

LE DIPLOME EUROPEEN EN OPTOMETRIE

**LES IMPLICATIONS
POUR L'ENSEIGNEMENT DE L'OPTOMETRIE**

MICHEL GUILLON
ANCIEN MAITRE DE CONFERENCES

1. SYNOPSIS

Sous l'influence du Professeur Jean Farges « Université Paris-Sud » (UPS) l'enseignement de l'optométrie en France a beaucoup progressé à un rythme très rapide et plus particulièrement entre les années 1997 et 2003.

Il est maintenant nécessaire de considérer cet enseignement dans le contexte plus vaste de l'Union Européenne (UE). L'optométrie est la première profession à entreprendre l'harmonisation au sein de l'UE par le biais d'un Diplôme Européen (DE) unique. Le DE a été développé en prenant le plus haut niveau de chaque pays de l'UE. La loi européenne prévoit que l'harmonisation d'une profession permette la libre circulation des professionnels détenteurs du DE et la pratique de la profession au niveau de ce diplôme dans toute l'UE. Ceci crée une opportunité unique pour la profession en France, mais crée des demandes nouvelles pour l'enseignement.

Ce document compare les enseignements de l'optométrie et indique les mesures nécessaires pour amener l'enseignement de l'optométrie au niveau européen.

2. INTRODUCTION

Le but du Diplôme Européen (DE) en Optométrie est de faciliter la libre circulation des diplômés en Optométrie au sein de l'Union Européenne (UE). Le diplôme permettra l'harmonisation du niveau des professionnels dans les différents pays de l'Union. Les enseignements d'Optique Physiologique, Optique de Contact et Optométrie doivent permettre à ses diplômés d'être en mesure d'obtenir le Diplôme européen. Les cursus actuels diffèrent de celui du Diplôme européen et sont défectueux dans certaines matières.

Le but de ce document est de réaliser une comparaison détaillée des cursus afin de permettre l'harmonisation des enseignements à celui du diplôme européen.

L'harmonisation du programme avec celui du DE doit être la plus grande priorité de tout enseignement pour les raisons énoncées dans ce document.

3. EVALUATION COMPARATIVE DES CURSUS

3.1. Remarques

Le cursus du DE est comparé au cursus combiné du BTS OL et des anciennes formations du type MST. Le DE ne spécifie pas le programme horaire. La seule manière d'évaluer le niveau à acquérir dans chaque matière est donc la description détaillée de l'examen.

3.2. Cursus européen

Le cursus européen a été préparé par l'European Council of Optometry and Optics (ECOO) = Conseil Européen de l'Optométrie et de l'Optique. L'ECOO réunit les organisations professionnelles de vingt cinq pays européens. Chaque pays est représenté par une organisation unique au sein de l'ECOO.

Le cursus de l'ECOO est divisé en trois sections. Chacune étant constituée de trois modules :

Section A : Perception visuelle et technologie optique

- Optique
- Perception visuelle
- Optique lunetterie

Section B : Management des problèmes visuels

- Réfraction
- Vision binoculaire
- Contactologie

Section C : Santé générale et anomalies oculaires

- Biologie générale
- Biologie oculaire
- Anomalies oculaires

Le détail du cursus de l'ECOO est donné en Annexe A.

3.3. Cursus BTS / MST

La comparaison des cursus combinés du Brevet de Technicien Supérieure d'Opticien Lunetier (BTS-OL) et des anciennes Maîtrise de Sciences et Technique (MST) d'Optique Physiologique, Optique de Contact et Optométrie (OPOCO) au cursus du DE (détails horaires « cours, travaux dirigés et travaux pratiques ») est donnée en annexe A.

Remarque : Les cursus du BTS et des anciennes MST ont pu subir quelques fluctuations. Ils sont indiqués approximativement dans les colonnes de l'annexe A.

4. EXAMEN EUROPEEN EN OPTOMETRIE

4.1. Remarques générales

L'examen est divisé en trois sections qui reflètent celle du cursus :

- A. Perception visuelle et technologie optique
- B. Management des problèmes visuels
- C. Santé générale et anomalies oculaires

Le diplôme européen est attribué quand le candidat a réussi aux trois sections. Dans chaque section le candidat doit passer une série d'épreuves écrites QCM (Questions aux Choix Multiples) et une série d'épreuves pratiques.

La réglementation gouvernant l'examen est relativement flexible pour permettre aux professionnels en activité de pouvoir se présenter au diplôme tout en travaillant. Cette réglementation permettra aux étudiants actuels de se présenter aux diverses sections à des périodes différentes de leur formation. Les points principaux de la réglementation sont comme suit :

- Pas de temps limité pour l'obtention du diplôme.
- L'ordre de présentation à l'examen des différentes sections est au choix du candidat.
- Pour chaque partie l'examen écrit doit être passé avant l'examen pratique.

4.2. Détails de l'examen

L'examen du diplôme européen correspond à un total de six jours d'examen. La forme générale de l'examen est similaire pour les trois parties (Tableau 1). Le détail de l'examen est donné en Annexes C et D. L'Association des Optométristes de France (AOF) est chargée par l'ECOO de promouvoir le Diplôme Européen et de le faire reconnaître. L'AOF a participé à l'organisation de la 1^{ère} session de l'examen, avec les enseignants de la filière optométrie de l'UPS. Cette première session de l'examen en langue française a eu lieu sur le campus de l'UPS, les 27-29 novembre 1998 pour la partie écrite et les 23 - 25 juin 1999 pour la partie pratique.

Tableau 1 : Format général de l'examen européen en optométrie

Section A. Perception visuelle et technologie optique	
Ecrit	<ul style="list-style-type: none">• 2 examens de 3 heures chacun• 100 QCM par examen
Pratique	<ul style="list-style-type: none">• 4 examens de 60 minutes chacun• 2 examens de 90 minutes chacun

Section B. Management des problèmes visuels	
Ecrit	<ul style="list-style-type: none">• 2 examens de 3 heures chacun• 100 QCM par examen
Pratique	<ul style="list-style-type: none">• 4 examens de 45 minutes chacun
Etude de cas	<ul style="list-style-type: none">• 2 examens de 3 heures• 30 études de cas avec 3 QCM chacune

Section C. Santé générale et anomalies oculaires	
Ecrit	<ul style="list-style-type: none">• 2 examens de 3 heures chacun• 100 QCM par examen
Pratique	<ul style="list-style-type: none">• 4 examens de 45 minutes chacun
Etude de cas	<ul style="list-style-type: none">• 1 examen de 3 heures• 30 études de cas avec 3 QCM chacune

ANNEXE A

CURSUS DU DIPLOME EUROPEEN

PART A: VISUAL PERCEPTION AND OPTICAL TECHNOLOGY

Diplome Europeen	BTS	<small>Anciennes</small> MST	C	TD	TP
OPTICS					
Section 1. Geometrical Optics (32-40)					
a. Refraction at single spherical or plane surfaces					
1. Curvature and sagitta	○		○	○	
2. Refractive index and rectilinear propagation	○		○	○	
3. Vergence and dioptric power	○		○	○	
4. Object-image relationships, including apparent depth	○		○	○	
5. Ray tracing, nodal point, and nodal ray	○		○	○	
6. Lateral (translinear) and angular magnification	○		○	○	
7. Snell's law of refraction			?		
b. Thin lenses					
1. Vergence: dioptric and effective power	○		○	○	
2. Object-image relationships	○		○	○	
3. Lateral (translinear) and angular magnification	○		○	○	
4. Thin lens systems	○		○	○	
5. Prismatic effect (Prentice's rule and prism effectively)	○		○	○	
6. Ray tracing, optical centre, and optic axis	○		○	○	
c. Thick lenses					
1. Cardinal points	○		○	○	
2. Vertex power and equivalent power	○		○	○	
3. Lateral (translinear) and angular magnification	○		○	○	
4. Reduced systems	○		○	○	
d. Aberrations					
1. Spherical	○		○		
2. Coma	○		○		
3. Oblique astigmatism	○		○		
4. Curvature of field	○		○		
5. Distortion	○		○		
6. Chromatic (longitudinal and lateral)	○		○		
e. Apertures					
1. Entrance and exit pupil size and location	○		○		
2. Depth of focus, depth of field, hyperfocal distance	○		○		
3. Field of view and half illumination	○		○		
f. Sphero cylindrical lenses					
1. Location of foci, image planes, principal meridians, and circle of least confusion	○		○	○	

2. Obliquely crossed spherocylindrical lenses	<input type="radio"/>		<input type="radio"/>	<input type="radio"/>
3. Transposition	<input type="radio"/>		<input type="radio"/>	<input type="radio"/>
4. Prismatic effect	<input type="radio"/>		<input type="radio"/>	<input type="radio"/>
g. Thin prisms				
1. Unit of measurement (prism dioptre)			?	
2. Prism deviation				
3. Combination of thin prisms				
4. Resolution of an oblique prism into horizontal and vertical components				
5. Total internal reflection				
h. Mirrors				
1. Planar and spherical reflection	<input type="radio"/>		<input type="radio"/>	
2. Proportion of light reflected from a surface (Fresnel's law)	<input type="radio"/>		<input type="radio"/>	
3. Focal power, focal length, and curvature	<input type="radio"/>		<input type="radio"/>	
4. Object-image relationships	<input type="radio"/>		<input type="radio"/>	
5. Magnification	<input type="radio"/>		<input type="radio"/>	
6. Lens / mirror systems	<input type="radio"/>		<input type="radio"/>	
7. Ray tracing	<input type="radio"/>		<input type="radio"/>	
i. Ophthalmic and optical instruments				
1. Direct and indirect ophthalmoscopes		- <input type="radio"/>	- <input type="radio"/>	
2. Retinoscope		- <input type="radio"/>	- <input type="radio"/>	
3. Focimeter		<input type="radio"/>	<input type="radio"/>	
4. Biomicroscope (slit lamp microscope)			N	
5. Radiuscope (microspherometer)			N	
6. Keratometer (ophthalmometer)		<input type="radio"/>	<input type="radio"/>	
7. Diagnostic lenses (gonioscopic, fundus, etc)			N	
Section 2. Physical Optics (20-28)				
a. Wave optics				
1. Characteristics of wave motion		<input type="radio"/>	<input type="radio"/>	
2. Classifications of the electromagnetic spectrum		<input type="radio"/>	<input type="radio"/>	
3. Total and partial coherence		<input type="radio"/>	<input type="radio"/>	
4. Diffraction (single slit, circular aperture, limits of resolution, zone plates)		<input type="radio"/>	<input type="radio"/>	
5. Interference (double slit, multiple slits, thin film, anti-reflective coatings, holography)		<input type="radio"/>	<input type="radio"/>	
6. Scattering (Rayleigh compared to Tyndall)		<input type="radio"/>	<input type="radio"/>	
7. Dispersion		<input type="radio"/>	<input type="radio"/>	
b. Interaction of light and matter				
1. Atomic energy levels, absorption and emission line spectra			N	
2. Continuous spectra (Black body radiator and grey body radiator characteristics)			N	
3. Fluorescence (photons, energy levels)			N	

4. Lasers (theory of operation, speckle pattern)			N		
5. Spectral transmission			N		
c. Polarization					
1. Linearly polarized light	- O		- O		
2. Circular and elliptical polarization	- O		- O		
3. Polarization by reflection (glare reduction, Brewster's law)	- O		- O		
4. Effects of scattering on polarization	- O		- O		
5. Transmission through successive polarizers (stress analysis, Malus' law)	- O		- O		
d. Image quality					
1. Resolving power		O	O		
2. Point and line spread function		O	O		
3. Modulation transfer function (Fourier optics)		O	O		

Diplome Europeen	BTS	Andennes MST	C	TD	TP
VISUAL PERCEPTION					
Section 1. Ocular Physiology/Neurophysiology (2-4)					
a. Visual Pathway					
1. Function of lateral geniculate body		±O	±O		
2. Receptive fields of cells in lateral geniculate body (relationship to colour vision, binocularity space perception, etc.)		±O	±O		
3. Function of visual cortex		±O	±O		
4. Receptive field properties (single cell properties)		±O	±O		
5. Functional organisation of visual cortex		±O	±O		
6. Physiology of binocular vision		±O	±O		
7. Mechanism of feature detection		±O	±O		
Section 2. Visual Optics (12-18)					
a. Schematic eye models					
1. Dioptric components	O		O	O	
2. Cardinal points, entrance and exit pupils	O		O	O	
3. Ametropia: far point, near point, correction	O		O	O	
4. Accommodation: amplitude and effectivity	O		O	O	
5. Astigmatism, including correction	O		O	O	
6. Retinal image size, spectacle magnification, and relative spectacle magnification	O		O	O	

b. Dioptrics of the eye				
1. Characteristics of components (curvature, thickness, separation, refractive indices, and axial length)	O		O	O
2. Reference angles and axes	O		O	O
3. Catoptric (Purkinje) images	O		O	O
4. Retinal image size	O		O	O
5. Optical function of the pupil	O		O	O
c. Entoptic phenomena				
1. Characteristics and origin of various phenomena (involving the cornea, lense and vitreous)			N	
2. Vascular and circulatory phenomena (Purkinje tree, capillary circulation)			N	
3. Phenomena associated with central vision (Maxwell's spot, Haidinger's brushes)			N	
4. Phenomena associated with retinal distention or other forms of retinal activity (Moore's lightning streaks, blue arcs of the retina, phosphenes)			N	
d. Quality of the retinal image				
1. Aberrations (spherical, chromatic, coma, curvature, oblique astigmatism, distortion)			?	
2. Diffraction	O		O	
3. Stray light	O		O	
4. Point and line spread functions	O		O	
e. Radiation and the eye				
1. Radiometry (radiant, intensity, radiance, and irradiance)			N	
2. Photometry (luminosity function, luminous intensity, luminance, and illuminance, Lambertian surfaces-cosine laws)	O		O	
3. Spectral transmissions of the ocular media				
4. Retinal illuminance	O		O	
5. Effects of radiation (especially infrared, visible and ultraviolet)	O	O	O	
Section 3. Visual Perception (15-21)				
a. Colour Perception				
1. Chromatic discrimination (hue and saturation) for normal defective colour vision		- O	- O	
2. Colour mixture and appearance		- O	- O	
3. Colour contrast, constancy, and adaptation		- O	- O	
4. Colour specification and colorimetry (CIE)		- O	- O	
5. Spectral sensitivity of normal and defective colour vision		- O	- O	
6. Mechanics of colour deficiencies		- O	- O	

b. Space perception				
1. Direction and depth discrimination (monocular and binocular cues, oculocentric and egocentric localization)	±O	±O		
2. Characteristics of sensory function (binocular interactions including summation, binocular suppression and rivalry, corresponding points including horopter criteria)	±O	±O		
3. Development of sensory fusion and binocular vision	±O	±O		
4. Disturbances of perceived direction and distance	±O	±O		
5. Sensory-motor interactions (fixation, disparity, past pointing, visually guided behaviour, body posture and perceived orientation, and self-motion)	±O	±O		
c. Form perception				
1. Static visual acuity (including test configuration, various acuity tasks, and factors influencing acuity including blur, intensity and contrast), specification of visual acuity	O	O		
2. Spatial contrast sensitivity function (including factors influencing the function)	O	O		
3. Illusions, constancies, and figure-ground relations		N		
4. Simultaneous contrast and spatial interactions (Mach bands)		N		
d. Light perception				
1. Detection characteristics at the absolute light threshold (including spectral, spatial, and temporal aspects)	±O	±O		
2. Brightness-difference thresholds at various adaptation levels (Weber's and DeVries-Rose Laws), specification of contrast	±O	±O		
3. dark and light adaptation processes and theories	±O	±O		
4. Spatial and temporal summation characteristics (Ricco's, Piper's and Bloch's Laws)	±O	±O		
e. Motion perception				
1. Factors involved in the detection of real and apparent motion, detection of displacements			N	
2. Motion after-effects			N	
3. Dynamic visual acuity, visual performances with a moving object, and visual performances with a moving observer			N	
f. Temporal perception				
1. Critical flicker fusion frequency, including influencing factors (test object size, location and adaptation level)			N	
2. Sub-fusional flicker phenomena (Bartley brightness enhancement)			N	
3. Successive contrast and masking			N	

4. Temporal contrast sensitivity function			N		
5. Stabilised retinal images and monocular suppression (Troxler effect)			N		
6. Saccadic suppression			N		
Section 4. Psychophysical Methodology (2-4)					
a. Basic psychophysical methods and theory					
1. Measurement of absolute and difference thresholds			N		
2. Methods of limits, adjustment, and constant stimuli			N		
b. Psychophysical scaling methods and theory					
1. Direct scaling			N		
2. Indirect scaling			N		
c. Signal detection methods and theory			N		
Section 5. Human Development (4-8)					
a. Normal vision development in the infant and child					
1. Visual acuity		±0	±0		
2. Contrast sensitivity		±0	±0		
3. Refractive error		±0	±0		
4. Colour vision		±0	±0		
5. Spectral transmission of the ocular media		±0	±0		
6. Light sensitivity		±0	±0		
7. Form reproduction and perception		±0	±0		
b. Normal motor development in the infant and child					
1. Gross motor / language developmental milestones					
2. Oculomotor system		±0	±0		
3. Visual perceptual - motor abilities		±0	±0		
c. Normal cognitive and social development in the infant and child				N	
d. Effects of early environmental restrictions					
1. Plasticity of the system		±0	±0		
2. Animal models		±0	±0		
3. Light and pattern deprivation		±0	±0		
4. Monocular and binocular deprivation		±0	±0		
5. Refractive error		±0	±0		
6. Cataract		±0	±0		
e. Normal changes in vision with ageing					
1. Visual acuity		0	0		
2. Contrast sensitivity		0	0		
3. Refractive error		0	0		

4. Colour vision		O	O		
5. Spectral transmission of the ocular media		O	O		
6. Light sensitivity		O	O		
7. Glare (disability and discomfort)		O	O		
8. Dark adaptation, glare recovery		O	O		
9. Visual fields		O	O		
10. Critical flicker fusion frequency		O	O		
Section 6. Anomalies of Child Development (2-4)					
a. Epidemiology; history and signs/symptoms manifest by patients in the age ranges noted			N		
b. Clinical techniques and tests to assess the development of children at various ages					
1. Physical status			N		
2. Fine and gross motor development			N		
3. Personal-social development			N		
4. Speech-language development			N		
c. Clinical characteristics of children who deviate from normal patterns of development, and epidemiology of development disorders					
1. Mental abilities			N		
2. Sensory abilities (vision and hearing handicaps)			N		
3. Neuromuscular and physical abilities			N		
4. Personal-social behaviours			N		
5. Speech learning disabilities			N		
6. Multiple handicaps			N		
7. Specific learning disabilities			N		
d. Test that diagnose vision problems which may be associated with deviations from normal patterns of development					
1. Mental abilities			N		
2. Sensory abilities (vision and hearing handicaps)			N		
3. Neuromuscular and physical abilities			N		
4. Personal-social behaviours			N		
5. Speech learning disabilities			N		
6. Multiple handicaps			N		
7. Specific learning disabilities			N		
e. Tests used by optometrists to determine a child's level of visual- perceptual development					
1. Visual attention and discrimination			N		
2. Visual-motor integration			N		
3. Intersensory integration			N		
4. Bilateral integration and laterality			N		

d. Societal implications of colour vision anomalies					
1. School			N		
2. Vocational requirements			N		
3. Patient interest			N		
e. Patient management strategies					
1. Counselling			N		
2. Special aids			N		
Section 9. Environmental Vision (2-4)					
a. Visual demands on individuals					
1. Occupation		O	O		
2. Leisure activities		O	O		
b. Influence of environmental changes on visual performance		O	O		

Diplome Europeen	BTS	<small>Anciennes</small> MST	C	TD	TP
OPTICAL APPLIANCES					
Section 1. Geometrical Optics (6-10)					
a. Ophthalmic and optical instruments					
1. Focimeter	O		O		
Section 2. Ophthalmic Optics (28-36)					
a. Physical characteristics of ophthalmic lenses					
1. Geometry of lens surfaces (spherical, cylindrical, toric, aspheric)	O		O		
2. Lens form	O		O		
3. Lens thickness (centre, edge, gradients, isothickness curves)	O		O		
4. Specification of lens size and shape	O		O		
5. Materials (index of refraction, dispersion, hardness, specific gravity)	O		O		
b. Optical characteristics of ophthalmic lenses					
1. Locations of and relationships between the optic axis, optical centre, geometric centre, and major reference points	O		O		O
2. Principles of corrected curve lens design	O		O		O
3. Verification of lens prescriptions (focimeter, lens)					

measure, and hand neutralisation)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. Writing and transposing lens prescriptions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. Effect of lens tilt (spheres and spherocylinders about a principal meridian)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6. Effective power (for near and for changes in vertex distances)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c. Ophthalmic prisms and prismatic effects of lenses			
1. Thickness differences across a prism	<input type="radio"/>	<input type="radio"/>	
2. Prismatic effects in the periphery of a lens (spheres, spherocylinders)	<input type="radio"/>	<input type="radio"/>	
3. Decentration (prism from decentration, decentering to obtain prism, interpupillary distance)	<input type="radio"/>	<input type="radio"/>	
4. Correction of vertical prism effect			
(a) Slab off (front, back, top, bottom, reverse)	<input type="radio"/>	<input type="radio"/>	
(b) Double slab off	<input type="radio"/>	<input type="radio"/>	
(c) Dissimilar segments	<input type="radio"/>	<input type="radio"/>	
(d) Compensated R segments	<input type="radio"/>	<input type="radio"/>	
(e) Prism segments	<input type="radio"/>	<input type="radio"/>	
(f) Multiple corrections	<input type="radio"/>	<input type="radio"/>	
(g) Contact lenses	<input type="radio"/>	<input type="radio"/>	
(h) Fresnel prisms	<input type="radio"/>	<input type="radio"/>	
(i) Fresnel power additions	<input type="radio"/>	<input type="radio"/>	
d. Multifocal lenses			
1. Types (fused, 1-piece, progressive power additions and blended lenses)	<input type="radio"/>	<input type="radio"/>	
2. Methods of producing add powers	<input type="radio"/>	<input type="radio"/>	
3. Segment centre location	<input type="radio"/>	<input type="radio"/>	
4. Image movement	<input type="radio"/>	<input type="radio"/>	
5. Total displacement, horizontal and vertical imbalance	<input type="radio"/>	<input type="radio"/>	
6. Placement of distance and multifocal optical centre	<input type="radio"/>	<input type="radio"/>	
7. Optical and physical characteristics of segments (design and calculations, progressive adds, aberrations, surface characteristics)	<input type="radio"/>	<input type="radio"/>	
8. Specifying multifocal height, size, shape and location of segment	<input type="radio"/>	<input type="radio"/>	
e. Physical characteristics and biological compatibility of frame materials	<input type="radio"/>	<input type="radio"/>	
f. Specification and nomenclature of spectacle frame components	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
g. Optical and spectacle frame consideration of high powered lenses: spheric, aspheric, and high index materials	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

h. Spectacle magnification				
1. Shape and power factors	○		○	○
2. Iseikonic lens design	○		○	○
i. Methods of remedying reflections and secondary images		○	○	
j. Absorptive lenses				
1. Specification of lens tints and absorptive coatings (including spectral transmission curves)		±○	±○	
2. Characteristics of photochromic lenses		±○	±○	
3. Relationship between lens thickness and spectral transmission		±○	±○	
4. Special occupational requirements		±○	±○	
k. Impact resistance				
1. Degrees of resistance of ophthalmic lens materials	○		○	
2. Methods of rendering materials impact resistant	○		○	
3. Methods of verifying impact resistance	○		○	
4. Performance of materials upon impact and after impact	○		○	
5. Specifications of occupational safety lenses	○		○	
l. Optical tolerances and physical requirements of ophthalmic lenses and frame materials (ISO)				
Section 3. Anomalies of Refraction / Aniseikonia (3-5)				
a. Identification, treatment and management with spectacle and contact lenses and prognosis		○	○	○
Section 4. Spectacle Applications (20-28)				
a. Treatment and management of refractive, binocular vision and perceptual conditions using spectacle lenses				
1. Spectacle lens prescriptions for ametropia	○		○	○
2. Lens problems of aberrations, weight, thickness, limits of field, secondary images, magnification, jump and displacement	○		○	○
3. 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	○		○	○
4. Evaluation of lenses and frames, via focimeter, lens guage, and observation, for optical centre positioning, powers, and other specifications of design	○		○	○
5. Fitting and adjusting frames for the wearer	○		○	○

6. Patient counselling information associated with the dispensing of prescriptions for different ametropias	O		O		O
Section 5. Environmental Vision (6-10)					
a. Visual demands on individuals 1. Occupation 2. Leisure activities		O O	O O		
b. Materials and/or procedures designed to improve visual performance 1. Work 2. Home 3. Recreation			?		
Section 6. European Legislation (3-5)					
a. Legislation relating to the recording and supply of : 1. spectacle lens 2. spectacle frames			N N		
b. Mutual recognition of qualifications 1. 1st General Directive on the mutual recognition of Professional Diplomas 2. 2nd General Directive on the mutual recognition of Professional Diplomas			N N		

PART B: MANAGEMENT OF VISION PROBLEMS

Diplome Europeen	BTS	Anciennes MST	C	TD	TP
REFRACTION					
Section 1. Visual Optics (1-2)					
a. Refractive state of the eye					
1. Emmetropia	○	○	○	○	○
2. Myopia	○	○	○	○	○
3. Hyperopia	○	○	○	○	○
4. Astigmatism	○	○	○	○	○
5. Anisometropia and aniseikonia	○	○	○	○	○
6. Accommodation	○	○	○	○	○
7. Aphakia and pseudophakia		○	○	○	○
8. Empty field and night myopia		±○	±○	±○	±○
b. Mechanisms of presbyopia					
1. Effects of ageing on the ciliary muscle and accommodation	±○	±○	±○		
Section 2. Human Developments (1-3)					
a. Normal changes in vision with ageing					
1. Accommodation and convergence	○	○	○		
Section 3. Anomalies of Refraction / Ametropia (20-28)					
a. Epidemiology, history and symptoms	○		○		
b. Observation and recognition of clinical signs, and techniques and skills.					
1. Interpupillary distance	○	○	○	○	○
2. Visual acuity		○	○	○	○
3. Objective static and dynamic refractive devices		○	○	○	○
4. Standard subjective refraction procedures, including astigmatic dials, crossed cylinders, stenopaic slit, fogging methods and equalisation (duochrome) techniques	○	○	○	○	○
5. Binocular subjective refraction procedures, including accommodation binocular balancing methods	○	○	○	○	○
6. Cycloplegic subjective and objective techniques		±○	±○	±○	±○
7. Automatic computer assisted subjective procedures, laser refraction and variations in procedures for the various ametropias		±○	±○	±○	±○

c. Identification, treatment and management using spectacle and contact lenses and prognosis.		O	O		
Section 4. Anomalies of Refraction / Presbyopia (8-14)					
a. Epidemiology, history and symptoms			N		
b. Observation and recognition of clinical signs, and techniques and skills for determining the near add including :					
1. Amplitude of accommodation	±O	O	O		O
2. Crossed cylinders	±O	O	O		O
3. Trial lenses	±O	O	O		O
4. PRA/NRA	±O	O	O		O
c. Identification, treatment and management with spectacle and contact lenses and prognosis			N		
Section 5. Anomalies of Refraction / Aphakia and Pseudophakia (2-4)					
a. Epidemiology, history and symptoms			N		
b. Observation and recognition of clinical signs and phenomena associated with aphakia and pseudophakia					
1. Magnification			N		
2. Field of view			N		
3. Spatial distortion			N		
4. Convergence requirements			N		
5. Sensitivity to glare			N		
c. And techniques and skills for determining, evaluating and/or verifying:					
1. Types and characteristics of intraocular lenses and aphakic spectacle and contact lenses			N		
2. Intraocular lense power			N		
3. Special refraction techniques			N		
4. Lense prescriptions for aphakia		O	O		
d. Diagnosis, treatment and management with spectacle and contact lenses and prognosis		O	O		
Section 6. Anomalies of Refraction / Aniseikonia (1-3)					
a. Epidemiology, history and symptoms		O	O		

<p>b. Observation and recognition of clinical signs, and techniques and skills including:</p> <ol style="list-style-type: none"> 1. Detection of aniseikonia 2. Measurement of aniseikonia <p>c. Identification, treatment and management with spectacle and contact lenses and prognosis</p>		<p>○ ○</p> <p>○</p>	<p>○ ○</p> <p>○</p>		<p>○ ○</p>
<p>Section 7. Low Vision (3-5)</p> <p>a. Epidemiology, history and symptoms</p> <p>b. Observation and recognition of clinical signs, and techniques and skills for determining a correction</p> <ol style="list-style-type: none"> 1. Vision acuity 2. Special refraction techniques 3. Visual fields 4. Reading skills 5. Effects of illumination 6. Magnification determination 7. In-office evaluation with low vision devices <p>c. Identification, treatment and management of low vision patients, and prognosis</p> <ol style="list-style-type: none"> 1. Analysis and interpretation of personal, social, vocational, and psychological patient needs and factors 2. Prescribing low vision devices 3. Patient education and training 4. Roles and relationships with other disciplines 5. Prognostic factors and follow-up care 					
<p>Section 8. Anomalies of Accommodation and Accommodative Vergence (1-3)</p> <p>a. Observation and recognition of clinical signs and techniques to test</p> <ol style="list-style-type: none"> 1. Amplitude range, facility of accommodation 					
<p>Section 9. Anomalies of Child Development (1-3)</p> <p>a. Clinical characteristics of children who deviate from normal patterns of development, and epidemiology of developmental disorders</p> <ol style="list-style-type: none"> 1. Sensory abilities (vision and hearing handicaps) 					

<p>b. Tests that diagnose vision problems which may be associated with deviations from normal patterns of development</p> <p>1. Sensory abilities (vision and hearing handicaps)</p>			N		
<p>c. Tests used by optometrists to determine a child's level of visual - perceptual development</p> <p>1. Visual attention and discrimination</p> <p>2. Visual motor integration</p> <p>3. Intersensory integration</p> <p>4. Bilateral integration and laterality</p>		±O ±O O	±O ±O N O		
Section 10. Age-Related Changes (1-3)					
<p>a. Symptom profiles, clinical procedures, and tests identifying changes in vision function of the ageing patient</p>		O	O		
<p>b. Clinical management of ageing patients with multisensory loss</p>			N		
<p>c. Assessment of the need for referral and consultation with other disciplines</p>			N		
Section 11. Environmental Vision (2-4)					
<p>a. Visual demands on individuals</p> <p>1. Occupation</p> <p>2. Leisure activities</p>	O O	O O	O O		

Diplome Europeen	BTS	Anciennes MST	C	TD	TP
BINOCULAR VISION					
Section 1. Ocular Motility (4-8)					
<p>a. Extraocular musculature</p> <p>1. Purpose and roles for vision</p> <p>2. Dynamics and kinematics of eye movement</p> <p>3. Specification of direction of gaze and ocular orientation (torsion)</p> <p>4. Agonist-antagonist relationships</p> <p>5. Primary action, and secondary and tertiary actions</p> <p>6. Fields of action</p>		O O O O O O	O O O O O O		

b. Characteristics and control of the various eye movements				
1. Versional eye movements (pursuits and saccades)		○	○	○
2. Vergence eye movements (tonic, accommodative including models of accommodative/vergence interaction, fusional, and proximal)		○	○	○
3. Nystagmus including optokinetic and vestibular		○	○	○
Section 2. Human Development (5-9)				
a. Normal vision development in the infant and child				
1. Accommodation and convergence		±○	±○	
2. Stereopsis		±○	±○	
b. Effects of early environmental restrictions				
1. Strabismus		○	○	
c. Normal changes in vision with ageing				
1. Accommodation and convergence		○	○	
2. Oculomotor system		○	○	
Section 3. Oculomotor Neuropathology (2-4)				
a. Observation, inspection, recognition of signs, and techniques and skills for infranuclear pathology including				
1. Objective and subjective testing for incomitancy			?	
Section 4. Anomalies of Refraction / Presbyopia (1-3)				
a. Observation and recognition of clinical signs, and techniques and skills for determining near add including				
1. Amplitude of accommodation.	○	○	○	○
Section 5. Sensory Anomalies of Binocular Vision / Strabismus (35-43)				
a. Epidemiology, history and symptom inventory		○	○	
b. Observation and recognition of clinical signs and techniques and skills to test:				
1. Monocular fixation		○		±○
2. Amblyopia		○		±○
3. Sensory fusion and stereopsis		○		±○
4. Fixation disparity		○		±○
5. Anomalous correspondence		○		±○

6. Suppression		○			±○
c. Identification, treatment and management procedures, and prognosis					
1. Spectacle and contact lens applications, including prisms		○	○		
2. Vision therapy		○	○		
Section 6. Anomalies of Eye movements (3-7)					
a. Epidemiology, history and symptom inventory			N		
b. Observation and recognition of clinical signs, and techniques and skills to test:					
1. Comitance		○	○		○
2. Deviations and measurements thereof		○	○		○
3. Diplopia		○	○		○
4. Motor fusion		○	○		○
5. Paralytic syndromes		○	○		○
6. Nystagmus		○	○		○
c. Identification, treatment and management of eye movement anomalies, and prognosis					
1. Spectacle and contact lens applications, including prisms		○	○		○
2. Vision therapy		○	○		○
Section 7. Anomalies of Accommodation and Accommodative Vergence (8-14)					
a. Epidemiology, history and symptom inventory		○	○		
b. Observation and recognition of clinical signs, and techniques and skills to test:					
1. Amplitude range, facility of accommodation		○	○		○
2. Analysis of accommodation and vergence relationships		○	○		○
c. Identification, treatment and management of accommodation and accommodative Vergence anomalies, and prognosis					
1. Spectacle and contact lens applications, including prisms and AC/A applications		○	○		○
2. Vision therapy		○	○		○

Diplome Europeen	BTS	Anciennes MST	C	TD	TP
CONTACT LENSES					
Section 1. Anomalies of Refraction / Ametropia (5-9)					
a. Observation and recognition of clinical signs, and techniques and skills including determination of 1. Corneal curvature and thickness	±0	±0	±0		±0
Section 2. Contact Lens Applications (60-70)					
a. Treatment and management of refractive / oculomotor / sensory integrative conditions using contact lenses					
1. Lens types and materials: hard lenses; haptics; lathe-cut, moulded, and spincast soft contact lenses		±0	±0		
2. Optics of contact lenses: curves, zone widths and tear lens effects, sagittal thickness; flex, asphericity and toric designs	±0	0	0		0
3. Basic 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	0	0	0		0
4. 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.	±0	0	0	0	0
5. The examination of a new prospective contact lens patient, the anterior segment examination and measurement		0	0		0
6. Contact lens selection from presently available types and forms of lenses	±0	0	0		0
7. Care of lenses; handling; cleaning; preservatives available; disinfection methods and solutions	±0	±0	±0	±0	±0
8. Follow-up care; adaptation, physiologic and post-fitting complications, allergic responses, lens changes and mechanical problems		0	0		0
9. Bifocal and astigmatic contact lenses; types, basis of selection and adaptation, techniques of fitting, and care for each		0	0		0
10. Specially designed lenses and fitting procedures for keratoconus and irregular corneas, sports vision, diseased and traumatic corneas, cosmetic (prosthetic) use, iris colour changes and colour vision deficiencies		±0	±0		±0

Section 3. European Legislation (1-3)					
a. Legislation relating to the recording and supply of					
1. contact lens		±O	±O		
2. contact lens disinfection systems		±O	±O		

PART C: GENERAL HEALTH AND OCULAR ABNORMALITY

Diplome Europeen	BTS	Anciennes MST	C	TD	TP
BIOLOGY					
Section 1. Gross Anatomy (3-7)					
a. Head and neck					
1. Skull (bones; sutures; fossae; foramina; cranial fossae; temporo- mandibular joint)			N		
2. Superficial and deep arteries, veins and lymphatics			N		
3. Muscles of facial expression and mastication	O		O		
4. Muscles of the neck (platysma, sternocleidomastoid, trapezius)	±O		±O		
5 Peripheral cranial nerve	O		O		
6. Cervical triangles and their contents, root of neck, thyroid and parathyroid glands			N		
7. Salivary glands			N		
8. Nose (framework, cavities, contents)			N		
9. Paranasal sinuses and their relations to the orbit and orbital contents			N		
10. Ear (outer ear, middle ear, walls, muscles, inner ear)		-O	-O		
11. Dural venous sinuses, meninges, cerebrospinal fluid			N		
b. Thorax					
1. Lungs (lobes, hilar structures, pleura, bronchopulmonary segments, bronchial tree)			N		
2. Pulmonary circulation			N		
3. Hear (surfaces, coronary circulation, pericardium, chambers, valves, conduction system)			N		
4. Superior mediastinum (great vessels, trachea, esophagus, vagus and phrenic nerves)			N		
c. Abdomen/pelvis					
1. Liver (concept of a portal system)			N		
2. Accessory digestive organs (gall bladder, pancreas)			N		
3. Other internal organs (spleen, kidney, suprarenal gland, urinary bladder)			N		
4. Gastrointestinal system (esophagus, stomach, large and small bowel)			N		
d. Systemic circulation of blood and lymph			N		

Section 2. Histology (3-7)					
a. Tissues					
1. Cell					
a) Molecular components, unit membrane		±0	±0		
b) Organelles (plasma membrane, endoplasmic reticulum, lysosomes, Golgi complex, mitochondria, lysosomes, microtubules, microfilaments, centrioles)		±0	±0		
c) Inclusions (metabolites, pigments, crystals)		±0	±0		
d) Nucleus (membrane, karyoplasm, chromatin, nucleolus)		±0	±0		
e) Cytoskeleton (microtubules, microfilaments, intermediate filaments)		±0	±0		
2. Epithelium					
a. Simple vs. stratified (pseudostratified)				N	
b. Squamous, cuboid or columnar				N	
c. Surface specialisations (microvilli, cilia, basal body)				N	
d. Cell junctions				N	
e. Basal specialisation (basal infoldings, basal lamina hemidesmosomes)				N	
3. Glands					
a. Unicellular vs. multicellular		-0	-0		
b. Exocrine vs. endocrine		-0	-0		
c. Secretory unit-mode of secretion		-0	-0		
d. Connective tissue element		-0	-0		
4. Connective tissue					
a. Cells		-0	-0		
b. Extracellular matrix (fibres, ground substances)		-0	-0		
c. Categories (loose, dense regular, irregular)		-0	-0		
d. Specialised types (bone, cartilage, blood)		-0	-0		
5. Muscle					
a. Smooth (cell shape, size, organelles, tissue organisation, fine structure, innervation)				N	
b. Striated (cell shape, size, organelles, tissue organisation, the distinction between red and white fibres, fine structure, innervation)				N	
c. Cardiac (cell shape, size, organelles, tissue organisation, fine structure, innervation)				N	
6. Blood					
a. Plasma (composition)		-0	-0		
b. Cells (RBC, agranular WBC, lymphocytes, monocytes, granular WBC, neutrophils, eosinophils,					

basophils)		-O	-O		
c. Platelets		-O	-O		
d. Lymphoid tissue (nodules, nodes, thymus, spleen)		-O	-O		
7. Nerve					
a. Neuron (perikaryon, nucleus, organelles, inclusions)			N		
b. Classification (processes, Golgi type, axons, dendrites)			N		
c. Ganglia			N		
d. Sheaths (myelin)			N		
e. Neuroglia			N		
f. Synapse			N		
8. Receptors					
a. Free nerve endings			N		
b. Encapsulated nerve endings (Pacinian corpuscles, Meissner corpuscles, Krause end bulbs, Merkel's discs, Ruffini corpuscles, Golgi tendon organs, muscle spindles)			N		
9. Blood vessels					
a. Capillaries (ultrastructure)			N		
b. Arteries (ultrastructure)			N		
c. Veins (ultrastructure)			N		
d. Lymphatic vessels			N		
e. Portal systems			N		
b. Organs					
1. Integumentary system					
a. Skin (epidermis, dermis, hypodermis)	O		O		
b. Cutaneous glands (sebaceous, sweat)	O		O		
c. Vessels and nerves	O		O		
2. Heart					
a. Endocardium			N		
b. Myocardium			N		
c. Epicardium			N		
d. Cardiac skeleton			N		
e. Valves			N		
f. Conduction system			N		
g. Coronary vessels			N		
3. Respiratory system					
a. Nose (mucosa, conchae, olfactory region)			N		
b. Paranasal air sinuses (diploic bone)			N		
c. Nasopharynx (mucosa, lymphatic tissue, muscle)			N		
d. Larynx (mucosa, vocal folds, glands, cartilage)			N		
e. Trachea (mucosa, cartilage)			N		

f. Lungs (pleura, bronchi and bronchioles, mucosa and submucosa, alveoli, vascular tree, lobules)			N		
4. Gastrointestinal system					
a. Oral cavity (lips, cheek, tongue and taste buds, tonsils and teeth)			N		
b. Salivary glands (parotid, submandibular, sublingual)			N		
c. Digestive tract (mucosa, submucosa, muscularis, serosa/adventitia: esophagus, stomach, duodenum, jejunum, ileum, colon, rectum, anal canal, appendix)			N		
d. Digestive glands (exocrine pancreas, liver, gall bladder: secretory unit, internal organisation, duct pattern, blood supply)			N		
5. Renal system					
a. Kidney (capsule, cortex, medulla, pelvis, hilus, nephron, renal corpuscle, proximal and distal convoluted tubule, loop of Henle, collecting tubules, blood supply)			N		
c. Histogenesis					
1. Epithelium					
a. Formation and differentiation of ectoderm and endoderm in the embryonic period (human embryology, weeks 1-12)	±0	±0	±0		
2. Connective tissue					
a. Hematopoiesis (red cells, white cells, platelets)			?		
3. Muscle					
a. Myoblast differentiation and migration	±0	±0	±0		
b. Myofilament synthesis	±0	±0	±0		
c. Cardiogenesis	±0	±0	±0		
Section 3. Neuroscience (3-7)					
a. Neurohistory					
1. Histogenesis in the nervous system					
a. Neural plate, neural fold, neural groove, neural tube, neural vesicles	0	0	0		
b. Derivatives of neural crest (ganglia, glia, adrenal medulla, melanocytes)			N		
c. Layers of neural tube (ependymal, mantle marginal)			N		
2. Degeneration and regeneration in the nervous system			N		

6. Diencephalon				
a. Dorsal thalamus (nuclei, thalamo-cortical connections)			N	
b. Hypothalamus (components, functions: pituitary)			N	
c. Epithalamus (components)			N	
d. Subthalamus (components)			N	
7. Cerebrum				
a. Gray matter (cytoarchitecture (layers), Brodmann's cortical areas)			N	
b. White matter (projections, internal capsule, optic radiations, commissural fibres, associational fibres)			N	
8. Cerebellum				
a. Nuclei (dentate, emboliform, globose, fastigium)			N	
b. Connections (peduncles)			N	
c. Functions (posture, muscle tone, co-ordination)			N	
9. Blood supply				
a. Surface arteries (e.g., anterior, middle, and posterior cerebral arteries)			N	
b. Circle of Willis and its branches			N	
10. Functional systems (e.g., visual, auditory, somesthetic, limbic)			N	
d. Neurophysiology				
1. Integration of nerve signals (synaptic processes, reflexes, feedback, adaption and habituation)			N	
2. Sensory coding (receptor potentials, uniand multimodal units, receptive fields)			N	
3. Somatosensory system (transmission of tactile, proprioceptive, temperature and pain sensations)			N	
4. Auditory system (functions of middle ear and cochlea, central auditory mechanisms)			N	
5. Vestibular system (function of vestibular apparatus, brainstem mechanisms of vestibulo-ocular and postural reflexes)			N	
6. Motor pathways (spinal reflexes, muscle spindles, control of movement by the motor cortex, the cerebellum, the basal ganglia and brainstem structures)			N	
7. Autonomic nervous system (including function of adrenal medulla and central regulation of visceral function)			N	
8. Significance of evoked potentials, CT and PET scanning, and MRI			N	

Section 4. General Biochemistry (3-7) a. Cellular biochemistry 1. Compartmentalization 2. Cell organelles 3. Intracellular/extracellular 4. Cell communication			?		
b. Proteins 1. Structure and Types a. Alpha amino acids, peptide bond b. Primary, secondary, tertiary structure c. Multimers d. Globular e. Enzymes f. Antibodies g. Connective-tissue/collagen 2. Mechanism of enzyme action a. Biocatalysis b. Free energy, activation energy c. Michaelis-Menton Model, equations d. Allosterism e. Competitive and non-competitive inhibition, positive and negative f. Enzyme cascades g. Haemoglobin, lysozyme, ATCase and seine proteases		±0 ±0 ±0 ±0 ±0 ±0 ±0 -0 -0 -0 -0 -0 -0 -0	±0 ±0 ±0 ±0 ±0 ±0 ±0 -0 -0 -0 -0 -0 -0 -0		
c. Bioenergetics and energy storage 1. Endergonic, exergonic and coupled reactions 2. Oxidation-reduction 3. pH and Henderson-Hasselbalch equation, biological buffers 4. ATP and other Nucleotide phosphates 5. NADH and FADH 6. NADPH 7. Acetyl CoA		-0 -0 -0 -0 -0 -0 -0	-0 -0 -0 -0 -0 -0 -0		
d. Carbohydrate biochemistry 1. Structure and function a. Monosaccharides b. Polysaccharides/glycogen c. Glycosamines d. Proteoglycans 2. Glycolysis 3. TCA cycle 4. Pentose monophosphate shunt 5. Gluconeogenesis			N N N N N N N N		

6. Glycogen synthesis, storage and utilization			N		
7. Oxidative phosphorylation			N		
a. Mitochondrial structure			N		
b. Electron transport/pH coupling			N		
e. Lipid biochemistry					
1. Structure and function					
a. Fatty acids			N		
b. Triacylglycerols			N		
c. Phospholipids, sphigomyelins, gangliosides			N		
d. Cholesterol and steroid hormones			N		
2. Fatty acid degradation/beta oxidisation					
a. Ketone bodies/gluconeogenesis			N		
3. Fatty acid synthesis					
a. Saturated via phosphotidyl intermediates			N		
b. Unsaturation and elongation beyond C-16			N		
4. Sterol synthesis					
a. AcetylCoA and mevalonate			N		
b. VLD, LDL, HDL control and transport			N		
c. Steroid hormone biosynthesis			N		
5. Membrane biochemistry					
a. Unit membrane/lipid bi-layer		O	O		
b. Fluid mosaic model		O	O		
c. Membrane proteins/structure and function		O	O		
f. Molecular Biology					
1. DNA structure and function					
a. Deoxymononucleotides and synthesis		O	O		
b. Base pairing/double helix		O	O		
c. Genetic code/intorns, exons		O	O		
d. Chromosome structure		O	O		
2. RNA structure and function					
a. Ribonucleotides and synthesis		O	O		
b. Messenger RNA synthesis and function		O	O		
c. Ribosomal RNA synthesis and function		O	O		
d. Transfer RNA synthesis and function		O	O		
3. DNA replication					
a. DNA polymerases		O	O		
b. Helicases and ligases		O	O		
c. Restriction enzymes		O	O		
4. Protein synthesis					
a. Ribosome function		O	O		
b. Initiation, elongation and termination		O	O		

c. Promoters, operators, polyA and post-transcriptional modification		O	O		
d. tRNA function/anticodons		O	O		
e. Post-translational modification/extracellular transport		O	O		
g. Biochemistry of specialized tissues					
1. Hormones and growth factors					
a. Synthesis			N		
b. Actions			N		
c. Receptors/secondary messengers			N		
d. Oncogenes			N		
2. Muscle					
a. Actin, myosin, tropomyosin, calmodulin			N		
b. Mechanism of contraction/Ca ⁺⁺ ion			N		
3. Immune system					
a. Structure of immunoglobulins		-O	-O		
b. Antibody/antigen reactions		-O	-O		
c. Molecular basis of variation/clonal selection		-O	-O		
d. Processing of antigens		-O	-O		
4. Liver					
a. Glycogen synthesis, storage and utilization			N		
b. Detoxification and portal circulation			N		
c. Lipid regulation			N		
5. Nerves					
a. Na ⁺ / K ⁺ balance / transport / channels		O	O		
b. Myelin		O	O		
c. Neurotransmitters		O	O		
1. Acetylcholine		O	O		
2. Catecholamines		O	O		
3. Glycine and GABA		O	O		
d. Receptors		O	O		
6. Eye					
a. Vitamin A, retinal and rhodopsin		O	O		
b. Light reactions / vision		O	O		
h. Nutrition					
1. Digestion of proteins, carbohydrates and lipids			N		
2. Essential amino acids			N		
3. Vitamins					
a. Water-soluble / role in co-enzymes			N		
b. Fat soluble			N		
c. Antioxidants / control of free radicals, peroxide, superoxides			N		
d. Toxicity			N		

4. Minerals			N		
Section 5. General Physiology / Neurophysiology (3-7)					
a. Cellular functions					
1. Cytoplasm and cytoskeleton (microtubules, microfilaments)		O	O		
2. Functions of organelles (nucleus, endoplasmic		O	O		
3. Cellular environment (intracellular and extracellular)		O	O		
4. Membrane potential and transport mechanisms		O	O		
5. Membrane receptors and postreceptors events		O	O		
b. Respiration					
1. Mechanics of breathing			N		
2. Gas exchange in the lung			N		
3. Diffusion of oxygen and carbon dioxide			N		
4. Oxygen transport and hypoxia, carbon dioxide transport			N		
5. Regulation of respiratory rate			N		
6. Acid-base balance			N		
c. Gastrointestinal activity					
1. Absorption			N		
2. Motility			N		
3. Regulation (nervous and hormonal control)			N		
4. Gastric, pancreatic and biliary secretions			N		
d. Muscle					
1. Neuromuscular junctions			N		
2. Conduction and contraction			N		
3. Types of contraction (isometric, isotonic)			N		
4. Reflex arc (muscle spindles, Golgi tendon organ)			N		
5. Smooth muscle			N		
e. Body fluids					
1. Composition of body fluids			N		
2. Control systems of the body (exchange of water and electrolytes between body compartments)			N		
3. Regulation of volume and osmolarity of extracellular fluid			N		
f. Renal system and body fluids					
1. Nephron, tubular reabsorption and secretion			N		
2. Regulation of glomerula filtration			N		
3. Functional characteristics of renal blood vessels			N		
4. Renal regulatory mechanisms			N		
5. Renal control of blood pressure and water balance			N		
6. Renal control of plasma sodium and potassium levels			N		
7. Regulation of acid-base balance			N		

g. Circulatory system				
1. Mechanical events of cardiac cycle			N	
2. Electrical activity of the heart (pacemaker potentials, action potentials, and spread of activity)			N	
3. Significance of EKG			N	
4. Hemodynamics (flow, pressure and resistance relationships)			N	
5. Regulation of blood flow and pressure (autonomic, hormonal, and local)			N	
6. Lymph formation and function			N	
7. Blood and its functions (including cell functions, hemostasis)			N	
h. Endocrine system				
1. Hormones (mechanism of action, control)			N	
2. Hypothalamic control of pituitary gland			N	
3. Pituitary control of endocrine glands			N	
4. Functions and regulations of adrenal cortex (glucocorticoids, mineral corticoids, androgens)			N	
5. Functions and regulation of adrenal medulla (epinephrine)			N	
6. Functions and regulation of thyroid gland (TRH, TSH T ₃ , T ₄)			N	
7. Functions and regulation of pancreatic insulin and glucagon		±0	±0	
8. Regulation of blood sugar levels		±0	±0	
9. Functions and regulation of Vitamin D, parathyroid hormone and calcitonin			N	
10. Functions and regulation of reproductive hormones			N	
11. Pregnancy and lactation			N	
12. Functions and regulation of endorphin, enkephalin and growth hormone blood levels			N	
Section 6. General Microbiology (3-7)				
a. Bacteriology				
1. Eucaryotic vs. procaryotic cells		-0	-0	
2. Bacterial cell structures and cell wall morphology				
a. Biochemical composition		-0	-0	
b. Gram (+) vs. Gram (-) characteristics		-0	-0	
c. Function in pathogenesis		-0	-0	
3. Physiological processes of bacterial growth				
a. Life cycle		-0	-0	
b. Anaerobic vs. aerobic		-0	-0	
c. Spore formation		-0	-0	
4. Genetic mechanisms of bacteria		-0	-0	
5. Normal body flora		-0	-0	
6. Disease states, transmission, pathogenic				

<p>mechanisms, symptoms, diagnosis and immunity of infections by</p> <ol style="list-style-type: none"> a. Gram (+) and Gram (-) cocci and rods b. Spirochetes c. Actinomycetes d. Mycobacteria e. Chlamydia f. Rickettsia g. Mycoplasma <p>7. Laboratory isolation, culture and identification of bacteria</p> <p>8. Procedures for antibiotic susceptibility testing</p> <p>9. Quality control/sterilisation and disinfection</p>			-O -O -O -O -O -O -O -O -O	-O -O -O -O -O -O -O -O -O		
<p>b. Virology</p> <ol style="list-style-type: none"> 1. Virus particle chemistry and morphology 2. Classification scheme for viruses <ol style="list-style-type: none"> a. DNA vs RNA types b. Double-stranded vs single stranded c. Envelopes 3. Genetic mechanisms of viruses 4. Viral replication in host cells <ol style="list-style-type: none"> a. DNA and RNA viruses, with or without envelopes 5. Disease states, transmission, pathogenic mechanisms, symptoms, diagnosis and immunity of infections by viruses 				N N N N N N		
<p>c. Mycology</p> <ol style="list-style-type: none"> 1. Biology of fungi <ol style="list-style-type: none"> a. Yeast and mould morphology b. Asexual and sexual reproduction/structures 2. Disease states, transmission, pathogenic mechanisms, symptoms, diagnosis and immunity of infections by <ol style="list-style-type: none"> a. Superficial mycoses b. Cutaneous mycoses c. Subcutaneous mycoses d. Systemic mycoses e. Opportunistic yeasts and moulds 3. Laboratory isolation, culture and identification of fungi 				N N N N N N N N		
<p>d. Parasitology</p> <ol style="list-style-type: none"> 1. Disease states, life cycles, transmission, pathogenic mechanisms, symptoms, diagnosis and immunity of infections by protozoans, trematodes, cestodes, nematodes and arthropods 2. Laboratory identification of parasites 				N N		

Section 7. General Immunology (3-7)				
a. Antigens (chemistry and origin)		±0	±0	
b. Antibodies		±0	±0	
1. Chemical structure		±0	±0	
2. Classification		±0	±0	
3. Immunology functions		±0	±0	
4. Genetics		±0	±0	
c. Antigen-antibody interactions		±0	±0	
d. Complement chemistry, function and pathways		±0	±0	
e. Cytokines (origin and function)		±0	±0	
f. Non-specific immunity				
1. Innate resistance of organ systems			N	
2. Phagocytic cell types and inflammation			N	
3. Role of complement and antibody			N	
4. Interferon			N	
g. Specific immunity				
1. Cell types, markers and function			N	
2. Cell-cell interactions in the immune response			N	
3. Humoural immunity			N	
4. Cellular immunity			N	
5. Primary and secondary immune responses			N	
h. Hypersensitivity responses				
1. Anaphylactic hypersensitivity			N	
2. Cytotoxic hypersensitivity			N	
3. Complex-mediated hypersensitivity			N	
4. Delayed hypersensitivity			N	
i. Transplantation immunology			N	
j. Immunological tolerance			N	
k. Autoimmunity			N	
l. Immunodeficiency states			N	
m. Tumor immunology			N	
n. Immunological tests			N	
Section 8. General Pharmacology (3-7)				
a. General principals of pharmacology and toxicity			?	
1. Pharmacodynamics				
a. concept of receptors				
b. Dose-response relationships				
2. Pharmacokinetics				
a. Absorption, distribution, metabolism and excretion of drugs				
b. Quantative aspects				
c. Influencing factors (age, gender, pathology, genetics, diet)				
b. Autonomic and/or neuromuscular junction drugs				
1. Neurohumoural transmission: autonomic and somatic				

motor nervous systems			N
2. Adrenergic agonists	±0	±0	
3. Adrenergic antagonists	±0	±0	
4. Cholinergic agonists	±0	±0	
5. Cholinergic antagonists	±0	±0	
6. Ganglionic agonists and antagonists	±0	±0	
7. Neuromuscular transmission agonists and antagonists	±0	±0	
c. Autacoid agonists and antagonists			N
d. Drugs affecting the respiratory system			
1. Bronchodilators			N
2. Mast cell stabilizers			N
3. Mucolytics			N
d. Drugs affecting the respiratory system			
1. Bronchodilators			N
2. Mast cell stabilizers			N
3. Mucolytics			N
e. Gastrointestinal agents			N
f. Chemotherapeutic agents			N
1. Antimicrobial agents			N
a. Antiseptics and disinfectants			N
b. Antibacterial			N
c. Antifungal			N
d. Antiparasite			N
2. Antiviral			N
3. Antineoplastic agents			N
g. Immunopharmacological agents	±0	±0	
h. Anti-inflammatory agents			
1. Steroids	±0	±0	
2. Non-steroids	±0	±0	
i. Major drugs acting on the central nervous system			
1. Neurotransmitters			?
2. Opioid and non-opioid analgesics			
3. Sedative hypnotics			
4. Anxiolytics			
5. Antipsychotics			
6. Antiparkinsonians			
7. Antidepressants			
8. Anticonvulsants			
9. Skeletal muscle			
10. Hallucinogens and drugs of abuse			
j. Local anaesthetics			N
k. Major drugs acting on the endocrine system			
1. Adenohypophyseal hormones			N
2. Thyroid and antithyroid drugs			N
3. Insulin and synthetic antidiabetics			N
4. Estrogens, progestins and androgens			N
l. Major cardiovascular drugs			
1. Antihypertensives			N
2. Agents used to treat CHF (inotropic agents,			N

recognition)				N	
4. X-linked inheritance (criteria for recognition)				N	
5. Development syndromes (characteristics, genetic basis)				N	
6. Congenital anomalies (characteristics, genetic basis)				N	
f. Neoplasia					
1. Histogenesis of neoplasms				N	
2. Classification of neoplasms				N	
3. Causes of neoplasms (viral, chemical, radiation)				N	
4. Differences between benign and malignant tumours				N	
5. Effects of tumour on host, oncogenes, agents)				N	
g. Integument system					
1. Infectious diseases				N	
2. Neoplastic diseases (benign, pre-malignant, and malignant)				N	
3. Pigmented lesions				N	
h. Haematopoietic and lymphoid system					
1. Disorders of RBC, WBC (non-neoplastic)				N	
2. Neoplastic disorders of WBC-leukemias				N	
3. Non-neoplastic disorders of lymph nodes				N	
4. Neoplastic disorders of lymph nodes				N	
i. Respiratory system					
1. Chronic obstructive pulmonary disease (COPD) and emphysema				N	
2. Infectious diseases of the lung				N	
3. Neoplastic diseases of the lung				N	
4. Interstitial diseases including pneumoconiosis				N	
j. Gastrointestinal system					
1. Disorders of the stomach (gastritis, ulcers)				N	
2. Disorders of the intestines and colon (enteritis, colitis)				N	
3. Neoplastic disorders of the gastrointestinal tract				N	
k. Cardiovascular haemodynamic disorders					
1. Congestion, oedema (causes, characteristics)				N	
2. Shock (classification, causes, complications)				N	
3. Thromboembolism (classification, causes, complications)				N	
4. Systemic hypertension (causes, complications)				N	
5. Atherosclerosis (causes, development, complications)				N	
6. Aneurysms (classification, development, complications)				N	
l. Heart disease					
1. Coronary artery disease (causes, complications)			-O	-O	
2. Hypertensive heart disease (causes, complications)			-O	-O	
3. Streptococcal infections and nonsupprative sequelae					
a. Rheumatic fever (causes, clinical features, pathologic features)					N
b. Glomerular nephritis (causes, clinical features, pathologic features)					N
c. Endocarditis (causes, clinical features, pathological feature)					N

4. Cardiomyopathies (causes, clinical features, pathologic features)			N		
m. Endocrine diseases					
1. Diabetes (classification, pathology, clinical manifestations)			N		
2. Hyperthyroidism			N		
3. Hypothyroidism			N		
4. Goiters, Graves disease			N		
5. Hyperparathyroidism			N		
6. Hypoparathyroidism			N		
7. Hyperpituitarism			N		
8. Hypercorticism (Cushings disease)			N		
10. Hypocorticism (Addison's disease)			N		
11. Disorders of adrenal medulla (pheochromocytoma)			N		
n. Nervous system and neuromuscular diseases					
1. Cerebrovascular disease			N		
2. Headaches			N		
3. Infectious diseases of the central nervous system			N		
4. Nervous system neoplasms			N		
5. Muscular atrophy, muscular dystrophy			N		
6. Demyelinating diseases			N		
7. Leukodystrophies, gangliosidoses			N		
8. Alzheimer's disease			N		
9. Trauma, closed head injuries			N		
o. Nutritional disorders					
1. Malabsorption			N		
2. Alcoholism			N		
3. Vitamin deficiencies			N		
4. Trace minerals			N		
p. Congenital and neonatal anomalies					
1. Cerebral palsy			N		
2. Fetal alcohol syndrome			N		
3. Infant drug addiction			N		
4. Anoxia (Apgar score)			N		
Section 10. General Health (1-2)					
a. Detailed history with regards to differential diagnosis of fatigue, weight loss, fever, headache, dizziness, and malaise			N		
b. Presentations involving abnormal body habitus and demeanour			N		
c. Deviation from physical developmental norms and standards for all ages			N		
d. Common systemic side effects of medications as related to general health and well-being			N		
e. Principal of basic cardiac life support			N		
f. Medical laboratory tests for screening			N		

<p>Section 11. Neurological System (1-2)</p> <p>a. Detailed assessment of the signs and symptoms associated with non-ocular neurological conditions (myasthenia gravis, multiple sclerosis, CVA, neoplasia, parkinsonism)</p> <p>b. Medical laboratory tests and diagnostic imaging</p>			N N		
--	--	--	--------	--	--

<p>Section 12. Musculo-Skeletal System (1-2)</p> <p>a. Symptoms and signs of the various arthritic syndromes (SLE, JRA, RA, ankylosing spondylitis)</p> <p>b. Medical laboratory tests and diagnostic imaging</p>			N N		
--	--	--	--------	--	--

<p>Section 13. Skin and Hair (1-3)</p> <p>a. Skin manifestation of systemic disorders</p> <p>b. Skin lesions in the phakomatoses</p> <p>c. Common dermatoses including allergic manifestations</p> <p>d. Benign, premalignant, and malignant skin lesions</p> <p>e. Medical laboratory tests</p>			N N N N N		
---	--	--	-----------------------	--	--

<p>Section 14. Head and Neck (1-3)</p> <p>a. Symptoms and signs of diseases of the nasopharynx, sinuses, salivary glands, lymph nodes, carotid and temporal arteries, skin and temporo-mandibular joint dysfunction</p> <p>b. Auscultation of caotid arteries, skull and orbits for bruits and venous hum</p> <p>c. Potential significance of dysarthria, dysphagia, dysphonia and hoarseness</p> <p>d. Medical laboratory tests and diagnostic imaging</p>			N N N N		
--	--	--	------------------	--	--

<p>Section 15. Haematopoietic System (1-2)</p> <p>a. Symptoms and signs of common blood disorders (anemias, pancytopenia, thrombocytopenia, leukopenia, leukocytosis, thrombocytosis, hyperviscosity syndromes, neoplasias including leukaemia, lymphoma, multiple myeloma)</p> <p>b. Medical laboratory tests and diagnostic imaging</p>			N N		
--	--	--	--------	--	--

Section 16. Immunologic System (1-2)					
a. Symptoms and signs of immunodeficiency syndromes			N		
b. Symptoms and signs of hypersensitivity reactions			N		
c. Symptoms and signs of common granulomatous diseases (sarcoidosis)		±O	±O		
d. Medical laboratory tests and diagnostic imaging			N		

Section 17. Cardiovascular System (1-2)					
a. Risk factors for atherosclerotic heart disease		±O	±O		
b. Symptoms and signs of coronary artery disease		±O	±O		
c. Significance of palpitations, syncope, murmurs, dyspnea and claudication			N		
d. Pulse, blood pressure, norms, indications and techniques for evaluation			N		
e. Signs and symptoms of heart failure			N		
f. Medical laboratory tests and electrocardiograms			N		

Section 18. Renal, Urinogenital System (1-2)					
a. Symptoms and signs of urogenital and renal disorders (sexually transmitted diseases)			N		
b. Symptoms and signs of renal failure			N		
c. Medical laboratory tests			N		

Section 19. Gastrointestinal System (1-2)					
a. Symptoms and signs of common gastrointestinal disorders (inflammatory bowel disease, peptide, ulcer disease, pancreatitis, malabsorption syndromes, neoplasia)			N		
b. Medical laboratory tests and diagnostic imaging			N		

Section 20. Liver and Biliary Tract (1-2)					
a. Symptoms and signs of liver disorders (cirrhosis, hepatitis, liver failure)			N		
b. Biliary tract disorders			N		
c. Medical laboratory test and diagnostic imaging			N		

Section 21. Endocrine/Metabolic System (1-2)					
---	--	--	--	--	--

a. Symptoms and signs of endocrine disorders (hypothalamic-pituitary dysfunction, thyroid dysfunction, abnormal carbohydrate metabolism including type I and type II diabetes mellitus, abnormal calcium metabolism, adrenal dysfunction, pheochromocytoma, multiple endocrine neoplasias)			N		
b. Medical laboratory tests and diagnostic imaging			N		

Section 22. Reproductive System (1-2)					
a. Symptoms and signs of pregnancy			N		
b. Complications of pregnancy (pre-eclampsia, eclampsia)			N		
c. Use of drugs			N		
d. Implication of breast feeding			N		
e. Medical laboratory tests and diagnostic imaging			N		
Section 23. Respiratory System (1-2)					
a. Symptoms and signs of respiratory disorders (COPD, asthma, respiratory failure)			N		
b. Significance of common respiratory symptoms including cough, haemoptysis, wheezing, shortness of breath			N		
c. Symptoms and signs of anaphylaxis			N		
d. Medical laboratory tests, diagnostic imaging, and spirometry			N		
Section 24. Nutrition (1-2)					
a. Symptoms and signs of nutritional abnormalities (vitaminosis, protein malnutrition)			N		
b. Eating disorders (obesity, anoxaemia, bulimia, and fadism)			N		
c. Medical laboratory testing			N		
Section 25. Psychosocial Illness (1-2)					
a. General assessment of behavioural patterns			N		
b. Symptoms and signs of psycho-social illness (depression, suicide, anxiety neurosis, schizophrenia, manic-depressive psychosis, substance abuse, child spouse and geriatric abuse, general verbal abuse)			N		
c. Medical laboratory tests			N		

<p>Section 26. Infectious Diseases (1-2)</p> <p>a. Symptoms and signs of common infectious diseases (tuberculosis, subacute bacterial endocarditis, sepsis, opportunistic infections)</p> <p>b. Medical laboratory tests and diagnostic imaging</p>			N N		
<p>Section 27. Congenital/Hereditary Conditions (1-2)</p> <p>a. Symptoms and signs of common genetic disorders (Down syndrome, cystic fibrosis, congenital heart disease, and other chromosomal anomalies)</p> <p>b. Symptoms and signs of common congenital disorder (foetal, alcohol syndrome, rubella, syphilis, toxoplasmosis)</p> <p>c. Medical laboratory tests and diagnostic imaging</p>		-O -O -O	-O -O -O		
<p>Section 28. Epidemiology and Biostatistics (3-7)</p> <p>a. Epidemiological data</p> <ol style="list-style-type: none"> 1. Incidence and prevalence 2. Odds ratio 3. Relative risk 4. Indices of health 5. Measures of central tendency and variability <p>b. Screening concepts</p> <ol style="list-style-type: none"> 1. Sensitivity and specificity 2. Predictive value 3. Yield <p>c. Major epidemiological studies</p> <p>d. Research design</p> <ol style="list-style-type: none"> 1. Descriptive and experimental studies 2. Case-control studies 3. Cross-sectional studies 4. Cohort studies (prospective and retrospective) <p>e. Morbidity and mortality</p> <ol style="list-style-type: none"> 1. General morbidity and mortality patterns 2. General distribution of eye and vision disorders 3. Legal blindness (age-specific causes, age-specific rates) 		±O ±O ±O ±O ±O	±O ±O ±O ±O ±O N N N N N N N N N N N		

Diplome Europeen	BTS	Anciennes MST	C	TD	TP
OCULAR BIOLOGY					
Section 1. Anatomy of the Eye, Ocular Adnexa and					

Visual Pathway (16-24)					
a. Orbit					
1. Contents (extrocular muscles, nerves, blood vessels, fat compartments, fascia)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>		
2. Anatomical relationships among orbital structures	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>		
3. Bones of the orbit	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>		
4. Foramina and openings of the orbit (location, contents)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>		
b. Extraocular muscles					
1. Names	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>		
2. Origins	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>		
3. Insertions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>		
4. Innervation, blood supply	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>		
5. Relationship to other orbital structures	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>		
c. Blood Supply					
1. Branches of internal and external carotid arteries related to the orbit, eyelid and upper face	\pm <input type="radio"/>		\pm <input type="radio"/>		
2. Branches of the internal and external jugular veins	\pm <input type="radio"/>		\pm <input type="radio"/>		
3. Dural sinuses	\pm <input type="radio"/>		\pm <input type="radio"/>		
d. Ocular and orbital nerves					
1. Cranial nerve I, III, IV, V, VI, VII (intracranial and extracranial course, branches, functions, tissue innervated)	\pm <input type="radio"/>	\pm <input type="radio"/>	\pm <input type="radio"/>		
2. Parasympathetic nerves (course, branches, tissue, innervated)	\pm <input type="radio"/>	\pm <input type="radio"/>	\pm <input type="radio"/>		
3. Sympathetic nerves (course, branches, tissue innervated)	\pm <input type="radio"/>	\pm <input type="radio"/>	\pm <input type="radio"/>		
e. Eyelid					
1. Anatomic boundaries	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>		
2. Layers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>		
3. Muscles (actions)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>		
4. Glands (secretions, functions)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>		
5. Blood supply drainage, lymphatic drainage	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>		
6. Innervation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>		
f. Eyebrow (structure and function)					
		<input type="radio"/>			
g. Conjunctiva					
1. Location		<input type="radio"/>	<input type="radio"/>		
2. Composition (layers, cell types, glands)		<input type="radio"/>	<input type="radio"/>		
3. Relationships with tarsal plate, extraocular muscles, sclera, Tenon's capsule, cornea		<input type="radio"/>	<input type="radio"/>		
4. Blood supply and venous drainage, lymphatic drainage		<input type="radio"/>	<input type="radio"/>		
5. Innervation		<input type="radio"/>	<input type="radio"/>		
6. Plica semilunaris (composition)		<input type="radio"/>	<input type="radio"/>		
7. Caruncle (composition)		<input type="radio"/>	<input type="radio"/>		
h. Lacrimal system					
1. Lacrimal gland (structure, innervation, blood supply)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>		
2. Accessory lacrimal glands (location, function)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>		
3. Distribution of tears (role of eyelids)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>		
4. Drainage of tears, nasolacrimal duct (cellular lining),	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>		

lacrimae papillae (location), lacrimae puncta, canaliculi (relationship to Horner's Muscle); lacrimae sac (relationship to medical palpebral ligament, Horner's muscle, orbicularis oculi, septum orbitale)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. Lacrimae fossa (bony structure)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6. Nasolacrimae canal (bony composition, relationships to maxillary sinus)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
i. Cornea			
1. Normal dimensions including diameter, radii of curvature (anterior and posterior) and thickness (central and peripheral)		<input type="radio"/>	<input type="radio"/>
2. Temperature		<input type="radio"/>	<input type="radio"/>
3. Epithelium (histology and ultrastructure)		<input type="radio"/>	<input type="radio"/>
4. Basal lamina (relationship to epithelium)		<input type="radio"/>	<input type="radio"/>
5. Bowman's layer (relationship to basal lamina and epithelium)		<input type="radio"/>	<input type="radio"/>
6. Stroma (composition, ultrastructure)		<input type="radio"/>	<input type="radio"/>
7. Descemet's membrane (relationship to stroma and endothelium)		<input type="radio"/>	<input type="radio"/>
8. Endothelium (composition, ultrastructure)		<input type="radio"/>	<input type="radio"/>
9. Innervation		<input type="radio"/>	<input type="radio"/>
10. Regeneration		<input type="radio"/>	<input type="radio"/>
j. Sclera			
1. Size		<input type="radio"/>	<input type="radio"/>
2. Radius of curvature		<input type="radio"/>	<input type="radio"/>
3. Thickness		<input type="radio"/>	<input type="radio"/>
4. Colour		<input type="radio"/>	<input type="radio"/>
5. Relationship to conjunctiva, Tenon's capsule, suprachoroidal space		<input type="radio"/>	<input type="radio"/>
6. Emissaria (contents, location)		<input type="radio"/>	<input type="radio"/>
7. Composition		<input type="radio"/>	<input type="radio"/>
8. Lamina cribrosa (structure)		<input type="radio"/>	<input type="radio"/>
k. Anterior chamber and angle			
1. Shape and volume		<input type="radio"/>	<input type="radio"/>
2. Boundaries		<input type="radio"/>	<input type="radio"/>
3. Diameter and depth		<input type="radio"/>	<input type="radio"/>
4. Trabecular meshwork (components, ultrastructure)		<input type="radio"/>	<input type="radio"/>
5. Juxtacanalicular tissue (components, ultrastructure)		<input type="radio"/>	<input type="radio"/>
6. Schlemm's canal (location, size, ultrastructure of wall, afferent and efferent connections)		<input type="radio"/>	<input type="radio"/>
7. Scleral spur (composition, location)		<input type="radio"/>	<input type="radio"/>
8. Schwalbe's ring (composition, location)		<input type="radio"/>	<input type="radio"/>
l. Iris			
1. Gross landmarks, zones		<input type="radio"/>	<input type="radio"/>
2. Diameter		<input type="radio"/>	<input type="radio"/>
3. Coloration (factors controlling)		<input type="radio"/>	<input type="radio"/>
4. Anterior border (composition, ultrastructure)		<input type="radio"/>	<input type="radio"/>
5. Stroma (composition,)		<input type="radio"/>	<input type="radio"/>
6. Sphincter muscle (type, composition, innervation)		<input type="radio"/>	<input type="radio"/>
7. Anterior epithelium (ultrastructure)		<input type="radio"/>	<input type="radio"/>

8. Dilator muscle (type, composition, innervation)	±0	±0	
9. Posterior epithelium (relationship to lens, anterior epithelium, pupil margin)	±0	±0	
10. Blood supply, venous drainage	±0	±0	
11. Innervation	±0	±0	
m. Pupil			
1. Size	±0	±0	
2. Location	±0	±0	
n. Posterior chamber			
1. Size and volume	0	0	
2. Boundaries	0	0	
o. Ciliary body			
1. Gross morphology	±0	±0	
2. Dimensions	±0	±0	
3. Relationship to sclera, anterior chamber, iris, posterior chamber, lens and retina	±0	±0	
4. Pars plana (location, components)	±0	±0	
5. Pars plicata (location, components)	±0	±0	
6. Stroma (components)	±0	±0	
7. Ciliary muscle (components, origin, insertion, action, innervation)	±0	±0	
8. Pigmented epithelium (basal lamina, ultrastructure)	±0	±0	
9. Non-pigmented epithelium (basal lamina, ultrastructure, relationship to pigmented epithelium)	±0	±0	
10. Blood supply and venous drainage	±0	±0	
11. Innervation	±0	±0	
p. Lens, zonule			
1. Zonule	±0	±0	
2. Location of lens	±0	±0	
3. Epithelium (capsule, ultrastructure)	±0	±0	
4. Cortex (composition of lens fibres, ultrastructure)	±0	±0	
5. Nuclei (various names and locations)	±0	±0	
6. Sutures (location)	±0	±0	
q. Choroid			
1. Extent	±0	±0	
2. Thickness	±0	±0	
3. Relationship to lamina fusca of sclera	±0	±0	
4. Choriocapillaris	±0	±0	
5. Stroma (composition)	±0	±0	
6. Blood supply	±0	±0	
7. Venous drainage	±0	±0	
8. Innervation	±0	±0	
9. Bruch's membrane (location, composition)	±0	±0	
r. Vitreous			
1. Volume	±0	±0	
2. Shape	±0	±0	
3. Attachments to retina and lens (ultrastructure)	±0	±0	
4. Patellar fossa (location)	±0	±0	

5. Anterior hyaloid (location)	±0	±0		
6. Posterior hyaloid (location)	±0	±0		
7. Cortex (composition)	±0	±0		
8. Hyaloid canal (location, origion)	±0	±0		
rs. Retina				
1. Layers (components of each, ultrastructure)	0	0		
2. Relationship between retinal pigment and Bruch's Membrane	0	0		
3. Relationship between retinal pigment epithelium and photoreceptor outer segments	0	0		
4. Synaptic connections within retina	0	0		
5. Glial cells (name, location, function)	0	0		
6. Blood supply	0	0		
7. Anatomical areas (location, size, composition) of area centralis, parafovea, fovea, foveola, macula lutea, ora serrata (ultrastructure)	0	0		
t. Optic nerve				
1. Surface features	±0	±0		
2. Prelaminar portion (composition, blood supply)	±0	±0		
3. Laminar portion (composition, blood supply)	±0	±0		
4. Retrolaminar portion (composition, blood supply)	±0	±0		
5. Central retinal artery and vein (location)	±0	±0		
6. Optic disc/cup	±0	±0		
u. Visual pathway				
1. Localisation of retinal fibres aloon visual pathway, optic nerve, chiasm (crossing), optic tract, lateral geniculate body, optic radiations, visual cortex	0	0		
2. Layers of lateral geniculate body (afferents, efferents)	0	0		
3. Layers of visual cortex, areas	0	0		
4. Blood supply	0	0		
5. Anatomy related to visual pathology	0	0		

Diplome Europeon	BTS	Anciennes MST	C	TD	TP
Section 2. Ocular and Visual Pathway Development (6-10)					
a. Orbit					
1. Development of bones of orbit (closure of sutures)			N		
2. Abnormalities (faulty development of facial bones)			N		
b. Extraocular muscles					
1. Condensation of mesenchyme (bilateral condensation)	-0	-0	-0		
2. Motor innervation development	-0	-0	-0		
3. Insertion of extraocular primordia into an anterior sclera	-0	-0	-0		
4. Late development	-0	-0	-0		
c. Eyelid					
1. Tissue origin		0	0		

2. Lid folds	O	O		
3. Fusion of eyelid	O	O		
4. Ectodermal derivatives (skin, glands, conjunctiva)	N	N		
5. Mesodermal derivatives (tarsus, orbital septum, orbicularis oculi, aponeurosis of levator, smooth muscle)	N	N		
d. Conjunctiva				
1. Ectodermal specialization forming conjunctiva and glands		N		
e. Lacrimal apparatus				
1. Tissue origin of lacrimal glands (main, accessory)		N		
2. Appearance of tearing and weeping (reflexes)		N		
3. Tissue origin of lacrimal and nasal passages		N		
f. Cornea				
1. Inductive mechanisms		N		
2. Ectodermal components (epithelium, primary stroma)		N		
3. Mesenchymal components (waves)		N		
4. Corneal nerve development (origin)		N		
5. Factors affecting corneal size, curvature, transparency		N		
g. Sclera				
1. Inductive mechanisms		N		
2. Tissue origin		N		
3. Comparison with cornea		N		
h. Anterior chamber and angle				
1. Creation of anatomical space		N		
2. Factors that promote growth of anterior chamber		N		
3. Creation of angle (atrophy theory, cleavage theory, reorganisation theory, rarefaction theory)		N		
4. Differentiation of Canal of Schlemm, scleral spur, trabecular meshwork		N		
5. Endothelial membrane		N		
i. Iris/Pupil				
1. Development of iris stroma (anterior leaf, posterior leaf)		N		
2. Development of pars iridica retinae (epithelial layer)		N		
3. Development of dilator and sphincter muscles		N		
4. Pupillary membrane (atrophy)		N		
5. Cilioidic circulation		N		
j. Posterior chamber		N		
k. Ciliary body				
1. Tissue origin (mesoderm, neural crest)		N		
2. Development of pars ciliaris retinae (epithelial layers)		N		
3. Development of ciliary processes, ciliary muscles, ciliary vessels		N		
l. Lens, zonules				
1. Zonule development		N		
2. Tissue induction and interaction (effect on development of vitreous, iris, cornea, retina)		N		
3. Mechanism of lens fibre orientation		N		
4. Stages of lens vesicle development (lens placode, lens		N		

<ul style="list-style-type: none"> pit, lens vesicles) 5. Stages of lens fibre development 6. Developmental nuclei (embryonic, fetal, infantile) 7. Zones of development of lens epithelium 			N		
<ul style="list-style-type: none"> m. Choriod <ul style="list-style-type: none"> 1. Tissue origin (paraxial mesoderm, neural crest cells) 2. Development of choroidal vasculature (3 stages) 3. Development of Bruch's membrane 			N		
<ul style="list-style-type: none"> n. Vitreous <ul style="list-style-type: none"> 1. Primary vitreous (hyaloid canal, tissue origin, tissue characteristics) 2. Secondary vitreous (tissue origin, tissue characteristics) 3. Tertiary vitreous (tissue origin, tissue characteristics) 			N		
<ul style="list-style-type: none"> o. Retina <ul style="list-style-type: none"> 1. Development of optic cup 2. Analogies between development of retina and central nervous system 3. Foetal tissue (formation, fusion, function) 4. Retinal differentiation (stages I,II,III, proliferation, migration, differentiation) 5. Maculr differentiation 6. Retinal circulation development (hyaloid system, central retinal artery/vein) 7. Postnatal events 			N		
<ul style="list-style-type: none"> p. Optic Nerve and visual pathway <ul style="list-style-type: none"> 1. Developmental stages of lower visual pathway, before lateral geniculate body (differences between crossed and uncrossed fibres) 2. Myelination of the visual pathway (lower visual pathways vs. upper visual pathway) 3. Relationship between development of upper visual pathway and central vision 			N		
<p>Section 3. Ocular Physiology / Neurophysiology (16-22)</p>					
<ul style="list-style-type: none"> a. Circulation <ul style="list-style-type: none"> 1. Haemodynamic patterns (resistance, transmural pressure, flow rate, critical closing pressures) 2. Autoregulation 3. Autonomic nervous system control 4. Unique environment of the eye (high extravascular pressure) 5. Uveal blood flow : choroid, ciliary body, iris (unique characteristics of each, functions of each) 6. Retinal blood flow (unique characteristics, dual supply, functions) 			N		
<ul style="list-style-type: none"> b. Eyelids 			?		

1. Normal closure of eyelids (forces, spontaneous)		?	
2. Blink reflexes (spontaneous, menace, auditory, touch, dazzle)		?	
3. Role of eyelids in production, distribution and drainage of tears		?	
4. Protective functions of eyelids		?	
c. Tears			
1. Function of tears (wet eye, smooth surface, antibacterial, nutritional, etc.)	○	○	
2. Composition of tears (3 layers)	○	○	
3. Function of each layer of tears	○	○	
4. Source of each layer of tears	○	○	
5. Basic tear secretion	○	○	
6. Reflex tear secretion	○	○	
7. Tear film stability	○	○	
8. Wetting the cornea (thin fluid principals)	○	○	
d. Cornea			
1. Physical characteristics (water content, protein content, cells, resistance to trauma)	○	○	
2. Permeability characteristics of various layers	○	○	
3. Metabolic characteristics of various layers	○	○	
4. Theories of corneal transparency	○	○	
5. Factors influencing corneal thickness/hydration (osmolarity of tears, integrity of of epithelium and endothelium, epithelial and endothelial pumps)	○	○	
6. Physiological parameters necessary to maintain corneal integrity (oxygen level, glucose level, pH, etc.)	○	○	
7. Epithelial regeneration (normal and response to trauma)	○	○	
8. Physiological characteristics of corneal nerves	○	○	
9. Ageing changes of the cornea	○	○	
e. Intraocular pressure			
1. Mean pressure	○	○	
2. Diurnal variation	○	○	
3. Factors controlling aqueous production (capilliary pressure, active transport)	○	○	
4. Factors controlling aqueous outflow (IOP, episcleral venous pressure, etc.)	±○	±○	
5. Nervous system regulation of IOP	±○	±○	
6. Systemic factors influencing IOP (blood osmolarity, body position, blood pH, blood pressure, etc.)	±○	±○	
f. Aqueous			
1. Functions of aqueous	±○	±○	
2. Volume, osmolarity, viscosity	±○	±○	
3. Formation (ultrafiltration, active transport)	±○	±○	
4. Factors influencing rate of flow	±○	±○	
5. Composition	±○	±○	
6. Blood aqueous barriers (location, ultrastructure, function)	±○	±○	

g. Lacrimal apparatus				
1. Regulation of basic tear secretion		○	○	
2. Regulation of reflex tear secretion		○	○	
3. Distribution of tears		○	○	
4. Drainage of tears (role of Horner's muscle)		○	○	
h. Pupillary pathways				
1. sympathetic pathways to iris		○	○	
2. Parasympathetic pathway to iris		○	○	
3. Functional relationships between pupillary pathways and central nervous system		○	○	
i. Lens				
1. Functions of lens		○	○	
2. Composition of lens		○	○	
3. Difference in composition between lens and aqueous		○	○	
4. Metabolism of lens (various pathways essential to the lens)		○	○	
5. Types of lens proteins		○	○	
6. Factors which regulate size and solubility of the lens proteins (Vitamin C, glutathione)		○	○	
7. Theories of lens transparency		○	○	
8. Mitotic activity of lens epithelium		○	○	
9. Ageing changes in composition of the lens		○	○	
j. Choroid				
1. Functions of choroid		±○	±○	
2. Physiological relationships between choroid and retina		±○	±○	
k. Vitreous				
1. Functions			N	
2. Composition			N	
3. Metabolism			N	
4. Ageing changes in composition			N	
5. Physical characteristics (volume, water content, transparency)			N	
l. Retina				
1. Composition of disc outersegments		○	○	
2. Formation of disc outersegments (disc renewal, disc shedding)		○	○	
3. Composition of visual pigments		○	○	
4. Formation of visual pigments		○	○	
5. Stage of visual cycle		○	○	
6. Photoreceptor electrophysiology (membrane potentials, dark current role of sodium, calcium, etc.)		○	○	
7. Retinal neurotransmitters		○	○	
8. Function of bipolar, horizontal, macrine and ganglion cells (receptive fields)		○	○	
9. Retinal neural mechanisms of colour vision (spatial, temporal and chromatic)		?	?	
m. Visual Pathway				
1. Function of lateral geniculate body		○	○	
2. Receptive fields of cells in lateral geniculate body		○	○	

(relationship to colour vision, binocularity, space perception, etc.)		O	O		
3. Function of visual cortex		O	O		
4. Receptive field properties (single cell properties)		O	O		
5. Functional organisation of visual cortex		O	O		
6. Physiology of binocular vision		O	O		
7. Mechanism of feature detection		O	O		
n. Extraocular muscles					
1. Visual-vestibular interactions (vestibulo-ocular reflex, optokinetic reflex)		-O	-O		
2. Supranuclear control of the eye movements.		-O	-O		
Section 4. Ocular Pharmacology (15-21)					
a. General Principals					
1. Factors affecting ocular drug bioavailability		O	O		
2. Routes of ocular drug administration		O	O		
b. Autonomic Drugs					
1. Functional concepts and ocular receptor types		±O	±O		
2. Ocular cholinergic agents		±O	±O		
3. Ocular adrenergic agents		±O	±O		
c. Local anaesthetics					
1. Properties of topical ocular anaesthetics non-injectable)				N	
d. Antihistamines				N	
e. Anti-inflammatory agents					
1. Steroids		±O	±O		
2. Non-steroids (including mast cell stabilizers)		±O	±O		
f. Chemotherapeutic Agents					
1. Antimicrobials		±O	±O		
2. Antivirals		±O	±O		
3. Antifungals		±O	±O		
g. Dyes					
1. Topical diagnostic agents				N	
2. Oral and intravenous agents				N	
h. Hypersomotic agents					
1. Topical ocular agents				N	
i. Lubricants and tear substitutes				N	
j. Preparations used with contact lenses				?	
k. Toxicology					
1. Ocular effects from topical ocular drug administration				N	
2. Ocular effects from systemic drug administration				N	
3. Systemic effects from ocular drug administration				N	
Section 5. Ocular Motility (2-4)					
a. The intraocular musculature (iris and ciliary)					
1. Purposes and roles for vision		O	O		
2. Dynamics of muscle action		O	O		
3. Biomechanics and neurological control of pupillary					

reflexes and accommodation			O	O		
4. Interrelationships between pupillary changes, accommodation, and convergence (the near reflex)			O	O		
5. Factors affecting pupil size			O	O		
b. Extraocular musculature						
1. Purpose and roles for vision			O	O		
2. Dynamics and kinematics of eye movements			O	O		
3. Specification of direction of gaze and ocular orientation (torsion)			O	O		
4. Agonist-antagonist relationships			O	O		
5. Primary action, and secondary and tertiary actions			O	O		
6. Fields of action			O	O		
c. Characteristics and control of the various eye movements						
1. Reflex eye movements, including compensatory movements			±O	±O		
2. Small eye movements associated with steady fixation			±O	±O		
3. Versional eye movements (pursuits and saccades)			±O	±O		
4. Vergence eye movements (tonic, accommodative including models of accommodative/vergence interactional, fusional, and proximal)			±O	±O		
5. Nystagmus including optokinetic and vestibular			±O	±O		
d. Adnexal musculature						
1. Purposes and roles for vision				N		
2. Characteristics				N		
3. Lid reflexes				N		
Section 6 Human Development (1-3)						
a. Normal changes in vision with ageing						
1. Oculomotor system				?		

Diplome Europeen	BTS	Anciennes MST	C	TD	TP
OCULAR ABNORMALITY					
Section 1. Ocular Adnexa (4-8)					
a. Epidemiology, history and symptom inventory			N		
b. Observation, inspection, recognition of signs, and techniques and skills including:			N		
1. Palpatation of relevant structures			N		
2. Lid eversion			N		
3. Tonus and strength testing of facial and lid muscles by the third and seventh cranial nerves			N		
4. Tests for integrity of the fifth cranial nerve			N		
5. Testing for facial anhidrosis			N		

<ul style="list-style-type: none"> and location of irregularities, deposits, opacities, etc. 2. Evaluation of surface optical quality and abnormal curvature via reflections 3. Methods to assess retinal function in presence of corneal irregularity and opacities 4. Corneal aesthesiometry and pachometry 5. Use of anaesthetics/vital dyes 6. Evaluation of regional lymph nodes 7. Obtaining and interpreting smears and cultures 8. Slit-lamp photography 9. Signs and symptoms of related systemic diseases 		<ul style="list-style-type: none"> O O O O O O O 	<ul style="list-style-type: none"> O O O O O O O N 		
<p>Section 5. Sclera / Epsiclera (5-9)</p> <ul style="list-style-type: none"> a. Epidemiology, history and symptom inventory b. Observation, inspection, recognition of signs, and techniques and skills including : <ul style="list-style-type: none"> 1. Investigation of entities producing pain in or referred to eye or orbit 2. Biomicroscopic techniques useful to detect episcleral and scleral inflammation deep to conjunctival injection/chemosis 3. Indirect ophthalmoscopy to detect posterior scleritis 4. Signs and symptoms of related systemic disease 5. Use of topical vasoconstrictor c. Pathophysiology, diagnosis, management options, and prognosis 		<ul style="list-style-type: none"> O 	<ul style="list-style-type: none"> ? N O N N N N 		
<p>Section 6. Anterior Uvea (Iris and Ciliary Body) (5-9)</p> <ul style="list-style-type: none"> a. Epidemiology, history and symptom inventory b. Observation, inspection, recognition of signs, and techniques and skills including : <ul style="list-style-type: none"> 1. Biomicroscopy 2. Gonioscopy 3. Transillumination in albinoids 4. Evaluation of pupil 5. Binocular indirect ophthalmoscopy, with scleral depression 6. Referral criteria for special tests 7. Slit-lamp photography 8. Signs and symptoms of related systemic disease c. Pathophysiology, diagnosis, management options, and prognosis 		<ul style="list-style-type: none"> O O 	<ul style="list-style-type: none"> ? O N O N N N N N 		

<p>Section 7. Pupillary, Accommodative and Refractive Pathology (5-9)</p> <p>a. Epidemiology, history and symptom inventory</p> <p>b. Observation, inspection, recognition of signs, and techniques and skills including :</p> <ol style="list-style-type: none"> 1. Evaluation of the sympathetic pathway 2. Evaluation of the parasympathetic pathway and surrounds in third nerve disease 3. 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 of accommodative paresis, spasm and ciliary body oedema 4. Swinging flashlight and pupil cycle tests 5. Evaluation and recognition of signs of aberrant regeneration 6. Evaluation of deep tendon reflexes in Aide's syndrome 7. Evaluation of suspicious refractive shifts 8. Signs and symptoms of related systemic diseases <p>c. Pathophysiology, diagnosis, management options, and prognosis</p>			<p>?</p> <p>O O</p> <p>O O</p> <p>O N</p> <p>O O</p> <p>N N</p> <p>N N</p> <p>N N</p>		<p>O</p> <p>O</p> <p>N</p> <p>O</p> <p>N</p> <p>N</p> <p>N</p>
<p>Section 8. Orbit (5-9)</p> <p>a. Epidemiology, history and symptom inventory</p> <p>b. Observation, inspection, recognition of signs, and techniques and skills including :</p> <ol style="list-style-type: none"> 1. Assessment of asymmetrical fissures 2. Recognition of sysplastic craniofacial appearance 3. General workup for periorbital ache/pain of unknown cause 4. Exophthalmometry 5. Palation of orbital rim and anterior orbit 6. Evaluation of episcleral venous dilation 7. Assessment of periorbital oedema 8. Testing for orbital bruits 9. Valsalva maneuver in proptosis 10. Workup for suspected blow out fracture 11. Tests for restrictive myopathy 12. Special test including tomograms, ultrasound, CT-scan, venograms 13. Signs and symptoms of related systemic diseases <p>c. Pathophysiology, diagnosis, management options, and prognosis</p>			<p>N</p> <p>N</p> <p>N</p> <p>N</p> <p>N</p> <p>N</p> <p>N</p> <p>N</p> <p>N</p> <p>N</p> <p>N</p> <p>N</p> <p>N</p> <p>N</p> <p>N</p>		

<p>Section 9. Anterior Chamber, Angle Structure and Abnormal IOP (5-9)</p> <p>a. Epidemiology, history and symptom inventory b. Observation, inspection, recognition of signs and techniques and skills including : 1. Tensions 2. Biomicroscopic appearance of associated anterior segment signs of glaucomas 3. Tests for estimation of chamber depth 4. Gonioscopy, direct and indirect 5. Estimating ocular rigidity with Shiotz tonometer 6. Assessment of post surgical eyes 7. Signs and symptoms of related systemic diseases c. Pathophysiology, diagnosis, management options, and prognosis</p>		<p>O</p> <p>O</p> <p>±O</p> <p>O</p> <p>±O</p> <p>?</p>	<p>?</p> <p>O</p> <p>±O</p> <p>O</p> <p>±O</p> <p>?</p> <p>N</p>		
<p>Section 10. Lens/Aphakia/Pseudophakia (4-8)</p> <p>a. Epidemiology, history and symptom inventory b. Observation, inspection, recognition of signs, and techniques and skills including : 1. Lens toxicology 2. Biomicroscopy 3. Ophthalmoscopy 4. Retinal integrity testing with opaque media 5. Signs and symptoms of related systemic diseases c. Pathophysiology, diagnosis, management options, and prognosis</p>			<p>?</p> <p>O</p> <p>±O</p> <p>±O</p> <p>N</p> <p>N</p> <p>N</p>		
<p>Section 11. Posterior Pole (4-8)</p> <p>a. Epidemiology, history and symptom inventory b. Observation, inspection, recognition of signs, and techniques and skills including : 1. Direct ophthalmoscopy 2. Indirect ophthalmoscopy 3. Family history 4. Biomicroscopy with fundus lenses 5. Ophthalmodynamometry 6. Colour vision testing 7. Photo stress testing 8. Amsler grid testing 9. Visual fields 10. Dark adaptometry 11. Contrast sensitivity testing 12. Retinal photography 13. Basic interpretation of special studies (EOG, ERG,</p>		<p>O</p> <p>O</p> <p>O</p> <p>O</p> <p>O</p> <p>O</p> <p>O</p> <p>O</p> <p>O</p> <p>O</p> <p>O</p> <p>O</p> <p>O</p>	<p>?</p> <p>O</p> <p>N</p> <p>O</p> <p>O</p> <p>N</p> <p>O</p> <p>N</p> <p>O</p> <p>O</p> <p>O</p> <p>O</p> <p>O</p> <p>O</p> <p>N</p> <p>N</p>		

<p>VER, intravenous fluorescein angiography, ultrasound)</p> <p>14. Retinal integrity testing with opaque media</p> <p>15. Signs and symptoms of related systemic diseases</p> <p>c. Pathophysiology, diagnosis, management options, and prognosis</p>			N N N N		
<p>12. Peripheral Fundus/Vitreous (4-8)</p> <p>a. Epidemiology, history and symptom inventory</p> <p>b. Observation, inspection, recognition of signs, and techniques and skills including:</p> <ol style="list-style-type: none"> 1. Nerve toxicology 2. Colour vision testing in optic nerve disorders 3. Visual field testing 4. Testing for objective and subjective afferent pupillary defects 5. Pupil cycle types 6. Pulfrich phenomenon 7. Use of neutral density filters 8. Interpretation of electrodiagnostic tests, contrast sensitivity, etc. 9. Observation of nerve head and peripapillary retina with ophthalmoscope, fundus lenses and stereophotography 10. Carotid assessment 11. Plain x-rays, tomograms, CT-scan, ultrasound and intravenous fluorescein 12. Signs and symptoms of related systemic diseases <p>c. Pathophysiology, diagnosis, management options, and prognosis</p>			? N N N N N N N N N N N		
<p>Section 14. Sensory Neuro-Visual Pathology (4-8)</p> <p>a. Epidemiology, history and symptom inventory</p> <p>b. Observation, inspection, recognition of signs, and techniques and skills including :</p> <ol style="list-style-type: none"> 1. Transient neuro-visual episodes 2. Detailed visual fields 3. Detailed headache workup 4. 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 scans 5. Signs and symptoms of related systemic diseases <p>c. Pathophysiology, diagnosis, management options, and prognosis</p>			? N N N N N N		

Section 15. Oculomotor Neuropathology (5-9)					
a. Epidemiology, history and symptom inventory			?		
b. Observation, inspection, recognition of signs, and techniques and skills for infranuclear pathology including :					
1. Objective and subjective testing for incomitancy			N		
2. Strength and fatigue testing in myopathies			N		
3. Recognition and examination for orbital signs			N		
4. Understanding indications for intravenous tensilon			N		
5. Signs and symptoms of related systemic diseases and observation, inspection, recognition of signs, and techniques and skills appropriate to supranuclear oculomotor neuropathology including :					
i. Observation, inspection and testing stability of eyes in fixation			N		
ii. Testing for adequacy of pursuits	O		N		O
iii. Testing for adequacy of saccades	O		O		O
iv. Testing of extraocular muscle reflexes	O		O		O
v. Assessment of “dizzy” patient			N		
vi. General Physical assessment and use of the medical laboratory appropriate to supranuclear oculomotor pathology					
c. Pathophysiology, diagnosis, management options, and prognosis			N		

ANNEXE B

CURSUS DU BTS-OL ET des anciennes MST d'Optométrie

Les cursus approximatifs (ont pu subir quelques fluctuations)

ANNEXE C

EXAMEN DU DIPLOME EUROPEEN PARTIE ECRITE

1. INTRODUCTION

L'examen écrit est sous forme de Questions aux choix multiples (QCM). Les questions des différentes parties d'une section seront mélangées. Le niveau de difficulté des questions sera variable.

2. SECTION A

PERCEPTION VISUELLE ET TECHNOLOGIE OPTIQUE

EXAMEN ECRIT OPTIQUE GENERAL ET PERCEPTION VISUELLE

(Durée 3 heures)

	Nombres de questions
A. OPTIQUE GENERALE (60 questions)	
Optique géométrique	32 – 40
Optique physique	20 – 28
B. PERCEPTION VISUELLE (60 questions)	
Physiologie oculaire et neurophysiologie	2 – 4
Optique visuelle	12 – 18
Perception visuelle	15 – 21
Méthodes psychophysiques	2 – 4
Développement humain	4 – 8
Anomalies du développement de l'enfant	2 – 4
Anomalies du vieillissement de l'adulte	2 – 4
Anomalies de la vision des couleurs (acquises, hereditaires)	4 – 8
Environnement visuel	6 – 10
C. OPTIQUE LUNETTERIE (60 questions)	
Optique géométrique	6 – 10
Optique ophtalmique	28 – 36
Anomalies de la réfraction / aniseikonie	3 – 5
Correction par des lunettes	20 – 28
Environnement visuel	6 – 10
Législation européenne	3 – 5

3. SECTION B MANAGEMENT DES PROBLEMES VISUELS

EXAMEN ECRIT REFRACTION – VISION BINOCUALIRE LENTILLE DE CONTACT (Durée 3 heures)

	Nombres de questions
A. REFRACTION (73 questions)	
Optique visuelle	1 – 2
Développement humain	1 – 3
Anomalies de la réfraction / Amétropies	20 – 28
Anomalies de la réfraction / Presbytie	8 – 14
Anomalies de la réfraction / Aphakie et pseudophake	2 – 4
Anomalies de la réfraction / Aniseikonie	1 – 3
Basse Vision	3 – 5
Anomalies de l'accommodation et modification de la vergence	1 – 3
Anomalies de la réfraction /	1 – 3
Vieillessement	1 – 3
Environnement visuel	2 – 4
B. SENSORIELLES DE LA VISION BINOCULAIRE (73 questions)	
Motilité Oculaire	4 – 8
Développement humain	5 – 9
Neuropathologie Oculomotrice	2 – 4
Anomalies de la réfraction / Presbytie	1 – 3
Anomalies sensorielles de la vision binoculaire / Strabisme	35 – 43
Anomalies des mouvements oculaires	3 – 7
Anomalies de l'accommodation et de la vergence accommodative	8 – 14
C. LENTILLES DE CONTACT (74 questions)	
Anomalies de la réfraction / amétropies	5 – 9
Utilisation des lentilles de contact	60 – 70
Legislation européenne	1 – 3

4. SECTION C SANTE GENERALE ET ANOMALIE OCULAIRE

EXAMEN ECRIT BIOLOGIE GENERALE ET OCULAIRE

(Durée 3 heures)

	Nombres de questions
A. BIOLOGIE GENERALE (70 questions)	
Anatomie générale	3 – 7
Histologie	3 – 7
Neuroscience	3 – 7
Biochimie générale	3 – 7
Physiologie générale / Neurophysiologie	3 – 7
Microbiologie générale	3 – 7
Immunologie générale	3 – 7
Pharmacologie générale	3 – 7
Pathologie générale	3 – 7
Santé générale	1 – 2
Système neurologique	1 – 2
Système Muscles Squelette	1 – 2
Peau et Cheveux	1 – 2
Tête et cou	1 – 2
Système hématologique	1 – 2
Système immunologique	1 – 2
Système cardio vasculaire	1 – 2
Système uro génitale	1 – 2
Système gastro intestinale	1 – 2
Foie et système biliaire	1 – 2
Système métabolique et endocrinien	1 – 2
Système reproducteur	1 – 2
Nutrition	1 – 2
Maladie psychosociale	1 – 2
Maladies infectieuses	1 – 2
Conditions héréditaires	1 – 2
Epidémiologie et biostatistiques	3 – 7
B. BIOLOGIE OCULAIRE (70 questions)	
Anatomie de l'œil, annexe oculaire et des voies optiques	16 – 24
Développement de l'œil et des voies optiques	6 – 10
Physiologie oculaire	16 – 22
Pharmacologie oculaire	15 – 21
Motilité oculaire	2 – 4
Développement humain	1 – 3

C. ANOMALIES OCULAIRES (100 questions)

Annexe oculaire	4 – 8
Système lacrymal	4 – 8
Conjonctive	5 – 9
Cornée	5 – 9
Sclère / Episclère	5 – 9
Uvée antérieure / Iris / Corps ciliaire	5 – 9
Pathologie de la pupille de l'accommodation et de la réfraction	5 – 9
Orbite	5 – 9
Chambre antérieure, angle irido cornéen et anomalie de la pression oculaire	5 – 9
Aphaquie / Pseudophaque	4 – 8
Pole postérieur	4 – 8
Vitré / Fond d'œil périphérique	4 – 8
Pathologie du nerf optique	5 – 9
Pathologie du système neuro visuel	4 – 8
Neuropathologie oculomotrice	5 – 9

ANNEXE D

**EXAMEN DU DIPLOME EUROPEEN
PARTIE PRATIQUE**

1. Section A Perception Visuelle et Technologie Optique

1.1. Examen Pratique Session 1

1.1.1. Poste 1

- Mesures de lunettes avec verres progressifs
- Mesures de verres simple foyer et asphérique

1.1.2. Poste 2

- Montage de verres progressifs meule automatique

1.1.3. Poste 3

- Ajustage et vérifications de lunettes à verres progressifs
- Vérifications de lunettes, mesures de montures diverses et identification de verres spéciaux.

1.1.4. Poste 4

- Montage verres doubles foyers meule manuelle

1.2. Examen Pratique Session 2

1.2.1. Station 5

- Assemblage et montages de verres prismatiques

1.2.2. Station 6

- Assemblage d'une monture en métal

2. SECTION B MANAGEMENT DES PROBLEMES VISUELS

2.1. EXAMEN PRATIQUE POSTE 1

EXAMEN CLINIQUE EN VISION BINOCULAIRE

(Durée 45 minutes)

A. MASQUAGE

Le candidat doit réaliser de façon précise le test du masquage en vision de loin et en vision de près afin de déterminer l'équilibre oculomoteur du patient.

B. MOTILITE OCULAIRE

Le candidat doit examiner les mouvements de poursuites oculaires de façon précise pour déterminer le jeu moteur.

C. CONVERGENCE

Le candidat doit réaliser le point de bris de façon précise pour déterminer la convergence.

D. HETEREPHORIE DISSOCIEE

Le candidat doit déterminer l'hétérophorie au loin et au près par le test du masquage ou par la méthode Von Graefe.

E. HETEREPHORIE ASSOCIEE

Le candidat doit déterminer l'hétérophorie associée au loin et au près à l'aide du Polatest ou du test de Mallet

F. ACCOMMODATION

Le candidat doit déterminer les réserves accommodatives en monoculaire et en binoculaire d'un patient non presbyte.

2.2. EXAMEN PRATIQUE - POSTE 2

EXAMEN CLINIQUE EN REFRACTION

(Durée 45 minutes)

A. SKIASCOPIE

Le candidat doit faire une skiascopie statique des deux yeux d'un patient presbyte et donner les résultats corrigés de la distance d'observation.

B. REFRACTION

Le candidat poursuivra l'examen du patient en partant de la skiascopie. Il doit :

1. Déterminer la réfraction monoculaire de chaque œil
2. Mesurer l'acuité visuelle monoculaire et binoculaire

C. EQUILIBRE BINOCULAIRE

Le candidat doit réaliser l'équilibre en utilisant selon son choix une des méthodes ci dessous :

- Septum
- Test polarisé
- Flou monoculaire

D. ADDITION EN VISION DE PRES

Le candidat doit déterminer l'addition nécessaire de vision de près

2.3. EXAMEN PRATIQUE - POSTE 3

EXAMEN CLINIQUE EN CONTACTOLOGIE

(Durée 45 minutes)

A. INTERROGATION DU PATIENT

Le candidat doit faire une histoire de cas afin de :

1. Déterminer les motivations du patient envers les lentilles de contact
2. Recueillir tous renseignements pertinents
3. Identifier toutes contre indications

Le candidat doit instruire le patient sur les méthodes appropriées d'entretien, d'utilisation et d'hygiène des lentilles.

B. BIOMICROSCOPIE

Le candidat doit faire un examen biomicroscopique complet des deux yeux d'un patient. Cet examen doit comprendre l'observation minutieuse et précise :

- des annexes oculaires
- de la partie externe et du segment antérieur de l'œil

Le candidat doit commenter verbalement et rapporter par écrit de façon détaillée ses observations.

C. KERATOMETRIE

Le candidat doit mesurer les rayons kératométriques centraux des deux yeux du patient en mm.

D. CHOIX, EVALUATION DE L'EQUIPEMENT ET MANIPULATION DES LENTILLES

Le candidat doit :

1. Sélectionner une lentille LRPG pour l'œil droit et une lentille LSH pour l'œil gauche d'après les informations obtenues précédemment.
2. Vérifier les paramètres de la lentille LRPG et s'assurer qu'ils sont conformes aux spécifications indiquées sur l'étui.
3. Poser la lentille LRPG sur l'œil droit et la LSH sur l'œil gauche.
4. Evaluer de façon précise l'équipement et le commenter.

5. Retirer les lentilles.

Le candidat doit réaliser ce travail en prêtant attention aux règles d'hygiène et de sécurité.

2.4. EXAMEN PRATIQUE - POSTE 4

COMMUNIQUE EN CLINIQUE

(Durée 45 minutes)

Dans ce poste d'examen le candidat ne procède pas à des mesures cliniques.

Le candidat doit faire une histoire de cas et une évaluation de la symptomatologie sur deux patients. Le candidat doit :

1. Identifier les raisons principales de la visite.
2. Obtenir les informations pertinentes avant l'examen optométrique. En particulier les aspects nécessitant une attention particulière.

2.5. MANAGEMENT OPTOMETRIQUE D'ETUDE DE CAS

Visual Identification and Management of Optometric Conditions (VIMOC)

(Durée 3 heures)

Cette section est constituée de 30 cas. Chaque étude de cas comprend :

1. L'histoire de cas
2. La représentation visuelle des tests cliniques.

Le candidat doit répondre à trois QCM par cas. Ces questions testent :

1. La compréhension du cas
2. La décision optométrique
3. Le suivi à long terme du cas

Les 30 cas sont divisés de la façon suivante :

Réfraction	6 cas
Vision binoculaire	12 cas
Contactologie	12 cas

3. SECTION C SANTE GENERALES ET ANOMALIES OCULAIRES

3.1. EXAMEN PRATIQUE POSTE 1

EXAMEN CLINIQUE RELATIONNEL AVEC LE PATIENT

(Durée 45 minutes)

A. HISTOIRE DE CAS

Le candidat doit faire l'histoire de cas d'un nouveau patient qui présente un problème et / ou oculaire. Il doit obtenir du patient les informations pertinentes et nécessaires à la subséquente performance tout appropriée.

Après l'histoire de cas le candidat doit expliquer au patient la nature et le but des procédures diagnostiques proposées

B. COMMUNICATION AVEC LE PATIENT

Le candidat est mis en présence d'un patient avec son diagnostic oculaire.

Le candidat doit donner au patient une explication de la nature et du but des procédures de diagnostiques. L'explication doit être claire et précise et selon une terminologie non technique.

3.2. EXAMEN PRATIQUE POSTE 2

EXAMEN CLINIQUE DU SEGMENT POSTERIEUR

(Durée 45 minutes)

A. BIOMICROSCOPIE

Le candidat doit faire un examen biomicroscopique complet d'un œil qui doit comprendre l'observation minutieuse et précise :

Des annexes oculaires

De la partie externe et du segment antérieur de l'œil.

B. OPHTALMOSCOPIE INDIRECTE BINOCULAIRE

Le candidat doit examiner le pôle postérieur (examen du fond d'œil) de l'autre œil du patient à l'aide du biomicroscope et d'une lentille de fond d'œil (non-contact).

La pupille de l'œil examine sera préalablement dilatée.

C. OPHTALMOSCOPIE DIRECTE

Le candidat doit faire un examen ophtalmoscopique complet du fond d'œil d'un patient. L'examen doit être minutieux et précis, en particulier le candidat doit mesurer le rapport « cup-disque » et le rapport artères / veines.

3.3. EXAMEN PRATIQUE POSTE 3

EXAMEN CLINIQUE DU SEGMENT ANTERIEUR ET TANSION OCULAIRE

(Durée 45 minutes)

A. INSTILLATION D'UN ANESTHESIQUE LOCAL

Le candidat doit instiller un collyre anesthésiant dans l'œil d'un patient.

B. TONOMETRIE

Le candidat doit mesurer la pression intra-oculaire de l'œil anesthésié a l'aide d'un tonomètre a applanation (Goldmann).

C. PACHIMETRIE CORNEENNE

Le candidat doit mesurer l'épaisseur centrale de la cornée de l'œil d'un patient. Il doit faire trois mesures successives et calculer la valeur moyenne.

D. EVALUATION PUPILLAIRE

Le candidat doit mesurer examiner les pupilles d'un patient sans connaissance préalable du patient.

Le candidat doit rapporter ses observations a l'examineur de façon similaire a ses notes cliniques.

3.4. EXAMEN PRATIQUE POSTE 2

EXAMEN CLINIQUE DU SEGMENT POSTERIEUR ET EXAMENS SPECIFIQUES

(Durée 45 minutes)

A. OPHTALMOCOPIE INDIRECTE BINOCULAIRE

(Ophtalmoscopie binoculaire)

Le candidat doit faire un examen de façon précise et minutieuse le pôle postérieur d'un œil d'un patient à l'aide d'un ophtalmoscope binoculaire. La pupille sera préalablement dilatée.

Le candidat doit réaliser une image nette de la papille, de la fovea et la périphérie rétinienne.

B. INSERTION DE CLOU CANALICULAIRE

Le candidat doit préparer et insérer à mi distance un clou dans le punctum inférieur de l'œil d'un patient en utilisant le biomicroscope comme système d'observation.

Le candidat doit maintenir le clou en position et le retirer. Il ne doit pas l'insérer complètement.

Le candidat doit expliquer à l'examineur comment il va manipuler le clou pour l'insérer dans le canalicule inférieur.

Le candidat doit assumer :

- Qu'il n'y a pas de contre indication à l'utilisation d'un clou
- Que l'incisneur est stérile>

C. PREMIERS SECOURS

Le candidat est testé sur la délivrance des premiers secours oculaires. Le candidat doit :

- Retourner la paupière supérieure d'un œil et examiner la conjonctive du tarse au biomicroscope.
- Rincer l'œil avec une solution saline stérile et poser une compresse sur le même œil.