability to assess the internal eye				
10	The ability to make an assessment of the fundus in the presence of media opacities.				
11	The ability to detect anterior chamber signs of ocular inflammation.				
12	The ability to assess and interpret visual fields of patients with normal, sub-optimal, or reduced visual acuity.				
13	The ability to use non-contact and applanation tonometers to measure intraocular pressure and analyse and interpret the results				

C.3.2. Subject 24: Abnormal Ocular Conditions

C.3.2. Subject 24: Abnormal Ocular Conditions					
	<i>Clinical/practical competencies:</i>	Competency assessment		Clinical experience	
		Brief details of the assessment	Where in the programme?	Minimum number of patients a student would examine	Brief description of how evidence of clinical experience is recorded
1	The ability to interpret and investigate the presenting symptoms and concerns of the patient.				
2	The ability to develop a management plan for the investigation of the patient.				
3	The ability to identify external pathology and offer appropriate information and advice to patients not needing referral.				
4	The ability to recognise common ocular abnormalities and to refer when appropriate.				
5	The ability to manage a patient presenting with a red eye.				
6	The ability to manage a patient presenting with reduced vision.				
7	The ability to identify abnormal colour vision and to appreciate its significance.				
8	The ability to manage a patient presenting with cataract.				
9	The ability to evaluate glaucoma risk factors, to detect glaucoma and refer accordingly.				
10	The ability to manage a patient presenting with macular degeneration or other macular disease.				

11	The ability to recognise, evaluate and manage diabetic eye disease and refer accordingly.				
12	The ability to evaluate and manage a patient presenting with symptoms suggestive of retinal detachment.				
13	The ability to recognise manifestations of systemic disease.				
14	The ability to assess symptoms and signs of neurological significance.				
15	The ability to manage patients presenting with sight-threatening eye disease.				
16	An ability to recognise adverse ocular reactions to medication.				
17	The ability to recognise, evaluate and manage optic nerve and optic nerve head disease and refer accordingly.				

D.

INTEGRAL COMPETENCIES

D.1. Integral competencies: Knowledge base for the European Diploma competencies.

D.1.1. Subject 25: Communication

Suggested ECTS: 2

Learning outcome: The candidates should demonstrate fundamental knowledge and insight in (1) different communication styles, (2) verbal and non-verbal communication, (3) cultural differences, and (4) cross-cultural communication techniques.

Learning outcomes	Details of how* and where this is delivered in the programme? <i>*theoretical/practical/self-directed</i>	Contribution of this component to Credit weighting?	Method of assessment?
(1) different communication styles,			
(2) verbal and non-verbal communication,			
(3) cultural differences,			
(4) cross-cultural communication techniques.			

D.1.1.1. Subject 25: Communication - Topics to be covered to achieve these learning outcomes:

D.1.1.1.1. Recognizing and Understanding Communication Styles

D.1.1.1.1.1. What is communication?

- Passive communication
- Aggressive communication
- Passive-aggressive communication
- Assertive communication
- Differences in perceptions in communication between submitter and recipient

D.1.1.1.1.2. Barriers to communication

- Physical impediments affecting communication
- Personality conflicts and communication

D.1.1.1.2. Verbal and Nonverbal Communication

D.1.1.1.2.1. Verbal communication

- What makes up verbal communication
- How to use verbal communication effectively

D.1.1.1.2.2. Nonverbal communication

- Defining nonverbal communication
- Why is nonverbal communication effective
- Reading nonverbal cues

D.1.1.1.2.3. Communicating in writing

- Use written communication
- Pros and Cons of written communication
- Avoiding misunderstanding in written communication

D.1.1.1.3. Cultural differences in communication

D.1.1.1.3.1. What is culture?

- Understanding the role of communication in culture
- Recognise cultural variables
 - Beliefs, values, expectations, attitudes
- Understanding the differences in decision making of different cultures
- Understanding norms, rituals and taboos of other cultures
- Equality, diversity and inclusion

D.1.1.1.3.2. Barriers to intercultural communication

- Adjustment to other cultures
- Culture shock
- Cultural blindness
- Language

D.1.1.1.3.3. Sensitivity to own cultural background and its impact on communication

- Ethical issues in intercultural communicating
- Communication with people from different cultures
- Manifestation of differences in intercultural communication in different professional settings
- Considering individual needs in patients with different cultural background

D.1.1.1.4.

Cross-Cultural communication techniques

D.1.1.1.4.1.

Gestures, eye contact, verbal and nonverbal communication

D.1.2. Subject 26: Professional Conduct

Suggested ECTS: 1

Learning outcome: The candidates should demonstrate fundamental understanding, knowledge, accountability, and responsibility of (1) the legal obligations for optometric practice, (2) the ethical and cultural standard, (3) a safe environment through quality assurance and risk management strategies, (4) using strategies to promote health and prevent illnesses, and (5) participating in continuing professional development activities to maintain competencies and knowledge in areas of optometric practice.

Learning outcomes	Details of how* and where this is delivered in the programme? <i>*theoretical/practical/self-directed</i>	Contribution of this component to Credit weighting?	Method of assessment?
(1) the legal obligations for optometric practice,			
(2) the ethical and cultural standard,			
(3) a safe environment through quality assurance and risk management strategies,			
(4) using strategies to promote health and prevent illnesses,			
(5) participating in continuing professional development activities to maintain competencies and knowledge in areas of optometric practice.			

D.1.2.1. Subject 26: Professional conduct - Topics to be covered to achieve these learning outcomes:

D.1.2.1.1. Legal obligations for optometric practice

D.1.2.1.1.1. Laws governing practice of medical and paramedical professions (including optometry, opticianry and ophthalmology)

- Legal scope of practice
- Licensure
- Insurance
- Record keeping

D.1.2.1.1.2. Malpractice

- Discipline, professional and unprofessional conduct
- Liability
- Negligence

D.1.2.1.2. Ethical and cultural standard

D.1.2.1.2.1. Professional ethics and professional discipline

- Relationships to members of own and other health professionals (collegiality, respectfulness, etc.)
- Knowledge and practice at high standards of contemporary professional level
- Knowledge and adherence to referral guidelines

D.1.2.1.2.2. Responsibility to the patients

- Respect for patient's rights, dignity, autonomy
- Forms of discrimination and avoidance of discrimination
- Confidentiality of the information received in the course of professional consultation
- Disclosing information where the patient consents or the law requires
- Provide and recommend care options based on clinical judgement independent of personal commercial profit or gain
- Understand patient's cultural perspective and level of background knowledge

D.1.2.1.3. Safe environment through quality assurance and risk management strategies

D.1.2.1.3.1. Quality assurance

- Patient satisfaction
- Employee training and responsibilities
- Continuing education
- Equipment maintenance and care
- Safety regulations

D.1.2.1.3.2. Risk management

- Types of risks
- Strategies of risk avoidance
- Continuity of care

D.1.2.1.4. Strategies to promote health and prevent illness

D.1.2.1.4.1. Strategies of health promotion

- Types of health promotion (local vs. national)
- Standardised screening protocols for disease detection (including history taking and selection of tests)

- Disease- and country specific referral guidelines
- Patient information through various types of media (leaflets, films, presentations)
- Raising awareness for the need of optometric examinations subject to patient age
- Education on the influence of lifestyle on eye conditions and health
- Facilitators and barriers of health promotion

D.1.2.1.5. Continuing professional development activities to maintain competencies and knowledge in areas of optometric practice

D.1.2.1.5.1. Continuing education

- Importance of and need for continuing education
- Options of maintaining and improving competencies and knowledge
- Membership professional organisations

D.1.2.1.5.2. Professional organisations

- Associations of the optometric profession for political representation at national and international level
- Development of quality standards
- Regulating authorities for the optometric profession

D.2. Integral competencies: Clinical/practical European Diploma competencies.

D.2.1. Subject 25: Communication

Learning outcome: The candidates should demonstrate the ability to communicate effectively with the patient using a broad range of communication styles appropriate to the educational level, cognitive ability, and age profile of the patient. The candidates is competent to (1) communicate in a respectful tone and manner, (2) listen actively and communicates effectively, (3) listen and ask questions to understand the patient's concerns and viewpoints, (4) communicate in a timely manner, (5) be aware of and responsive to verbal and non-verbal communication, (6) recognise and adjust to cultural differences, and (7) use effective cross-cultural communication skills if appropriate. The candidate is able to (8) communicate with a diverse group of patients with a range of ophthalmic conditions and needs, (9) to provide information in a way which is appropriate to the patient and (10) the ability to break bad news in an appropriate and considerate manner.

<i>Clinical/practical competencies:</i>		Competency assessment		Clinical experience	
		Brief details of the assessment	Where in the programme?	Minimum number of patients a student would examine	Brief description of how evidence of clinical experience is recorded
1	The ability to communicate in a respectful tone and manner,				
2	The ability to listen actively and to communicate effectively,				
3	The ability to listen and ask questions to understand the patient's concerns and viewpoints,				
4	The ability to communicate in a timely manner,				
5	The ability to be aware of and responsive to verbal and non-verbal communication,				
6	The ability to recognise and adjust to cultural differences,				
7	The ability to use effective cross-cultural communication skills if appropriate.				

8	The ability to communicate with a diverse group of patients with a range of ophthalmic conditions and needs				
9	The ability to provide information in a way which is appropriate to the patient.				
10	The ability to break bad news in an appropriate and considerate manner				

D.2.2. Subject 26: Professional Conduct

Learning outcome: The candidates should demonstrate fundamental understanding, knowledge, accountability, and responsibility of (1) the legal obligations for optometric practice, (2) the ethical and cultural standard, (3) a safe environment through quality assurance and risk management strategies, (4) using strategies to promote health and prevent illnesses, and (5) participating in continuing professional development activities to maintain competencies and knowledge in areas of optometric practice.

<i>Clinical/practical competencies:</i>		Competency assessment		Clinical experience	
		Brief details of the assessment	Where in the programme?	Minimum number of patients a student would examine	Brief description of how evidence of clinical experience is recorded
1	The ability to look after patients in a safe, appropriate and confidential environment				
2	The ability to communicate by adhering to appropriate ethical and cultural standards				
3	The ability to comply with legal, professional and ethical issues relating to practice				