CURRICULUM

FOR

4 YEARS DEGREE PROGRAMME

IN

OPTOMETRY & ORTHOPTICS

B.SC. (HONS)

RAWALPINDI MEDICAL UNIVERSITY, RAWALPINDI

PAKISTAN

AIMS AND OBJECTIVES OF THE COURSE

AIMS:

The aim of the 4 years degree programme in Optometry and Orthoptics is to equip the students with relevant professional knowledge, skills, techniques and ethical values to enable them to apply their acquired expertise at a level between the doctors and the patient for efficient health service delivery.

GENERAL LEARNING OBJECTIVES:

Optometry and Orthoptics education and training should enable the student to:

- Develop accuracy and meticulousness to attain high levels of ethics and technical proficiency.
- Assess the technical and non-technical skills in a standardized and reproducible environment.
- Strengthen the decision power and exercise appropriate judgment skills, to be applied especially during crisis.
- Develop good leadership, problem solving and administrative skills.
- Develop and analyze innovative strategies for effective communication with the patients and the healthcare personnel.
- Demonstrate interdisciplinary team building strategies for effective co ordination between various Allied Health Disciplines.
- Demonstrate understanding of the basic concepts of professional Behaviour and legal implications of the work environment.
- Demonstrate the knowledge of his / her role in health care delivery system.
- Establish and maintain continuing education as a function of growth and maintenance of professional competence.

SPECIFIC LEARNING OUTCOMES

Following competencies will be expected from a student completing 4 years degree course in Optometry and Orthoptics. The student should be able:

- To obtain up to date knowledge for functions and recent advances in Optometry and Orthoptics.
- To alienate the shortage of trained Ophthalmic Midlevel Personnel and to focus on Human Resource Development.
- To provide clinical attachment for trained Ophthalmic Midlevel Professionals in both private and public sector hospitals in the country.
- To establish the Institutionalized training in the field of Optometry and Orthoptics at par with International level.
- To have International collaboration with well recognized Institutions in respective disciplines for developing the program and postgraduate fellowship training in Optometry and Orthoptics.
- To ultimately establish an institute of Optometry and Orthoptics.

NOMENCLATURE AND DURATION

NOMENCLATURE:
The name of the degree programme shall be B.Sc(HONS) Optometry and Orthoptics. The duration of the course shall be 4 years with structured training in a recognized department under supervisor.

COURSE TITLE:
B.Sc(HONS) Optometry and Orthoptics

TRAINING CENTERS:
Departments of Ophthalmology accredited by RMU for this training.

COURSE DURATION:
Four years structured training in a recognized department under the guidance of a supervisor.

COURSE SCHEME:
The training is spread over four years with a specific component for each year of training.

FIRST YEAR:

Theoretical component:

1. Basic Anatomy
2. Basic Physiology
3. Basic Biochemistry
4. General Pathology
5. Behavioral Sciences
6. Islamiyat
7. Pakistan studies
8. Computer Education

Practical component:

Hand- on training in basic techniques related to the discipline

SECOND YEAR:

Theoretical component:

1. Ophthalmic Anatomy and Physiology
2. Physiological and Visual Optics
3. Physical, Geometrical and Instrument Optics
4. Orthoptics, Squint and Low Vision

Practical component:

Hand- on training in Optometry and Orthoptics techniques in above mentioned Disciplines

THIRD YEAR:

Theoretical component:

1. Ophthalmic Dispensing and Contact Lenses
2. Ophthalmic Diseases And Pharmacology
3. Occupational Optometry and Preventive Ophthalmology
4. Clinical Optometry and Examination

Practical component:

Hand- on rotational training in Optometry and Orthoptics techniques

FOURTH YEAR:

Theoretical component:

1. Pediatric Optometry
2. Ophthalmic Instrumentation
3. Biostatistics And Research Methodology

Practical component:

- Advanced Training Related to Optometry and Orthoptics including Pediatric Optometry, School Screening and Out Reach, Diagnostic Equipment's Unit etc.
- Research Report writing related to the subject of interest of the student

Training as Trainers

The students during final year of the programme will be involved actively in the teaching & training of the junior classes i.e. 1st year & 2nd year so that the seniors become mentors for the juniors. These educational activities will be carried out under the direction and supervision of a faculty member.

ELIGIBILITY CRITERIA FOR ADMISSION:

DOCUMENTS REQUIRED FOR ADMISSION:

- Complete B.Sc. Optometry and Orthoptics application form
- Copy of the Matriculation Certificate
- Copy of the B.Sc. Premedical/ Equivalent examination Certificate with detailed marks sheet
- Copy of the entry test result card
- 3 passport size photographs

GENERAL REQUIREMENTS:

- Securing pass percentage in the entry test.
- Qualifying the interview successfully.
- Having up to the marks credentials (No. of attempts, any medal or distinction).

REGISTRATION AND ENROLLMENT:

- Total number of students enrolled must not exceed 30 per department.
- RMU will approve supervisors for the course.
- Candidates selected will be registered with the approved supervisor and enrolled with RMU.

SKILLS TO BE LEARNT DURING OPTOMETRY & ORTHOPTICS

COURSE

1. To Perform Refraction
2. To Dispense glasses
4. To be able to do a proper referral to an Ophthalmologist
5. To do Low vision assessment
6. To Dispense low vision devices
7. To provide training in using Low Vision Devices
8. To dispense contact lenses and be able to manage these patients
9. To be able to perform Diagnostic tests i.e. Visual Fields, Tangent Screen, Hess's
10. To do Vision assessment of Infants and children.
11. To perform refractions in children
12. To do Orthoptics / Squint assessment
13. To follow the plan of surgical squint correction

EQUIPMENTS AND GADGETS

As Per Ophthalmology Units of the Accredited Hospitals

- Professional Ophthalmoscope
- Professional Retinoscope
- Streak Retinoscope
- Photo Slit Lamp
- Variable Angle Retinal Camera
- Lens Set
- Spectacles /Glasses Mirror lens
- Trans Equator Lens
- Ocular Science type lens
- Cross Cylinder Set (0.25, 0.50, 0.75, 1.00)
- Prism Bar Set: horizontal & vertical
- Set of Trial frames
- Trial Frame for Children/Kids:
- Direct Ophthalmoscope
- Pin-hole Occluder
- Set of Optical Pliers
- Vision testing room
- Optometry and orthoptic laboratory
- Well-equipped room for surgical maneuver
- Other equipment's as required during the course

Annex : A

First Professional B.Sc Optometry and Orthoptics Examination

Total Marks = 400 Pass Marks= 50%
Paper Subjects
Paper-I Basic Anatomy & Physiology
Theory 80 Marks
Internal Assessment 20 Marks
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Total Marks=100
Paper-II Basic Biochemistry & General Pathology
Theory 80 Marks
Internal Assessment 20 Marks
_____
Total Marks=100
Paper-III Islamic Studies / Ethics & Pakistan Studies
Theory 80 Marks
Internal Assessment 20 Marks
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Total Marks=100
Paper-IV Behavioral Sciences & Computer Education
Theory 80 Marks
Internal Assessment 20 Marks

FIRST PROFESSIONAL EXAMINATION
OUTLINE OF TESTS

The First Professional examination shall be held at the end of first academic year (nine months of teaching) and every candidate shall be required to take examination in the following subjects. A candidate to pass in a subject shall have to obtain a minimum of 50% of total marks of each part of the subject separately. The minimum number of marks required to pass the examination for Islamic Studies/Ethics & Pakistan Studies shall be thirty three percent (33%) in each paper separately and thirty three percent (33%) in aggregate.

Paper-I Basic Anatomy & Physiology = 100 marks

The examination in the subject of Basic Anatomy & Physiology shall consist of one Theory Paper of three hours duration and of maximum 80 marks. Internal Assessment will be of 20 marks. The syllabus to be covered is mentioned in Appendix "B".

Section I : Basic Anatomy = 50 Marks

There will be 40 MCQs and each question will carry 01 mark.
Internal Assessment will be of 10 marks.

Section – II: Basic Physiology = 50 marks

There will be 40 MCQs and each question will carry 01 mark
Internal Assessment will be of 10 marks

Paper-II Basic Biochemistry & General Pathology = 100marks

The examination in the subject of Basic Biochemistry & General Pathology shall consist of one Theory Paper of three hours duration and of maximum 80 marks. Internal Assessment will be of 10 marks. There will be two sections in this paper.

Section – I: Basic Biochemistry = 50marks

There will be 40 MCQs and each question will carry 01 mark.
Internal Assessment will be of 10 marks.

Section – II: General Pathology = 50marks

There will be 40 MCQs and each question will carry 01 mark.
Internal Assessment will be of 10 marks.

Paper-III Islamic Studies / Ethics & Pakistan Studies =100 marks
The examination shall consist of one Theory Paper of 60+40=100 marks and 3 hours duration. The syllabus to be covered is mentioned in Appendix "B".
Section-I : Islamic Studies/Ethics =60 marks.
This section shall have question on Islamic Studies in case Muslim candidates and on Ethics in case of non-Muslim. There shall be 3 questions in this section of Theory and there will be no choice.
Each question shall carry 18 marks.
Internal Assessment will be of 06 marks.
Section-II : Pakistan Studies = 40 marks
This section shall have 3 questions on Pakistan Studies and there will be no choice. Each question shall carry 12 marks.
Internal Assessment will be of 04 marks.
Paper-IV Behavioural Sciences & Computer Education= 100 marks
The examination in the paper of Behavioural Sciences& Computer Education shall consist of one Theory Paper of 80 marks and three hours duration. Internal Assessment will be of 20 marks. The syllabus to be covered is mentioned in Appendix "B".
Section I : Behavioural Sciences = 50 marks
There will be 40 MCQs and each question will carry 01 mark.
Internal Assessment will be of 10 marks.
Section – II: Computer Education = 50 marks
There will be 40 MCQs and each question will carry 01 mark
Internal Assessment will be of 10 marks.

Second Professional B.Sc Optometry and Orthoptics Examination

Total Marks = 800 Pass Marks= 50%

Paper I Ophthalmic Anatomy and Physiology

Theory 80 Marks
Internal Assessment 20 Marks
Practical & Oral 80 Marks
Internal Assessment 20 Marks

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Total Marks=200

Paper II Physiological and Visual Optics

Theory 80 Marks
Internal Assessment 20 Marks
Practical & Oral 80 Marks (OSPE-Short case/ Long case)
Internal Assessment 20 Marks

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Total Marks=200

Paper III Physical, Geometrical and Instrument Optics

Theory 80 Marks
Internal Assessment 20 Marks
Practical & Oral 80 Marks (OSPE-Short case/ Long case)
Internal Assessment 20 Marks

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Total Marks=200

Paper IV Orthoptics, Squint and Low Vision

Theory 80 Marks
Internal Assessment 20 Marks
Practical & Oral 80 Marks (OSPE-Short case/ Long case)
Internal Assessment 20 Marks

SECOND PROFESSIONAL EXAMINATION
OUTLINE OF TESTS

Total marks : 800 Pass marks : 50 %

The Second Professional Examination shall be held at the end of second year and shall consist of the following subjects: The details of the syllabus is outlined in the Appendix B.

Paper-I:

Ophthalmic Anatomy and Physiology Total Marks : 200

Theory:

The examination in the subject of Ophthalmic Anatomy and Physiology shall consist of one Theory Paper of three hours duration and of maximum 80 marks. Internal Assessment shall be of 20 Marks.

The syllabus to be covered is mentioned in Appendix "B".

The written paper will consist of two sections as detailed below.

Section I : Ophthalmic Anatomy = 40 marks

There will be 04 short essay questions from the subject of Ophthalmic Anatomy and there will be no choice. Each short essay question will carry 05 marks.

There will be 20 MCQs and each question will carry 01 mark.

Internal Assessment will be of 10 marks.

Section – II: Ophthalmic Physiology = 40 marks

There will be 04 short essay questions from the subject of Ophthalmic Physiology and there will be no choice. Each short essay question will carry 05 marks.

There will be 20 MCQs and each question will carry 01 mark.

Internal Assessment will be of 10 marks.

Oral/ Practical Examination in the subject of Ophthalmic Anatomy and Physiology will consist of maximum 80 marks. Internal Assessment shall be of 10 Marks.

Paper-II:

Physiological and Visual Optics Total Marks : 200

Theory:

The examination in the subject of Physiological and Visual Optics shall consist of one Theory Paper of three hours duration and of maximum 80 marks.

Internal Assessment shall be of 20 Marks.

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The syllabus to be covered is mentioned in Appendix "B".

The written paper will consist of two sections as detailed below.

Section I : Physiological Optics = 40 marks

There will be 04 short essay questions from the subject of Physiological Optics and there will be no choice. Each short essay question will carry 05 marks.

There will be 20 MCQs and each question will carry 01 mark.

Internal Assessment will be of 10 marks.

Section – II: Visual Optics = 50 marks

There will be 04 short essay questions from the subject of Visual Optics and there will be no choice. Each short essay question will carry 05 marks.
There will be 20 MCQs and each question will carry 01 mark.
Internal Assessment will be of 10 marks.
Oral/ Practical Examination in the subject of Physiological Optics and Visual Optics will consist of OSPE -Short case/ Long case with maximum 90 marks. Internal Assessment shall be of 20 Marks.

Paper-III:

Physical ,Geometrical and Instrument Optics

Total Marks : 200

Written paper:

The examination in the subject of Physical, Geometrical and Instrument Optics shall consist of one Theory Paper of three hours duration and of maximum 80 marks. Internal Assessment shall be of 20 Marks.
The syllabus to be covered is mentioned in Appendix "B".
The written paper will consist of three sections as detailed below.

Section I : Physical Optics = 30 marks

There will be 03 short essay questions from the subject of Physical Optics and there will be no choice. Each short essay question will carry 05 marks.
There will be 12 MCQs and each question will carry 01 mark
Internal Assessment will be of 06 marks

Section – II: Geometrical Optics =. 40marks

There will be 04 short essay questions from the subject of Geometrical Optics and there will be no choice. Each short essay question will carry 05 marks.
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There will be 11 MCQs and each question will carry 01 mark.
Internal Assessment will be of 08 marks

Section – III: Instrument Optics = 30 marks

There will be 03short essay questions from the subject of Instrument Optics and there will be no choice. Each short essay question will carry 05 marks.
There will be 12 MCQs and each question will carry 01 mark
Internal Assessment will be of 06 marks
Oral/ Practical Examination in the subject of Physical, Geometrical and Instrument Optics will consist of OSPE -Short case/ Long case with maximum 90 marks. Internal Assessment shall be of 20 Marks.

Paper-IV:

Orthoptics, Squint and Low Vision Total Marks : 200

Written paper:

The examination in the subject of Orthoptics, Squint and Low Vision shall consist of one Theory Paper of three hours duration and of maximum 90 marks. Internal Assessment shall be of 10 Marks.
The syllabus to be covered is mentioned in Appendix "B".
The written paper will consist of two sections as detailed below.

Section I : Orthoptics & Squint = 50 marks

There will be 04 short essay questions from the subject of Orthoptics & Squint and there will be no choice. Each short essay question will carry 05 marks.

There will be 20 MCQs and each question will carry 01 mark.
Internal Assessment will be of 10 marks.

Section – II: Low Vision = 50 marks

There will be 04 short essay questions from the subject of Low Vision and there will be no choice. Each short essay question will carry 05 marks.
There will be 20 MCQs and each question will carry 01 mark.
Internal Assessment will be of 10 marks.
Oral/ Practical Examination in the subject of Orthoptics, Squint and Low Vision will consist of OSPE -Short case/ Long case with maximum 90 marks. Internal Assessment shall be of 20 Marks

Third Professional B.Sc Optometry and Orthoptics Examination

Total Marks = 700 Pass Marks= 50%

Paper I Ophthalmic Dispensing and Contact Lenses

Theory 80 Marks
Internal Assessment 20 Marks
Practical & Oral 80 Marks (OSPE-Short case/ Long case)
Internal Assessment 20 Marks

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Total Marks=200

Paper II Ophthalmic Diseases And Pharmacology

Theory 80 Marks
Internal Assessment 20 Marks
Practical & Oral 80 Marks (OSPE-Short case/ Long case)
Internal Assessment 20 Marks

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Total Marks=200

Paper III Clinical Optometry and Examination

Theory 80 Marks
Internal Assessment 20 Marks
Practical & Oral 160 Marks (OSPE-Short case/ Long case)
Internal Assessment 40 Marks

Total marks 300

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THIRD PROFESSIONAL EXAMINATION OUTLINE OF TESTS

Total marks : 700 Pass marks : 50 %

The third Professional Examination shall be held at the end of third year and shall consist of the following subjects: The details of the syllabus is outlined in the Appendix B.

Paper-I:

Ophthalmic Dispensing and Contact Lenses Total Marks : 200

Written paper:

The examination in the subject of Ophthalmic Dispensing and Contact Lenses shall consist of one Theory paper of three hours duration and of maximum 90 marks. Internal Assessment shall be of 20 Marks.
The syllabus to be covered is mentioned in Appendix "B".
The written paper will consist of two sections as detailed below.

Section I : Contact Lenses = 50 marks

There will be 04 short essay questions from the subject of Contact Lenses Therapy

and there will be no choice. Each short essay question will carry 05 marks.
There will be 20 MCQs and each question will carry 01 mark.
Internal Assessment will be of 10 marks.

Section – II: Ophthalmic Dispensing = 50 marks

There will be 04 short essay questions from the subject of Ophthalmic Dispensing Therapy and there will be no choice. Each short essay question will carry 05 marks.
There will be 20 MCQs and each question will carry 01 mark.
Internal Assessment will be of 10 marks.

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Oral/ Practical Examination in the subject of Ophthalmic Dispensing will consist of OSPE - Short case/ Long case with maximum 80 marks. Internal Assessment shall be of 20 Marks.

Paper-II:

Ophthalmic Diseases and Pharmacology Total Marks : 200

Written paper:

The examination in the subject of Ophthalmic Diseases And Pharmacology shall consist of one Theory paper of three hours duration and of maximum 90 marks. Internal Assessment shall be of 10 Marks.
The syllabus to be covered is mentioned in Appendix "B".
The written paper will consist of two sections as detailed below.

Section I : Ophthalmic Diseases (Local & Systemic) = 50 marks

There will be 04 short essay questions from the subject of Ophthalmic Diseases and there will be no choice. Each short essay question will carry 05 marks.
There will be 20 MCQs and each question will carry 01 mark.
Internal Assessment will be of 10 marks.

Section – II: Ophthalmic Pharmacology = 50 marks

There will be 04 short essay questions from the subject of Ophthalmic Pharmacology and there will be no choice. Each short essay question will carry 05 marks.
There will be 20 MCQs and each question will carry 01 mark.
Internal Assessment will be of 10 marks.
Oral/ Practical Examination in the subject of Ophthalmic Diseases and Pharmacology will consist of OSPE -Short case/ Long case with maximum 80 marks. Internal Assessment shall be of 20 Marks.

Paper III Total Marks : 300

Clinical Optometry and Examination

The examination in the subject of Clinical Optometry and Examination shall consist of one Theory paper of three hours duration and of maximum 80 marks. Internal Assessment shall be of 20 Marks.
The syllabus to be covered is mentioned in Appendix "B".
There will be 09 short essay questions from the subject of Clinical Optometry and Examination and there will be no choice. Each short essay question will carry 05 marks.
There will be 45 MCQs and each question will carry 01 mark.
Oral/ Practical Examination in the subject of Clinical Optometry and Examination will consist of OSPE -Short case/ Long case with maximum 160 marks. Internal Assessment shall be of 40 Marks.

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Final Professional B.Sc Optometry and Orthoptics Examination

Total Marks = 700 Pass Marks= 50%

Paper I Pediatric Optometry

Theory 90 Marks
Internal Assessment 10 Marks
Practical & Oral 90 Marks (OSPE-Short case/ Long case)
Internal Assessment 10 Marks

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Total Marks=200

Paper II Ophthalmic Instrumentation

Theory 90 Marks
Internal Assessment 10 Marks
Practical & Oral 90 Marks (OSPE-Short case/ Long case)
Internal Assessment 10 Marks

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Total Marks=200

Paper III Biostatistics and Research Methods

Theory 45 Marks
Internal Assessment 05 Marks
Oral Examination on Research Report 45 Marks
Internal Assessment 05 Marks

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Total Marks= 100

Paper IV Occupational Optometry and Preventive Ophthalmology

Theory 80 Marks
Internal Assessment 20 Marks
Practical & Oral 80 Marks (OSPE-Short case/ Long case)
Internal Assessment 20 Marks

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Total Marks=200

FINAL PROFESSIONAL EXAMINATION
OUTLINE OF TESTS

Total marks : 700 Pass marks : 50 %

The Final Professional Examination shall be held at the end of fourth year and shall consist of the following subjects: The details of the syllabus is outlined in the Appendix B.

Paper I

Pediatric Optometry Total Marks : 200

The examination in the subject of Pediatric Optometry shall consist of one Theory Paper of three hours duration and of maximum 90 marks. Internal Assessment shall be of 10 Marks.
The syllabus to be covered is mentioned in Appendix "B".
There will be 09 short essay questions from the subject of Pediatric Optometry and there will be no choice. Each short essay question will carry 05 marks.
There will be 40 MCQs and each question will carry 01 mark.
Oral/ Practical Examination in the subject of Pediatric Optometry will consist of OSPE - Short case/ Long case with maximum 80 marks. Internal Assessment shall be of 20 Marks

Paper II

Ophthalmic Instrumentation Total Marks : 200

The examination in the subject of Ophthalmic Instrumentation shall consist of one Theory Paper of three hours duration and of maximum 80 marks. Internal Assessment shall be of 20 Marks.
The syllabus to be covered is mentioned in Appendix "B".
There will be 08 short essay questions from the subject of Ophthalmic Instrumentation and there will be no choice. Each short essay question will carry 05 marks.
There will be 40 MCQs and each question will carry 01 mark.
Oral/ Practical Examination in the subject of Ophthalmic Instrumentation will consist of OSPE -Short case/ Long case with maximum 90 marks. Internal Assessment shall be of 20 Marks
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Paper III

Biostatistics and Research Methods

The examination in the subject of Biostatistics and Research Methods shall consist of one Theory Paper of one & a half hours duration and of maximum 45 marks. Internal Assessment shall be of 05 Marks.
The syllabus to be covered is mentioned in Appendix "B".
There will be 05 short essay questions from the subject of Biostatistics and Research Methods and there will be no choice. Each short essay question will carry 05 marks.
There will be 20 MCQs and each question will carry 01 mark.
Oral Examination on research report will be of maximum 45 marks.
Internal Assessment shall be of 05 Marks

Paper IV Total Marks : 200

Occupational Optometry and Preventive Ophthalmology

The examination in the subject of Occupational Optometry and Preventive Ophthalmology shall consist of one Theory paper of three hours duration and of maximum 90 marks.
Internal Assessment shall be of 20 Marks.
The syllabus to be covered is mentioned in Appendix "B".
The written paper will consist of two sections as detailed below.

Section I : Occupational Optometry = 50 marks

There will be 04 short essay questions from the subject of Occupational Optometry Therapy and there will be no choice. Each short essay question will carry 05 marks.
There will be 20 MCQs and each question will carry 01 mark.
Internal Assessment will be of 05 marks.

Section – II: Preventive Ophthalmology = 50 marks

There will be 05 short essay questions from the subject of Preventive Ophthalmology Therapy and there will be no choice. Each short essay question will carry 05 marks.
There will be 20 MCQs and each question will carry 01 mark.
Internal Assessment will be of 05 marks.
Oral/ Practical Examination in the subject Occupational Optometry and Preventive Ophthalmology will consist of OSPE -Short case/ Long case with maximum 90 marks.
Internal Assessment shall be of 10 Marks.

APPENDIX – B
First Professional B.Sc Optometry and Orthoptics Examination
Paper-I BASIC ANATOMY & PHYSIOLOGY
Syllabi and Course of Reading

Note: Syllabi and course of reading is divided into two parts. 100 hours will be allocated for Sec I and 100 hours will be allocated for the Sec II. Question paper will carry 50 theory marks for each part.

Section- I BASIC ANATOMY
(1) Introduction regarding
- Anatomical Nomenclature
- Life span of a human being
- Structural and functional organization
- Terminology and body plan
- Systematic Anatomy
- Basic organization of the body

(2) Skin
- The structure of the hypodermis, dermis. and epidermis.
- Superficial fascia and deep fascia

(3) The Musculoskeletal System:
Muscles, Bones and Joints
- Components of the Skeletal System
- Description of Axial & Appendicular Skeleton
- The process of bone ossification. Growth, Remodeling,and repair
- Main features of the skull including all views
- Shape and regions of vertebral column
- Important features of the regional vertebrae
- Bones of the thoracic cage, including the types of ribs.
- The bones of the pectoral girdle and upper limb
- The bones of the pelvic girdle and lower limb

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- Various types of joints and types of joint movement
- connective tissue, components of the connective tissue matrix
- Description of skeletal muscle, smooth muscle and cardiac muscle
- Origin, insertion. synergist, antagonist and prime mover.
- The movements of the arm, forearm and hand and the involved muscle groups
- Muscles of the trunk and the actions they accomplish.
- Movements of the thigh, leg and foot with involved muscle groups

(4) The Nervous System

- Division of the Nervous System and the characteristics of each.
  - Central Nervous System
  - Peripheral Nervous System
  - Autonomic Nervous System
  - Special Senses
- Anatomical pathways and decription of:
- Olfactory system---- olfactory neurons
- Hearing and Balance , structure of the outer middle and inner ear
- Taste ---- taste bud.
- Visual --- chambers of the eye and structure of the rods and cones
- The structure of a neuron, nerve, nerve tract, nucleus, and ganglion.
- The components of a reflex arc and synapse
- The three meningeal layers surrounding the central nervous system,
- Cerebrospinal fluid and its circulation.
- List the various cranial nerves
- Various lobes of the brain and the cerebellum

(5) The Cardiovascular System

- Anatomy of the Heart---- the size, shape and location of the heart and Chambers, valves and their locations
- The location of the coronary arteries
- The structure of the conduction system of the heart.
- Pulmonary and systemic circulation
- The structure of arteries, capillaries and veins.
- Major arteries and veins and the body areas, they supply
- Lymphatic system tonsils, lymph nodes, the spleen and the thymus.

(6) Respiratory System

- The anatomy of the respiratory passages, beginning at the nose and ending with the alveoli.
- The lobes of the lungs and the membranes that cover the lungs
- Pleural cavity
- The muscles of contraction of respiration

(7) The Digestive System

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- The structure of the organs that make up the digestive tract and their relations to other organs in thoracic and abdominal cavity
- Blood supply of the organs of the GI tract
- Important secretory glands, the liver and pancreas (both exocrine and endocrine components).

(8) Genito-Urinary System

- The structures and organs of the urinary system and its relations with other organs
- The structure of the nephron
- Formation of Sex Cells
- Organs of the Male Reproductive System
- Organs of the Female Reproductive System

Recommended Books:

- Essentials of anatomy and physiology by Seely, Stephens, and Tate (4th ed)
- Anatomy & Physiology by Ross & Wilson
- General Anatomy by Laeeq Hussain
- General Anatomy by Dr Ghulam Ahmad
- Anatomy by D. R. Johnson & K. L. Moore
- Color Atlas of anatomy by Mc Minn
- Lasts Anatomy by R.M.H Mcminn

Section- II BASIC PHYSIOLOGY

(1) Introduction To The Human Physiology

- Functional organization---relationship between structure and function of the human body
- Homeostasis – its importance-- negative and positive feedback mechanism

(2) Integumentary System

- Functions of the skin, hair, glands and nails
- Body temperature and its regulation

(3) The Musculoskeletal System:

- Functions of the bones and muscles
- Functional characteristics of Skeletal Muscle, Smooth Muscle and Cardiac Muscle
- The events of muscle contraction and relaxation in response to an action potential

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in a motor neuron.

- Distinguish between aerobic and anaerobic muscle contraction.
- Muscle hypertrophy and atrophy

(4) The Nervous System

Functions of the central nervous system,

- The functional areas of the cerebral cortex and their interactions.
- functions of the parts of the brainstem diencephalons, basal nuclei. Limbic system. And cerebellum.
- functions of various cranial nerves.
- **Functions of the somatic motor nervous system**
- **Functions of the autonomic nervous system**
- The function of neurons, neuroglial cells.and their components.
- Resting membrane potential and an action potential.
- The function of a synapse and reflex arc

(5) The functions of the specialized sense organs

- Eye---- physiology of site, accommodation, optic nerve and optic chiasma
- Ear---- functions of the internal, middle and external ear
- Physiology of the hearing and balance
- Smell---------- physiology of olfactory nerve
- Taste ---------physiology of taste

Location of the taste buds
physiology of speech

(6) The Endocrine System

- Functions of the Endocrine System
- Chemical Signals, receptors and hormones
- The Endocrine Glands and their Hormones
- Other Hormones

(7) Blood

- Composition of Blood and Plasma
- Functions of Blood
- Formed Elements
- Stages of cell development
- Blood grouping
- Coagulation mechanism

(8) The Cardiovascular system

- Functions of the Heart
- Electrical Activity of the Heart origin and propagation of cardiac impulse

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- Phases of the Cardiac Cycle
- Heart Sounds
- Regulation of Heart Functions--- intrinsic and extrinsic
- Functions of the Peripheral Circulation
- The Physiology of Circulation
  - Pulmonary Circulation
  - Systemic Circulation: Arteries
    - Veins
- Local Control of Blood Vessels
- Nervous Control of Blood Vessels
- Regulation of Arterial Pressure
- The function of Lymphatic System, tonsils, lymph nodes, the spleen and the thymus.

(9) Respiratory System

- Functions of the Respiratory System beginning at the nose and ending with the alveoli.
- Ventilation and Lung Volumes
- Gas Exchange and gas transport in the blood
- Rhythmic Ventilation

(10) The Digestive System

- Functions of each organ of the Digestive System including major salivary glands
- Movements and Secretions in each organ of the Digestive System and their regulation
- Physiology of Digestion, Absorption, and Transport

(11) Genito-Urinary System

- Urine Production, Urine Movement

- Regulation of Urine Concentration and Volume
- Body Fluid Compartments
- Regulation of Extracellular Fluid Composition
- Regulation of Acid-Base Balance
- Physiology of Male Reproductive system—spermatogenesis and reproductive glands, hormones and their regulations
- Physiology of Female Reproductive system--- ovulation, hormones and their regulations

(12) Immunity

- Define immunity, Innate Immunity, Adaptive Immunity
- Antigens and Antibodies
- Primary and secondary responses to an antigen

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- Antibody-mediated immunity and cell-mediated immunity
- Role of lymphocyte in immunity regulation

Recommended Books

- Essentials of Anatomy and Physiology by Seelay, Stephens and Tate. 4th edition
- Ross & Wilson Anatomy and Physiology.
- Human Physiology. Stuart Ira Fox. 7th edition
- Text Book of Medical Physiology Guyton
- Essential of Medical Physiology Vol.I & II by Mushtaq Ahmad.
- Lecture notes on human physiology by Bray JJ, Cragg, PA MacKnight

PAPER II: BASIC BIOCHEMISTRY AND GENERAL PATHOLOGY

35

Theory Marks: 90
Internal Assessment 05 Marks in each subject
Total Marks: 100
Pass Marks: 50%
Total study hours: 200

Syllabi and Course of Reading

Note: Syllabi and course of reading is divided into two parts. 100 hours will be allocated for Sec I and 100 hours will be allocated for the Sec II. Question paper will carry 50 theory marks for Basic biochemistry and 50 theory marks for General Pathology.

Section -I: BIOCHEMISTRY

- **Physiochemical Principles**
- Hydrogen ion conc. and pH notation
- Acidity & Alkalinity
- Indicators & Buffer solutions
- PH and its determination
- The colloidal state
- Absorption
- Structure and function of cell membrane and movement of materials across cell membrane

- Osmosis & Osmotic pressure
- Surface tension
- Viscosity
- **Carbohydrates**
- Introduction and classification of carbohydrates
- Some important monosaccharides, disaccharides and polysaccharides
- Regulation of blood glucose level
- Definition and end products of
- glycolysis
- citric acid cycle
- Glycogenolysis
- Glycogenoses
- Gluconeogenesis
- **Proteins And Amino Acids**
- Introduction, importance, classification and properties of proteins
- Entry of amino acids into cells and peptide linkage
- Special sources of proteins
- **Lipids**
- Introduction, Classification and Function of lipids
- Biosynthesis of fatty acids, natural fats or triglycerides
- Fatty acid oxidation

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- **Vitamins And Minerals**
- Classification of vitamins
- Fat soluble vitamins and Water soluble vitamins
- Deficiency effects
- **Enzymes**
- Introduction, Classification Chemical nature and properties of enzymes
- The mechanism of enzyme reactions
- Factors affecting the enzyme activity
- Important coenzymes and their actions
- Regulatory enzymes
- **Nutrition and Dietetics**
- Balanced diet
- Role of carbohydrates, fats and proteins, their dietary sources and uses in the body
- Quantitative and qualitative daily requirements of carbohydrates, fats, proteins, vitamins and minerals

Recommended Books

- Review of Biochemistry by Lippincott
- Essential of Medical Biochemistry Vol.I & II by Mushtaq Ahmad.
- Fundamentals of Biochemistry by D. Voet, J.G.Voet (1999)
- Text Book of Biochemistry with Clinical Correlations by T.M.Devlin.
- Modern Experimental Biochemistry by R.F.Boyer.

Section -II: GENERAL PATHOLOGY

Cell Injury and adaptation

Cell Injury

- Reversible and Irreversible Injury
- Fatty change, Pigmentation, Pathologic calcification
- Necrosis and Gangrene

Cellular adaptation

- Atrophy, Hypertrophy,
- Hyperplasia, Metaplasia, Aplasia

Inflammation

- **Acute inflammation** --- vascular changes, Chemotaxis, Opsonization and Phagocytosis
- Enlist the cellular components and chemical mediators of acute inflammation
- Differentiate between exudates and transudate

37

- **Chronic inflammation**
- Etiological factors, Granuloma

Cell repair and wound healing

- Regeneration and Repair
- Healing--- steps of wound healing by first and second intention
- Factors affecting healing
- Enlist the complications of wound healing
-

Haemodynamic disorders

- Define and classify the terms Edema, Haemorrhage, Thrombosis, Embolism, Infarction & Hyperaemia with at least two examples of each.
- Define and classify Shock with causes of each.
- Describe the compensatory mechanisms involved in shock
- Describe the possible consequences of thrombosis
- Describe the difference between arterial and venous emboli

Neoplasia

- Define the terms Dysplasia and Neoplasia with examples of each
- Enlist the differences between benign and malignant neoplasms
- Enlist the common etiological factors for neoplasia
- Define and discuss the different modes of metastasis

Recommended Books

Pocket companion to Robbins. Pathologic basis of disease Cotran, Kumar, Collins

PAPER III ISLAMIC STUDIES/ETHICS & PAKISTAN STUDIES

38

Total Theory Marks:100

Syllabi and Course of Reading

Note: Syllabi and course of reading is divided into two parts50 hours will be allocated for Sec I and 50 hours will be allocated for the Sec II. Question paper will carry 60 theory marks for Islamiyat and 40 theory marks for Pakistan studies. Non muslims can appear in the subject of Ethics instead of Islamiyat. Candidates can attempt paper in Urdu or English.

ETHICS (FOR NON MUSLIMS)

Theory Marks: 54
Internal Assessment :06 Marks
Total Marks : 60
Pass Marks: 33%

1. Ethical Teachings of world religious with special reference to Budhish, Judaism Christianity and Islam.
2. 100 ethical precepts from Quran and Sayings of the Prophet.

The Arabic text of Holy Quran and Ahadith would not be advisable for inclusion in the syllabus for the Non-Muslims. Instead the teachings of Holy Quran and sunnah relating to the following topic should be explained in English or Urdu, hence, questions about this portion of the syllabus should be based on the subject-matter, and not on the texts.

Virtues

Duty towards parents: respect for human life, unity of mankind, peace, justice, tolerance, beneficence, pity, contentment, chastity, meekness, repentance, social solidarity, individual accountability, moral excellence, patience and perseverance, forgiveness,

Vices

Arrogance, ostentation, extravagance, misery, greed, jealousy, suspicion, backbiting, coercion, hypocrisy, bribery, obscenity and immodesty.

1. Promotion of moral values in society.
2. Attitude of Islam Towards Minorities

ISLAMIYAT

Section II

PAKISTAN STUDIES

Paper-IV

BEHAVIOURAL SCIENCES & COMPUTER EDUCATION

Syllabi and course of reading

Note: Syllabi and course of reading is divided into two parts. 100 hours will be allocated for Sec I and 100 hours will be allocated for the Sec II. Question paper will carry 50 theory marks for Behavioural Sciences and 50 theory marks for Computer Education.

Section -I:

BEHAVIOURAL SCIENCES

Total Marks: 50
Pass Marks: 50%
Study hours: 100 hrs

1. Introduction to Behavioural Sciences and its importance in health.

Bio-Psycho-Social Model of Health Care and the Systems Approach
Normality vs Abnormality

Importance of Behavioural sciences in health
Desirable Attitudes in Health Professionals

2. Understanding Behaviour

Sensation and sense organs

Describe sensation, sense organs/special organs

Perception

Define perception, what factors affecting perception

Attention and concentration

Define attention and concentration. What factors affecting them

Memory

Define memory and describe its stages, types and methods to improving it

Thinking

Define thinking; describe its types and theories
What is cognition and levels of cognition?
Discuss problem solving and decision making strategies

Communication

Define communication. What are types, modes and factors affecting it. Describe ways to recognize non-verbal cues. Characteristics of a good communicator
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3. Individual Differences

Personality

Define personality. What factors affect personality development? How personality can be assessed? Influence of personality in determining reactions during health, disease, hospitalization, stress

Intelligence.

Define intelligence and the various types of intelligence.
What factors affect it and how it can be assessed?

Emotions

Define emotions. What are the various types of emotions?
Emotional Quotient (EQ)- concept & utility

Motivation

Define motivation and what are the types of motivation?

4.Learning

Define learning, Principles of learning, modern methods and styles of learning, types of learners, Strategies to improve learning skills

5. Stress and Stressors

Define and classify stress and stressors
Relationship of stress and stressors with illness

6. Life Events

Concept of life events and their relationship with stress and illness

7. Stress Management

What is coping skills
What is conflict and frustration?
What is concept of adjustment and maladjustment?

8. Interviewing / Psychosocial History Taking

Define, types of interview and listening

Skills of interviewing and listening

9. Allied Health Ethics-Hippocratic oath

Do's and Don'ts

What is the concept of Allied Health ethics?

10. Culture and Allied Health practice

Concept of group, its dynamics

Attitude, value, belief, myths, social class, stigma, sick role and illness, health belief models

11. Psychological reactions

Grief and bereavement, Family and illness

Dealing with difficult patients

45

What are the psychosocial aspects of illness, hospitalization, rape, torture, terminal illness, death and dying?

Psychosocial issues in Emergency Departments, Intensive Care and Coronary Care Units, Operating Theatres, Cancer wards, Transplant Units, Anaesthesia

12. Breaking Bad News

Introduction, Models, Methods, Death of the patient, abnormal baby, intractable illness

13. Pain, Sleep, Consciousness

Concept of pain.

Physiology of pain,

Altered states of consciousness.

14. Communication skills

Counseling,

Crisis Intervention

Conflict Resolution

Principles of effective communication, active listening, the art of questioning

The art of listening.

Good and bad listener.

Counseling: Scope, Indications and Contraindications,

Steps, Do's and Don'ts, How to deal with real life crisis and conflict situations in health settings

Section II:

COMPUTER EDUCATION

Introduction To Computers

- ***Definition***
- Usage and functionality of computers
- Limitations of Computers
- Classification of Computers
- Basic Components of Computers
- ***Hardware***
- ***Software***
- System Software
- Application Software

- Equipment's/devices in Personal computer system
- Input devices
- Output devices
- Storage devices
- The processor
- **Microsoft Windows**
- ***Introduction to MS-Windows***
- Arranging, Moving and Resizing Windows.

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- Identifying the components of desktop.
- Moving, Changing and Closing Windows.
- Crating, Opening and Deleting items and folders.
- Working with My Computer
- Deleting and Resume Print Jobs.
- Using Control Panel
- Working with Accessories.
- **Microsoft Office**
- ***Microsoft Win Word***
- Microsoft Excel
- Microsoft Power Point
- **Database**
- **Internet and Email**
- Introduction To Outlook Express
- Using Internet Explorer

Second Professional B.Sc Optometry and Orthoptics Examination

Paper I

OPHTHALMIC ANATOMY AND PHYSIOLOGY

Sec I

OPHTHALMIC ANATOMY

Anatomy (General Introduction)
Anatomy of the Eye Lid
Anatomy of the Cornea
Anatomy of the Sclera and its Openings
Anatomy of the Limbus and Conjunctiva
Anatomy of the Anterior Chamber
Anatomy of the Lacrimal Apparatus
Anatomy of the Extra – Ocular Muscles
Anatomy of the Skull & Orbit
Anatomy of the Uveal Tract
Anatomy of the Lens & Vitreous
Anatomy of the Retina
Anatomy of the Choroid
Anatomy of the Brain
Anatomy of the Optic Nerve & Tract
Anatomy of the Visual Cortex
Anatomy of the Visual Pathway
Anatomy of Cranial Nerves (I – VII)

Sec II

OPHTHALMIC PHYSIOLOGY

Normal Vision Development
Physiology of the Eye Lid
Physiology of the Cornea

Physiology of the Tear Film
Physiology of Lacrimal System
Physiology of Pupil & Reflexes
Motor Law's
Physiology of Aqueous Humour
Physiology of Lens Metabolism
Physiology of Accommodation & Convergence
Physiology of the Retina
Dark and light adaptation

Physiology of the color vision
Visual Pigments
Physiology of the Extra Ocular Muscles
Visual Pathway
Homeostatic Mechanism of the Eye
Immunity & Allergy
Tissue & Organ Transplant

PAPER II
PHYSIOLOGICAL AND VISUAL OPTICS
Sec I
PHYSIOLOGICAL OPTICS

Problems of Ametropia
Retinoscopy/ CROSSES
Subjective refraction
Balancing method of subjective refraction
Near vision tests & refraction
Routine eye examination
Accommodation – convergence relationship
Methods of accommodation & convergence measurement
Myopia
Hypermetropia
Astigmatism I –Simple
Astigmatism II –Compound
Aphakia and pseudophakia
Transposition
Anisokonia
Accommodation and convergence measurements / anomalies
Convergence types
Presbyopia
Prismatic corrections
Anisometropia
Near point and far point
Refractive consideration of near & far point

Sec II
VISUAL OPTICS (BASIC & APPLIED)

Optical system of the eye, Schematic & reduced eye
Retinal image formation and size
Visual acuity and factors affecting it
Depth of focus
Emmetropia & ammetropia
Spherical and astigmatic ammetropia
Presbyopia
Refractive variations with age
Binocular vision

Components of visual acuity
Corrective Lenses
Ocular and spectacle refraction
Convergence & divergence
Causes of refractive errors
Objective measurement of visual acuity
Uses of prisms
Optics of Low Vision Devices
Heterophoria and heterotropia
Prismatic decentration
Spherical equivalent
Cycloplegic refraction
Amplitude of Accommodation

Paper-III:
PHYSICAL,GEOMETRICAL AND INSTRUMENT OPTICS
Sec- I
PHYSICAL OPTICS

Principles of Radiant Energy

Emission spectra and black body
Interference phenomenon
Thin films, lens coating (interference)
Polarization
Diffraction: light distribution in images
Color: Spectrum, primary, equations, incandescence
Luminance
Photometric principles, units, measurements
Color temperature
Photo-electric effect
Photo-chemical effect

Sec II
GEOMETRICAL OPTICS

Reflection: Plane, spherical and parabolic mirror
Refraction: Refractive index, Refraction at plane and spherical surfaces
Spherical aberration
Important axis of eye
Lens combination
Afocal system
IPD methods
Catoptric images
Vergence and surface power, reduced vergence and reduced thickness
Coaxial system of spherical surfaces
Critical angle, total internal reflection, fiber optics,
Prisms deviation dispersion and spectra

Magnification
Cylinder, sphere and toric surfaces
Back and front vertex power
Eye as camera
Optical characters of the eye

Sec III
INSTRUMENT OPTICS

Test Charts –
Standard calculation of test charts
Trial case lenses and accessories in the Trial Box
Phoroptor
Trial frame design
Retinoscope – types
Retinoscope – optics
Autorefractors – principles and use
Direct ophthalmoscope
Indirect ophthalmoscope
Comparison of direct & indirect Ophthalmoscope
Lensmeter
Slit-lamp optics
Slit lamp – methods of examination
Glare and Contrast Sensitivity testing
Astigmatic dial and fan
Cross cylinder
Potential Acuity Meter
Tonometer and its optics
Visual fields

Paper-IV:
ORTHOPTICS, SQUINT AND LOW VISION
Sec I
ORTHOPTICS & SQUINT

Basic Terminologies uses in Squint / Orthoptics
Binocular Single vision (sensory Requirements)
Binocular Single vision tests
Binocular Abnormalities
Anomolic Retinal Correspondence
Sensory Evaluation
Motor Evaluation –
Cover test (Different Types and Methods)
Amblyopia –
Esotropias – Congenital Esotropia
Characteristics of Esotropias
Accommodative Esotropia

Accommodation & Convergence AC / A ratio
Microtropia
Strabismus Convergence Acutus
Exotropias Types
Exotropias Management
A &V pattern + Penalization
Synaptophore
Hess screen
Tangent Screen
Duane's syndrome Type I
Duane's Syndrome Type II & III
Brown's Syndrome
Miscellaneous syndrome (Jaw Winking, Mobius, FOEM, etc.)
3rd Nerve palsy
4th Nerve palsy (Superior Oblique Myochemia)
Post-operative diplopia test
6th Nerve palsy
DEP
Dissociated Vertical Deviation (DVD)
Myasthenia Gravis
Multiple sclerosis
Gravis Disease
Nystagmus (Types)
Nystagmus (Management)
Prism Fusion Range
Investigations of Incomitance Squint
Trauma and Squint –
Saccades Eye Movements –
Practical Aspects of Orthoptics Management & Practice

Sec II

LOW VISION

Epidemiology of Low Vision – Definitions and Global Situation
Causes of Low Vision
Patients History & Interview – Assessment tests
Low Vision Assessment
Essentials Supplementary tests – Color Vision, Visual Fields,
Visual Acuity
Magnification
Low Vision Devices – Types
EVD/EVP
Optical Devices for distance use – Telescopes & Filters
Optical Devices for near use – Magnifiers and their calculation –
Electronic & High tech Low Vision Devices
Low Vision Enhancement system – Video Presentation
How to use Low Vision Devices
Environmental Modifications – Special considerations
Visual Training

Low Vision Service Other Aspects of rehabilitation
Motivation and client's Behavior
Complication and side effects
Services for the Blind
Orientation and Mobility Training
Braille
Contrast sensitivity
Dispensing of low vision aids
Filters
Field expenders
Advantages & disadvantages of aids
Amler grid
Glare
Practical Training of LV Management Case Studies
Practical Training of LV Management Case Studies
Practical Training of LV Management Case Studies of the Blind Patients
Practical Training of LV Management Case Studies of the Blind Patients

Third Professional B.Sc Optometry and Orthoptics Examination

PAPER I

OPHTHALMIC DISPENSING AND CONTACT LENSES

Sec I

CONTACT LENSES

Anatomy and Physiology of Cornea in relations to Contact Lens use
Terminologies of contact lens
The History of Contact lenses
Cornea / Contact lens and Oxygen
Basic Contact lens Types
Indications and Contra Indication of Contact lens use
Contact Lens materials
Contact Lens Manufacturing
Optics of Contact lens
Silicon Hydrogel Lenses
Slit Lamp Biomicorscope
Slit Lamp examination of Contact lenses patients – Indicators and Findings
Astigmatism – Keratometry – Contact lenses
Corneal Topography: measurement and Significance
Contact lens verification
Evaluation of Astigmatism
Fluid lens optics
Introduction of Contact lens Fitting – Soft Lenses
RGP Lenses Fitting
RGP Fitting Patterns
Toric Lens Fitting
Difference between soft and hard lens
Special contact lens fitting situations
Scleral contact lenses
Cosmetic contact lens
Red eye and contact lens
Comparison of contact lens and spectacle
Contact lens in presbyopia
Contact lens in Aphakia
Initial problems with RGP
LARS
Overview of care and Maintenance – method if disinfection
Chemical Properties of contact lens care products
Contact Lens Deposits

Contact lens related ocular complications Soft lens and their management
Contact lens related ocular complications RGP lenses and their management
Diagnosis and management of Dry Eyes in contact lens wear
Contact lens related eye Problems –
Contact lens Aftercare

Fitting scleral lenses and an Ocular prosthesis
Business aspects of Contact lenses practice
Practice Management of Contact Lenses
Inventory of Contact Lenses

Sec II
OPHTHALMIC DISPENSING

Ophthalmic Lenses, Types of lenses
Definitions – lenses and frames materials
Lenses shapes and surfaces
Glazing
Retroscopic tilt
Frontal angle of splay
Spectacle frame measurements
Lensometer and I.PD measurements
Centration and decent ration effective result
Spectacles tints
Vertex distance and vertex power
Best form spectacle frames and lenses.
Axis chart and its use in dispensing
Lensometer types and use
Axis marking on Lensometer
Bifocals, Bifocals fitting, Bifocals dispensing
Bifocals manufacturing
Special purpose lenses, Progressive Lenses
Different materials used in dispensing
Pediatric dispensing, Special consideration for pediatric dispensing
Prescription mistakes commonly made
Auto Edger (Types and Fitting Methods)

PAPER II
OPHTHALMIC DISEASES AND PHARMACOLOGY
Sec I
COMMON OPHTHALMIC DISEASES

Diseases of the eye lids –
Diseases of the Conjunctiva –
Diseases of the Cornea –
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Diseases of the Cornea –
Diseases of lens – Congenital anomalies

Cataract
Pupil Abnormalities
Glaucoma
Glaucoma
Diseases of the Retina
Uveitis
Color Vision Defects
Important eye syndromes
Dry eye syndrome
Defects of the visual pathway
Visual cortex Problems
Cortical Blindness
Fundus examination & Optometric approach
Related Systemic Diseases
Congenital Diseases
Multiple Sclerosis
Myasthenia Gravis
Retinopathy of Prematurity
Albinisms
Double Elevator palsy
Trauma
Introduction to Genetics –
Hereditary Eye Disorders
Hereditary Eye Disorders
Diseases (Sign & Symptoms)
Diseases (Sign & Symptoms)
Diseases (Investigations)
Diseases (Management & Counseling) –
Cortical Blindness

Sec II
OPHTHALMIC PHARMACOLOGY

Introduction to ophthalmic pharmacology
Passages of ophthalmic drugs
Cycloplegics & mydriatics (mechanism of action)
Uses of cycloplegics & mydriatics, side effects
Antibiotics (introduction)
Antibiotics (types & uses)
Topical anesthetics
Anti-allergic
Anti-glaucoma drugs
Steroids
Anti-inflammatory drugs
Adverse reactions and Side Effects – Anti Biotic Drugs
Adverse reactions and Side Effects – Anti Glaucoma Drugs, Beta Blockers
Adverse Reactions of other Ophthalmic Drugs –
Diagnostic Stains: Fluorescein, Rose Bengal

PAPER III
CLINICAL OPTOMETRY AND EXAMINATION

Eye examination History & symptoms:
Signs of diseases:
External examination
Methods of examinations:
Approach & diagnosis with special emphasis on Case Studies:
Internal eye examination
Management of patients (Routine)
Management of practice (Occupational)
How to run an optometric practice
Merits & demerits:
Marketing
Contact lens
Low vision
Orthoptics
Subjective and pediatric refraction
Instruments

Final Professional B.Sc Optometry and Orthoptics Examination

Paper I

PEDIATRIC OPTOMETRY

Visual Assessment:
Pre Verbal Assessment
Verbal Assessment
Refraction:
Development of Refractive Error
Objective & Subjective methods
Pre Verbal Refraction
Verbal Refraction
Pediatric Low Vision:
Causes of Childhood Blindness – Need & Constraints
LV management in Children
Congenital Anomalies of the Eye:
Problems affecting the Optical management and Visual Outcome
Management Options
Pediatric Contact lenses & Dispensing & Screening:
Requirement & Management of the of Contact lenses in Children
Understanding the Indication and Contra Indication of Contact Lenses
Dispensing of Glasses to Children – Problems and care
Squint
Mile stone of Visual development
Retinopathy of prematurity
Ophthalmia neonatrium
Congenital cataract
Albinism
Stargts disease
Miscellaneous syndromes
Orbital tumors
Buphthalmos

Paper II

OPHTHALMIC INSTRUMENTATION

Visual Field Loss and Pattern
Equipment to assess Arc Perimeter
Humphrey automated perimeter
Goldman perimeter
Keratometer and its use

Corneal Topography
FFA
Biometry
Ultrasound
Heidelberg retinal tomography
Optical coherence tomography
Eye banking
Refractive surgeries
LASERS
Pantacam
IOL implantatation
Fundus Photography
YAG Lasers
Bagoline striated glasses, worth four dot test
Prisms, Fresnel prisms
Hess screen
Tangent screen
Synoptophore
Electro-physiological tests – VER, ERG, EOG

Paper III
BIOSTATISTICS AND RESEARCH METHODS

Theory Marks 45 Marks
Internal Assessment 05 Marks
Oral Examination on Research Report 45Marks
Internal Assessment 05 Marks
Total Marks 100 Marks
Pass Marks 50% Marks
Theory Hours 100
Practical Hours : 200
Total study Hours: 300

1. **Introduction of Statistics**: Statistical data condensation of data, presentation of data by graphs, health related data, rates and their relative importance, presentation of quantitative data.
2. **Sampling:** The concept of sampling, types and methods of drawing ideal sample, sampling distribution of sample mean, error of sampling, standard error, chi square, T-test and their uses in health.
3. **Central Tendency:** Concepts of central tendency, mean, median and ode and their value in health, percentiles, measure of dispersion, coefficient of variation and skewness, normal distribution, range, standard deviation and relative deviation.

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4. **Hypothesis:** Concepts of hypothesis testing, null & alternative hypothesis, two types of errors, acceptance & rejection regions, tow sided & one sided tests, general steps in hypothesis testing, test about means, confidence interval for mean, meaning of significance in statistical procedures and methods of inferential statistics.

5. **Regression & Correlation:** Scatter diagram, straight line regression model, method of least squares, sample correlation coefficient, inference about regression coefficient and correlation coefficient.
6. **Introduction to Research:** The question of legitimate knowledge, knowledge & decision making, the scientific method, quantitative vs qualitative research, application of scientific method, positivistic vs naturalistic paradigm.
7. **Classification of Research:** Basic vs applied research, evaluation research, research & development (R&D), action research.
8. **Selection & Formulation of a Problem:** From generic to a specific program, program statement, getting an access to primary and secondary resources, note taking and information to management, Review of related literature, questions and/or hypothesis of the study.
9. **Development of a Research Plan:** The ethical, legal and professional obligations, the rational of the study, the research plan, evaluation of a research plan.
10. **Selection of sample:** sample & population, basic considerations in sampling, Random sampling, stratified random sampling cluster sampling, systematic sampling determination of sample size, elimination of sampling bias.
11. **Instrumentation and Data Collection:** Tests and scales, objectivity and standardization, types of tests and scales, validity and reliability of an instrument, assessment of validity and reliability, development of tests/scale.
12. **Data Analysis & Interpretation:** Preparing data analysis, types of measurement scales, descriptive statistics inferential statistics, using computer for data analysis.
13. **Preparation of a Research Report:** Format & style, citation, references & bibliography writing theses, dissertations & journal articles.

Research paper/ Report writing related to the subject of interest of the student

NOTE. COURSE WILL BE DISTRIBUTED AMONG THREE TRIMESTERS BY THE RESPECTIVE DEPARTMENT.

PAPER IV
OCCUPATIONAL OPTOMETRY AND PREVENTIVE OPHTHALMOLOGY
Sec I
OCCUPATIONAL OPTOMETRY

Visual task analysis
Visual anomalies

VDUs and vision screeners
Vision and aging
Vision and driving
Color and color coding
Ocular hazards
Protective eyewear and International Standards

Terminology and calculations in illumination
Lamps and lighting
The Optician's Act
Country Situation and Optometric Practice
Optometric bodies
Eye examination and dispensing
Referral
Record keeping and data protection
English law including introduction to European law
Employment and consumer legislation and negligence
International professional bodies in Optometry
Marketing Optometric practice
Management of Optometric practice
Finance in Optometric practice

Sec II

PREVENTIVE OPHTHALMOLOGY

Primary eye Care introduction
General health and eye care
Prevention of Blindness basic Concepts and trends
Measurement of diseases in the community
Situation Analysis of existing resources for the prevention of Blindness
Primary eye care management of cataract
Primary eye care management of glaucoma
Primary eye care management of diabetes
Primary eye care VA Deficiency
Primary eye care Refractive errors
Primary eye care Childhood blindness
Primary eye care Trauma
Primary eye care Vision threatening diseases
Primary eye care of ROP
Primary eye care of Retinoblastoma
Onchocerciasis
Trachoma
Prevalence
Incidence
Vision 2020
Model of eye care
Programming and planning

BSC HONS OPTOMETRY AND OTHOPTICS

FIRST PROFESSIONAL

PAPER 1.

BASIC ANATOMY & PHYSIOLOGY

Course will be decided by the respective departments.

PAPER II

BASIC BIOCHEMISTRY & GENERAL PATHOLOGY

Course will be decided by the respective departments.

PAPER III

ISLAMIC STUDIES/ ETHICS & PAKISTAN STUDIES

Course will be decided by the respective departments.

PAPER IV

BEHAVORIAL SCIENCES & COMPUTER EDUCATION

Course will be decided by the respective departments.

BSc HONS OPTOMETRY AND ORTHOPTICS

SECOND PROFESSIONAL

Time distribution	SUBJECTS			
	ANATOMY AND PHYSIOLOGY	PHYSIOLOGICAL AND VISUAL OPTICS	PHYSICAL GEOMETRICAL AND INSTRUMENTAL OPTICS	ORTHOPTICS AND LOW VISION
1 – 12 WEEKS	1.Anatomy (introduction)	1. Myopia	1. principal of radiant energy	1. Basic Terminologies uses in Squint / Orthoptics
	2. Anatomy of Eyelid	2. Hypermetropia	2. Emission spectra and black body	2. Binocular Single vision (sensory Requirements)
	3 Anatomy of cornea	3. Astigmatism simple	3. interference phenomenon lens coating	3. Binocular Single vision tests
	4. Anatomy of sclera and its openings	4. Astigmatism compound	4. polarization	4. Binocular Abnormalities
	5. Anatomy of limbus and conjunctiva	5Accommodation	5. Diffraction :Light distribution in images	5. Abnormal Retinal Correspondence
	6. Anatomy of Anterior chamber	6. presbyopia	6. Color spectrum , primary equations ,incandescence	6. Sensory Evaluation
	PHYSIOLOGY		7. luminance	7. Motor Evaluation –
	1. Normal vision development	7. Aphakia and psudophakia	8. photometric units and measurements	8. Cover test (Different Types and Methods)
	2. Physiology of eyelid	8Near and far point	9. color temperature	9. Amblyopia –
	3. physiology of cornea	9Anisometropia	11. electromagnetic spectrum	10. Esotropias – Congenital Esotropia

	4. physiology of tear film	10. Anisokonia	12. Photoelectric Effect	11. Characteristics of Esotropias
	5 physiology of lacrimal system	11. problems of ammetropia	13. Photochemical Effect	12. Accommodative Esotropia
	6. physiology of pupil and reflexes	12.Amplitude of Accommodation		13. Accommodation & Convergence AC / A ratio
				14. Microtropia
				15. Strabismus Convergence Acutus
				16. Exotropias Types
				17. Exotropias Management
				18. A &V pattern + Penalization
				19.Synaptophore

BSc HONS OPTOMETRY AND ORTHOPTICS

SECOND PROFESSIONAL

Time distribution	SUBJECTS			
	ANATOMY AND PHYSIOLOGY	PHYSIOLOGICAL AND VISUAL OPTICS	PHYSICAL **GEOMETRICAL** AND INSTRUMENTAL OPTICS	ORTHOPTICS AND LOW VISION
13 _ 24 WEEKS	7. Motors law	13. subjective refraction	14. Reflection: Plane, Spherical and Parabolic mirror	20. Hess screen Tangent Screen
	8 physiology of aqueous humor	14. Balancing method of subjective refraction	15. Refraction : Refractive Index, Refraction at plane & Spherical Surfaces	21. Duane's syndrome Type I
	9. physiology of lens metabolism	15Near vision test and refraction	16. Vergences & Surface power, reduce vergences and reduce thickness	22. Duane's Syndrome Type II & III
	10. Physiology of Accommodation and convergence	16.Routine eye examination	17. Spherical chromatic coma and prismatic aberrations	23. Brown's Syndrome
	11. physiology of the Retina	17. Cycloplegic refraction	18. Coaxial system of spherical surfaces	24. Miscellaneous syndrome (Jaw Winking, Mobius, FOEM, etc.)
	12. Dark and light adaptations	18.Emmetropia and ammetropia	19. Critical Angle, total internal reflection Fiber optics	25. 3rd Nerve palsy
		19. convergence types	20. Prism deviation Dispersion and Spectra	26. 4th Nerve palsy (Superior Oblique Myochemia)
		20. Methods of accommodation and convergence measurements	21. Cylinder sphere and vertex power	27. 6th Nerve palsy

		21. Accommodation and convergence anomalies	22. Back and front vertex Power	28. DEP
		22. optical axis And catoptric images	23. Eye as Camera	29. Dissociated Vertical Deviation (DVD)
		23. Retinal image formation and size	24. Optical Character of eye.	30. Myasthenia Gravis
			25. A focal system	31. Multiple sclerosis
				32. Gravis Disease
				33. Nystagmus (Types)
				34. Nystagmus (Management)
				35. Prism Fusion Range
				36. Investigations of Incomitance Squint

BSc HONS OPTOMETRY AND ORTHOPTICS

SECOND PROFESSIONAL

Time distribution	SUBJECTS			
	ANATOMY AND PHYSIOLOGY	PHYSIOLOGICAL AND VISUAL OPTICS	PHYSICAL GEOMETRICAL AND INSTRUMENTAL OPTICS	ORTHOPTICS AND LOW VISION
25 _ 36 WEEKS	13. physiology of color vision	24. Visual acuity and factors affecting	**Instrumental Optics**	37. Trauma and Squint –
	14. visual pigments	25. Depth of focus	26. Trail case lens & accessories in the trail box	38. Saccades Eye Movements –
	15. physiology of extra ocular muscles	26. Binocular vision	27. Phoropter	39. Post-Operative diplopia test
	16. visual pathway	27. Asthenopia	28. Trail frame design	***Low Vision***
				40. Epidemiology of Low Vision – Definitions and Global Situation
	17. Homeostatic mechanism of eye	28. Ocular and spectacle refraction	29. Retinoscope types and optics	41. Causes of Low Vision
	18. immunity and allergy	29. causes of refractive error	30. Auto refractors Principle & use	42. Patients History & Interview – Assessment tests
	19. Tissue and organ transplant	30 transposition	31. Direct Ophthalmoscope	43. Low Vision Assessment
		31. prismatic decentration	32. Indirect Ophthalmoscope	44. Essentials Supplementary tests – Color Vision, Visual Fields, Contrast sensitivity

		32. Spherical equivalent	33. Comparison of direct & indirect Ophthalmoscope	45. Visual Acuity, Specially designed test chart
			34. Lens meter	46. Magnification and its calculations
			35. Slit lamp Optics	47. Low Vision Devices – Types
			36. Slit Lamp methods of examination	48. EVD/EVP
			37. Glare and Contrast sensitivity Testing	49. Optical Devices for distance & Near
			38. Astigmatic dial & fan method	50. Electronic & High tech Low Vision Devices Low Vision Enhancement system – Video Presentation
			39. Potential acuity meter	51. How to use Low Vision Devices
			40. Cross Cylinder	52. Environmental Modifications – Special considerations
			41. Tonometer & its Optics	53 Visual Training Scanning and tracking
			42. Visual Fields	54. Motivation and client's Behavior Complication and side effects
				55. Orientation and Mobility Training
				56. Braille
				57. Filters
				58. Fields Expenders
				59. Advantages and disadvantages of low vision aids
				60. Amslers Grid

				61. Glare Sensitivity in low vision

BSc HONS OPTOMETRY AND ORTHOPTICS

THIRD PROFESSIONAL

TIME DISTRIBUTION	SUBJECTS		
1 _ 12 WEEKS	CONTACT LENSES AND OPHTHALMIC DISPENSING	OPHTHALMIC DISEASE AND PHARMACOLOGY	CLINICAL OPTOMETRY AND EXAMINATION
	1. Terminologies of contact lens	Diseases of the eye lids	Eye examination History & symptoms
	2. Anatomy and physiology of cornea	Diseases of the Conjunctiva	Signs of diseases:
	The History of Contact lenses	Diseases of the Conjunctiva	External examination
	Cornea / Contact lens and Oxygen	Diseases of the Cornea	Methods of examinations
	Basic Contact lens Types	Diseases of lens – Congenital anomalies	Approach & diagnosis with special emphasis on Case Studies:
	Indications and Contra Indication of Contact lens use	Cataract	Internal eye examination
	Contact Lens materials	Pupil Abnormalities	
	Contact Lens Manufacturing	Glaucoma	
	Optics of Contact lens	Glaucoma	
	Silicon Hydrogel Lenses	Diseases of the Retina	
	Slit Lamp Biomicorscope	**PHARMACOLOGY.**	
	Slit Lamp examination of Contact lenses	Introduction to ophthalmic pharmacology	

	patients – Indicators and Findings		
	Astigmatism – Keratometer – Contact lenses	Passages of ophthalmic drugs	
	Corneal Topography: measurement and Significance	Cycloplegics & mydriatics (mechanism of action)	
	Contact lens verification	Uses of cycloplegics & mydriatics, side effects	
	Introduction of Contact lens Fitting – Soft Lenses	Antibiotics (introduction	
	RGP Lenses Fitting		
	RGP Fitting Patterns		
	Toric Lens Fitting		
	Overview of care and Maintenance – method if disinfection		
	Chemical Properties of contact lens care products		
	Contact Lens Deposits		
	Evaluation of lenticular astigmatism		

BSc HONS OPTOMETRY AND ORTHOPTICS

THIRD PROFESSIONAL

TIME DISTRIBUTION	SUBJECTS		
	CONTACT LENSES AND OPHTHALMIC DISPENSING	OPHTHALMIC DISEASE AND PHARMACOLOGY	CLINICAL OPTOMETRY AND EXAMINATION
13 _24 WEEKS	Contact lens related ocular complications Soft lens and their management	Uveitis	Management of patients (Routine
	Contact lens related ocular complications RGP lenses and their management	Color Vision Defects	How to run an optometric practice Merits & demerits: Marketing
	Diagnosis and management of Dry Eyes in contact lens wear	Important eye syndromes	Contact lens
	Contact lens related eye Problems	Dry eye syndrome	Low vision
	Contact lens Aftercare	Defects of the visual pathway	orthoptics
	Fluid lens optics	Visual cortex Problems	
	Difference between soft and hard lens	Cortical Blindness	
	Scleral contact lens	Fundus examination & Optometric approach	
	Fitting of cosmetic contact lens	Congenital Diseases	
	Therapeutic contact lens	Multiple Sclerosis	
	Contact lens related acute red eye	Myasthenia Gravis	
	Business aspects of Contact lenses practice	Antibiotics (types & uses)	
	Practice Management of Contact Lenses	Topical anesthetics	

	Ocular prosthesis	Anti-allergic	
	Inventory of Contact Lenses	Anti-glaucoma drugs	
	Left add right subtract	Steroids	
	Comparison of spectacle and contact lens		
	Contact lens in presbyopia		
	Contact lens in aphakia		
	Initial problem with RGP		
	Back vertex distance and contact lens		
	DISPENSING		
	Ophthalmic lenses,types of lenses		
	Definitions – lenses and frames		

BSc HONS OPTOMETRY AND ORTHOPTICS

THIRD PROFESSIONAL

TIME DISTRIBUTION	SUBJECTS		
	CONTACT LENSES AND OPHTHALMIC DISPENSING	OPHTHALMIC DISEASE AND PHARMACOLOGY	CLINICAL OPTOMETRY AND EXAMINATION
25 _ 36 weeks	Spectacle frame measurements	Retinopathy of Prematurity	Subjective refraction
	Lensmeter and I.PD measurements	Albinisms	Paediatric refraction
	Centration and decentration effective result	Double Elevator palsy	Diagnostic procedures
	Spectacles tints	Trauma	Intruments
	Vertex distance and vertex power	Introduction to Genetics	
	Best form spectacle frames and lenses	Hereditary Eye Disorders	
	Axis chart and its use in dispensing	Orbital disorders	
	Lensmeter types and use	Diseases (Sign & Symptoms	
	Axis marking on Lensmeter	Diseases (Sign & Symptoms	
	Bifocals, Bifocals fitting, Bifocals dispensing	Diseases (Investigations	
	Bifocals manufacturing	Diseases (Management & Counseling	
	Special purpose lenses, Progressive Lenses	Cortical Blindness	
	Different materials used in dispensing	Anti-inflammatory drugs	
	Pediatric dispensing, Special consideration	Adverse reactions and Side Effects – Anti Biotic Drugs	

	for pediatric dispensing		
	Prescription mistakes commonly made	Adverse reactions and Side Effects – Anti Glaucoma Drugs, Beta Blockers	
	Auto Edger (Types and Fitting Methods	Adverse Reactions of other Ophthalmic Drugs –	
	Lenses frame materials	Diagnostic Stains: Fluorescein, Rose Bengal	
	Lenses shapes and surfaces		
	glazing		
	Tinted photochromic lenses		
	Pantoscopic tilt		
	Retroscopic tilt		
	Frontal angle ,angle of splay,bridge shapes		

BSC HONS OPTOMETRY AND ORTHOPTICS
FOURTH YEAR

Time distribution	SUBJECTS		
	PEDIATRIC OPTOMETRY	OPHTHALMIC INSTRUMENTATION	OCCUPATIONAL OPTOMETRY AND PREVENTIVE OPHTHALMOLOGY
1-12 WEEKS	Retinopathy of prematurity	Visual Field Loss and Pattern	Visual task analysis
	Ophthalmia neonatorum	Equipment to assess Arc Perimeter	Visual anomalies
	Xeropthalmia	Humphrey automated perimeter	VDUs and vision screeners
	Congenital cataract	Goldman perimeter	Vision and aging
	Albinism and nystagmus	Keratometer and its use	Vision and driving
	Stargadts disease	Corneal Topography	Color and color coding
	Miscellaneous syndrome	Fluorescein fundus angiography	Ocular hazards mechanical
	Orbital tumors	Biometry	Non mechanical ocular hazards
	bupthalmos		Protective eyewear and International Standards
	Retinoblastoma		Terminology and calculations in illumination
			Lamps and lighting
			The Optician's Act
			Country Situation and Optometric Practice
			Optometric bodies
			Eye examination and dispensing
			Referral
			Record keeping and data protection

BSC HONS OPTOMETRY AND ORTHOPTICS
FOURTH YEAR

Time distribution	SUBJECTS		
12-24 WEEKS	**PEDIATRIC OPTOMETRY**	**OPHTHALMIC INSTRUMENTATION**	**OCCUPATIONAL OPTOMETRY AND PREVENTIVE OPHTHALMOLOGY**
	Visual Assessment	Ultrasound	English law including introduction to European law
	Pre Verbal Assessment	Fundus Photography	Employment and consumer legislation and negligence
	Verbal Assessment	YAG Lasers	International professional bodies in Optometry
	Refraction:	Bagoline striated glasses, worth four dot test	Marketing Optometric practice
	Development of Refractive Error	Prisms, Fresnel prisms	Management of Optometric practice
	Objective & Subjective methods	Hess screen	Finance in Optometric practice
	Pre Verbal Refraction	Tangent screen	Primary eye care VA Deficiency
	Verbal Refraction		Primary eye care Refractive errors
	Pediatric Low Vision		Prevention of Blindness basic Concepts and trends
	Causes of Childhood Blindness – Need & Constraints		Measurement of diseases in the community
			Situation Analysis of existing resources for the prevention of Blindness
			Primary eye care management of cataract
			Primary eye care management of glaucoma
			Primary eye care management of diabetes

BSC HONS OPTOMETRY AND ORTHOPTICS
FOURTH YEAR

Time distribution	SUBJECTS		
	PEDIATRIC OPTOMETRY	OPHTHALMIC INSTRUMENTATION	OCCUPATIONAL OPTOMETRY AND PREVENTIVE OPHTHALMOLOGY
25-36 WEEKS	LV management in Children	Synoptophore	Primary eye care Childhood blindness
	Congenital Anomalies of the Eye:	Electro-physiological tests – VER, ERG, EOG	Primary eye care Trauma
	Problems affecting the Optical management and Visual Outcome	Heidelberg retinal tomography	Primary eye care Vision threatening diseases
	Management Options	Optical coherence topography	Primary eye care of RoP
	Pediatric Contact lenses & Dispensing & Screening	Eye banking	Primary eye care of Retinoblastoma
	Requirement & Management of the of Contact lenses in Children	pentacam	onchocerchiasis
	Understanding the Indication and Contra Indication of Contact Lenses	Intra ocular lens implantation and calculation methods	Trachoma
	Dispensing of Glasses to Children – Problems and care	Refractive surgeries	Prevalence
	Extra ocular muscle imbalance	LASERS	Incidence
	Milestones of visual development		Vision 2020
			Models of eye care
			Programming and planning
			Primary secondary and tertiary eye care sevices
			Primary eye care community awareness
			Use of resources to prevent eye diseases

ASSESSMENT

- Formative Assessment (MCQs)
- Summative Assessment (SCQs , MCQs , ORAL) after every 3 months
  Final exams will be conducted by the university
- MCQs and SCQs theory exams 50%
- Practical exam 50%
- Passing marks 50 %

TEACHING TOOLS

- **Demonstration**
- **Lectures**
- **Hand on clinical methods**
- **Small group discussions**

TITLE PAGE