COURSE SPECIFICATION

(Optics of the Eye)

Faculty of Medicine– Mansoura University

(A) Administrative information

(1) Programme offering the course:	Master degree of Ophthalmology programme
(2) Department offering the programme:	Ophthalmology department
(3) Department responsible for teaching the course:	OPhthalmology department
(4) Part of the programme:	Master degree of Ophthalmology programme 1st part.
(5) Date of approval by the Department`s council	31/7/2016
(6) Date of last approval of programme specification by Faculty council	9-8-2016
(7) Course title:	Basic of Optics OPHT522 BO
(8) Course code:	OPHT522 BO
(9) Credit hours	1
(10) Total teaching hours:	١٥ hours

(B) Professional information

(1) Course Aims:

The broad aim of the course is to educate students about Optics of the Eye also to provide the students with updated data and researches concerned the eye, including the application of physical, geometric and physiological optics to clinical management and an appreciation of the principles of instrumentation and clinical practice in these areas.

(2) Intended Learning Outcomes (ILOs):

On successful completion of the course, the candidate will be able to:

A- Knowledge and Understanding

A1	Define the theory and terminology of physical optics.
A2	Recognize the clinical and technical relevance of such optical phenomena as interference, coherence, polarization, diffraction, and scattering.
A3	Explain the basic properties of laser light.
A4	Outline the principles of light propagation and image formation and some properties as refraction, reflection, magnification, and vergence.
A5	Label optical models of the human eye and how to apply them.
A6	Discuss the various types of visual perception and function, including visual acuity, brightness sensitivity, color perception, and contrast sensitivity.
A7	List the indications for prescribing bifocals and common difficulties encountered in their use.
A8	Recognize the optical principles underlying various modalities in refractive correction: spectacles, contact lenses, intraocular lenses, and refractive surgery.
A9	Recognize the basic methods of calculating intraocular powers and the advantages and disadvantages of the different methods.

B- Intellectual skills

I1	State the steps for performing streak Retinoscopy.
I2	Summarize the steps for performing a manifest refraction using a phoropter or trial lenses.
I3	Describe the use of the Jackson cross cylinder.
I4	Describe the indications for prescribing bifocals and common difficulties encountered in their use.
I5	Review the materials and fitting parameters of both soft and rigid contact lenses.
I6	Explain the optical principles underlying various modalities in refractive correction: spectacles, contact lenses, intraocular lenses, and refractive surgery.
I7	Discuss the basic methods of calculating intraocular powers and the advantages and disadvantages of the different methods.
I8	Describe the conceptual basis of multifocal IOLs and how the correction of presbyopia differs between these IOLs and spectacles.

C- Professional/practical skills

P1	Recognize optical models of the human eye and how to apply them.
P2	Describe how principles of light can be applied diagnostically and therapeutically.
P3	Recognize types of refractive correction and how to apply them most appropriately to the individual patient.
P4	Recognize the visual needs of low vision patients and how to address these needs through optical and non optical devices and/or appropriate referral.
P5	Recognize the operating principles of various optical instruments in order to use them more effectively.

(3) Course content:

Subjects	Lectures	Clinical	Laboratory	Field	Total Teaching Hours
1. **Physical** ○ Nature of light, properties of light	**1**				**15**

2. **Geometric**	**5**				
○ Reflection: plane, spherical mirrors					
○ Refraction: Plane, convex lens, concave lens, prisms, cylindrical lenses					
○ Toric refraction by the eye (Schematic, reduced eye)					
3. **Clinical**	**3**				
○ Aberrations					
○ Ametropias: Hyperopia, Myopia, Astigmatism, Aphakia, Anisometropia,aniseikonia					
○ Accommodation (prespyopia): Excess, spasm, insufficiency, paralysis					
○ Binocular Muscle Coordination: convergence					
○ Binoular Muscle Anomlies: Heterophoria , Heterotropia					
○ Convergence: excess, insufficiency					
○ Visual acuity: far , Near, measurement					
○ Retinoscopy:					
○ Ophthalmoscopy: Direct, indirect					
○ Verification of refraction					

4. **Appliances:** ○ Spectacles, Contact lenses, Intra ocular lenses, Low vision aids 5. **Instruments:** ○ Microscopy , operating microscope , Slit Lamp , Fundus Camera Refractometers , Keratometers , Orthoptic	4				
○ LASER	**2**				

(4) Teaching methods:

4.1: Lecture

4.2: Practical class

4.3: Small group discussion with case study and problem solving

4.4: Tutorial

4.5: Seminars

4.6: Workshops

(4) Assessment methods:

5.1:Written Examination for assessment of ILOs knowledge & intellectual.

5.2: Oral examination for assessment of ILOs knowledge & intellectual.

5.3: MCQ for assessment of ILOs number I20-I27

5.4: Practical examination for assessment of ILOs number C1,C2,C3, B1,B2,B3,B4,B6.

5.5: Log book for activities for assessment of : mainly for assessment of practical & transferrable skills which are accepted through attending different conferences, thesis discussions, seminars, workshops, attending scientific lectures as well as self learning.

5.5: seminars: the candidate should prepare and present at least one seminar in atopic related to the course and determined by the supervisors in front of the department staff (without marks).

Assessment schedule:

Assessment 1: written after 6 month from master registration

Assessment 2 : Oral exam 6 month from master registration

Assessment 3 : MCQ exam for continuous assessment of knowledge and intellectual skills at the end of the semester after 15 weeks

Assessment 4 Log book required activities to go through 1st part examination .

***Assessment 5*:** the candidate should prepare and present at least one seminar in atopic related to the course and determined by the supervisors in front of the department staff (without marks).

Percentage of each Assessment to the total mark:

Written exam: 180 Marks 60 %
Practical exam: 60 Marks 20 %
Oral exam: 60 MArks 20 %
Other assessment without marks: practical tests and exam, seminars and log book assessment are requirement of the 1^{ST} part exam.

(5) References of the course:

6.1: Text books:

- Optics of the eye: by Elkington,

6.2: Websites:

- Mrcoph.org.uk

6.3: Recommended books

- Optics of the eye: by Elkington,

(6) Facilities and resources mandatory for course completion:

- Lecture rooms: available in the department

Subjects	A1	A2	A3	A4	A5	A6	A7	A8	A9
1. **Physical**	√	√		√	√	√			
○ Nature of light, properties of light	√				√				
2. **Geometric**	√				√				
○ Reflection: plane, spherical mirrors	√				√				
○ Refraction: Plane, convex lens, concave lens, prisms, cylindrical lenses	√				√				
○ Toric refraction by the eye (Schematic, reduced eye)	√				√				
3. **Clinical**	√				√				
○ Aberrations	√				√				
○ Ametropias: Hyperopia, Myopia, Astigmatism, Aphakia,	√				√				

Anisometropia,aniseikonia									
○ Accommodation (prespyopia): Excess, spasm, insufficiency, paralysis	√				√				
○ Binocular Muscle Coordination: convergence	√				√				
○ Binoular Muscle Anomlies: Heterophoria , Heterotropia	√				√				
○ Convergence: excess, insufficiency	√				√				
○ Visual acuity: far , Near, measurement	√				√				
○ Retinoscopy:	√				√				
○ Ophthalmoscopy: Direct, indirect	√				√				
○ Verification of refraction	√				√				
4. **Appliances:**	√				√				
○ Spectacles, Contact lenses, Intra ocular lenses, Low vision aids	√				√		√	√	√
5. **Instruments:**	√				√				
○ Microscopy , operating microscope , Slit Lamp , Fundus Camera Refractometers , Keratometers , Orthoptic	√				√				
○ LASER	√		√		√				

Subjects	I1	I2	I3	I4	I5	I6	I7	I8
1. **Physical**								
○ Nature of light, properties of light								
2. **Geometric**								

○ Reflection: plane, spherical mirrors								
○ Refraction: Plane, convex lens, concave lens, prisms, cylindrical lenses		√	√					
○ Toric refraction by the eye (Schematic, reduced eye)	√	√						
3. **Clinical**								
○ Aberrations		√						
○ Ametropias: Hyperopia, Myopia, Astigmatism, Aphakia, Anisometropia,aniseikonia		√						
○ Accommodation (prespyopia): Excess, spasm, insufficiency, paralysis								
○ Binocular Muscle Coordination: convergence								
○ Binoular Muscle Anomlies: Heterophoria , Heterotropia								
○ Convergence: excess, insufficiency								
○ Visual acuity: far , Near, measurement								
○ Retinoscopy:	√							
○ Ophthalmoscopy: Direct, indirect								
○ Verification of refraction		√	√					
4. **Appliances:**								
○ Spectacles, Contact lenses, Intra ocular lenses, Low vision aids					√	√	√	√
5. **Instruments:**								
○ Microscopy , operating microscope , Slit Lamp ,								

Fundus Camera Refractometers , Keratometers , Orthoptic								
○ LASER								

Subjects	P1	P2	P3	P4	P5
1. **Physical**	√				
○ Nature of light, properties of light	√	√			
2. **Geometric**	√				
○ Reflection: plane, spherical mirrors	√				
○ Refraction: Plane, convex lens, concave lens, prisms, cylindrical lenses	√		√		
○ Toric refraction by the eye (Schematic, reduced eye)	√				
3. **Clinical**	√				
○ Aberrations	√				
○ Ametropias: Hyperopia, Myopia, Astigmatism, Aphakia, Anisometropia,aniseikonia	√				
○ Accommodation (prespyopia): Excess, spasm, insufficiency, paralysis	√				
○ Binocular Muscle Coordination: convergence	√				
○ Binoular Muscle Anomlies: Heterophoria , Heterotropia	√				
○ Convergence: excess, insufficiency	√				
○ Visual acuity: far , Near, measurement	√				

○ Retinoscopy:	√				
○ Ophthalmoscopy: Direct, indirect	√				
○ Verification of refraction	√				
4. **Appliances:**	√				
○ Spectacles, Contact lenses, Intra ocular lenses, Low vision aids	√		√	√	
5. **Instruments:**	√				
○ Microscopy , operating microscope , Slit Lamp , Fundus Camera Refractometers , Keratometers , Orthoptic	√				√
○ LASER	√				

Subjects	T1	T2	T3	T4	T5	T6	T7	T8
1. **Physical**								√
○ Nature of light, properties of light								√
2. **Geometric**								√
○ Reflection: plane, spherical mirrors								√
○ Refraction: Plane, convex lens, concave lens, prisms, cylindrical lenses		√						√
○ Toric refraction by the eye (Schematic, reduced eye)								√
3. **Clinical**								√
○ Aberrations								√
○ Ametropias: Hyperopia, Myopia, Astigmatism, Aphakia,								√

Anisometropia,aniseikonia								
○ Accommodation (prespyopia): Excess, spasm, insufficiency, paralysis								√
○ Binocular Muscle Coordination: convergence								√
○ Binoular Muscle Anomlies: Heterophoria , Heterotropia								√
○ Convergence: excess, insufficiency								√
○ Visual acuity: far , Near, measurement								√
○ Retinoscopy:	√							√
○ Ophthalmoscopy: Direct, indirect								√
○ Verification of refraction			√	√				√
4. **Appliances:**								√
○ Spectacles, Contact lenses, Intra ocular lenses, Low vision aids					√	√	√	√
5. **Instruments:**								√
○ Microscopy , operating microscope , Slit Lamp , Fundus Camera Refractometers , Keratometers , Orthoptic								√
○ LASER								√

Method of assessment									
	A1	A2	A3	A4	A5	A6	A7	A8	A9
Written Examination	√	√	√			√	√	√	
Oral Examination	√	√		√	√		√	√	
Practical Examination		√		√	√	√			
MCQ	√	√		√		√	√		√

Log book for activities									
seminars:		√	√		√	√		√	√

Method of assessment								
	I1	I2	I3	I4	I5	I6	I7	I8
Written Examination		√	√		√		√	
Oral Examination		√	√		√			√
Practical Examination	√	√			√		√	
MCQ		√			√		√	√
Log book for activities								
seminars:		√		√	√			√

Method of assessment					
	P1	P2	P3	P4	P5
Written Examination	√	√	√	√	√
Oral Examination	√	√		√	
Practical Examination					
MCQ	√	√	√		√
Log book for activities					
seminars:	√		√	√	√

Course coordinator: **:** Prof. Dr Adel El layeh

Head of the department: Prof. Dr Adel El layeh