Bharath

INSTITUTE OF HIGHER EDUCATION AND RESEARCH

(Declared as Deemed - to - be - University under section 3 of UGC Act 1956)

BHARATH INSTITUTE OF HIGHER EDUCATION
AND RESEARCH

Program
MS Ophthalmology

Course Contents

Essential theoretical knowledge

These are only broad guidelines and are illustrative; there may be overlap between sections.

The Basic Sciences:

1. Orbital and Ocular anatomy
    a. Gross anatomy
    b. Histology

2. Ocular Physiology
    a. Pathology
3. Ocular pathology:
    a. Gross pathology
    b. Histopathology.
4. Biochemistry
    a. General biochemistry,
    b. Biochemistry applicable to ocular function.
5. Microbiology
    a. Specific microbiology applicable to the eye
    b. Immunology with particular reference to ocular immunology
6. Geometric and ophthalmic optics
    a. Basic physical optics
    b. Ophthalmic optics
    c. Applied optics including optical devices
7. Clinical Ophthalmology
    a. Disorders of Refraction
    b. Disorders of the Lids
    c. Disorders of the Lacrimal System
    d. Disorders of the Conjunctiva
    e. Disorders of the Sclera
    f. Disorders of the Cornea
    g. Disorders of the Uveal Tract
    h. Disorders of the Lens
    i. Disorders of the Retina
    j. Disorders of the Optic Nerve & Visual Pathway

k. Disorders of the Orbit
l. Glaucoma
m. Neuroophthalmology
n. Paediatric ophthalmology
o. Systemic ophthalmology (Ocular involvement in systemic disease)
p. Immune ocular disorders
q. Strabismus & Amblyopia

Essential diagnostic skills – Instrumentation

Tonometry

1. Applanation
2. Indentation (commonly Schiotz)

Assessment of Epiphora

1. Jone's dye test
2. Syringing – performance & interpretation

Dry eye evaluation

1. Schirmer test
2. Rose Bengal staining
3. Tear film breakup time
4. Tear meniscus evaluation

Corneal ulceration

1. Taking a corneal scraping
2. Inoculation into media
3. Evaluation of Gram's stain
4. Evaluation of KOH preparation
5. Corneal wedge biopsy

Direct ophthalmoscopy

1. Distant direct
2. Media assessment
3. Use of filters provided

Indirect ophthalmoscopy

1. Scleral depression
2. Fundus drawing capability
3. Use of filters provided

Slit Lamp Examination

1. Diffuse examination
2. Focal examination
3. Retroillumination – direct & indirect
4. Sclerotic scatter
5. Specular reflection
6. Staining modalities and interpretation

Slit Lamp Accessories

1. Applanation Tonometry
    a. Goldman's applanation
2. Gonioscopy
    a. Grading of the angle
    b. Testing for occludability
    c. Indentation gonioscopy

3. 3-mirror examination of the fundus
4. 78-D / 90-D / examination
5. Optical Pachymetry
6. Slit lamp photography

Colour vision evaluation

1. Ishihara pseudoisochromatic plates
2. Other tests including
    a. Farnsworth – Munsell 100 – hue or 15 – hue tests
    b. Holmgren's wols
    c. Edridge – Green lantern

Use of Amsler's charting

1. Instructing in the use of and interpreting the chart

Corneal topography and corneal mapping

1. Interpretation of corneal topography mapping

Specular microscopy of the corneal endothelium

Keratometry

1. Performance & interpretation of keratometry
2. Diagnosis of situations such as keratoconus

Fundus photography & fundus fluorescein angiography (FFA, FAG)

1. Doing and evaluating stereoscopic fundus photographs
2. Performance of and interpretation of FFA
3. Performance of indirect fluorescein angioscopy
4. Autofluorescence
5. Optical Coherence Tomography

Refraction

1. Retinoscopy
2. Streak Retinoscopy
3. Use of trial set
4. Use of Jackson's cross-cylinder
5. Subjective and objective refraction
6. Prescription of glasses for all types of refractive errors
7. Knowledge of manufacture, fitting & dispensing of glasses

Autorefractometry

1. Use of and interpretation of autorefractometer

Diagnosis & assessment of Squint

1. Ocular position and motility examination
2. Versions, ductions and vergences
3. Convergence facility estimation
4. Cover/ Uncover/ Alternate cover test
5. Use of prism bars or free prisms in assessment of squint
6. Use of Synaptophore
7. Use of Bagolini's striated glasses / red filters / Maddox rod
8. Use of Worth's four dot test
9. Use & interpretation of the Hess chart / Lees' screen
10. Performance & interpretaion of diplopia charting
11. Diagnosis of amblyopia

Exophthalmometry

1. Use of Hertel's exophthalmometer

2. Use of Luedde's exophthalmometer
3. Use of other exophthalmometers
4. Measurement **of proptosis or Exophthalmos**

Use and evaluation of ophthalmic ultrasound

1. A-scan ultrasound with biometry
2. **B-scan ultrasound : performance & interpretation**

Interpretation of perimetry

1. Tangent screening
2. Goldman perimeter & interpretation
3. Static computerized perimetry
    a. Interpretation of common field defects

Radiology

1. **Interpretation of plain skull films**
    a. PA-20 (Caldwell's view)
    b. PNS (Water's view)
    c. Lateral
    d. Submentovertical
    e. Optic canal views
    f. Localisation of intra ocular and intra orbital FBs

2. **Interpretations of contrast studies**
    a. Performance & interpretation of dacryocystograms
    b. Performance and interpretations of orbital venograms
    c. Interpretation of carotid angiograms

3. **Interpretation of CT –Scan & MRI Scans**
    a. Orbital CT interpretation & orbital MRI evaluation
    b. Brain CT interpretation

4. **Understanding of current techniques & specialized investigations**
    a. OCT
    b. UBM
    c. ERG / VEP

Essential surgical skills

Procedure	Nature of activity * & number			
	O	A	PA	PI
1. Operating theatre				
a. Anaesthesia:				
i. Peribulbar anaesthesia	-	-	-	-
ii. Parabulbar anaesthesia		-	-	-
iii. Facial blocks				
• O'Brein	-	-	-	
• Van Lint & modifications	-	-	-	
iv. Frontal blocks	-	-	-	
v. Infra orbital blocks	-	-	-	
vi. Blocks for sac surgery	-	-	-	
b. Magnification:				
i.Operating microscope: Familiarity with use is essential	-	-	-	
ii. Operating loupe				
c. Lid surgery:				
i. Tarsorrhaphy	-	-	-	-
ii. Ectropion and Entropion procedures	-	-	-	-
iii. Ptosis surgery	-	-	-	-
iv. Lid repair following trauma and surgical excision of lid for tumours etc.	-	-	-	-
v. Epilation, electrolysis, cryotherapy etc.	-	-	-	-
d. Destructive procedures:				
i. Evisceration with or without implant				
ii. Enucleation with or without implant				
iii. Modified enucleation procedures for intraocular tumours				
e. Sac surgery				
i. Dacryocystectomy	-	-	-	-
ii. Dacryocystorhinostomy	-	-	-	-
iii. Probing for congenital obstruction	-	-	-	-

of nasolacrimal duct				
Procedure	Nature of activity * & number			
	O	A	PA	PI
f. Extraocular muscle surgery				
i. Recession and resection procedures on the horizontal recti	-	-	-	-
g. Cataract surgery				
i. Standard ECCE with or without IOL implantation – Cataract –surgery	-	-	-	-
ii. Small incision ECCE with or with-out IOL implantation				
iii. Secondary AC or PCIOL implanta-tion				
iv. Phacoemulsification				
v. Intra capsular cataract extraction				
h. Retinal surgery				
i. Needs to know to assist in external procedures such as buckling	-	-	-	-
ii. Prophylactic cryotherapy	-	-	-	-
i. Orbit surgery				
i. Anterior orbitotomy for diagnostics and therapy	-	-	-	-
ii. Lateral orbitotomy for tumours		-	-	-
iii. Incision and drainage via anterior orbitotomy for abscess	-	-	-	-
iv. Exenteration		-	-	-
v. Fine needle aspiration biopsy of orbital disease		-	-	-

j. Vitrectomy				
i. Intra vitreal and intra cameral (anterior chamber) injection techniques and dosages, particularly for endophthalmitis management.	-	-	-	-
ii. Needs to know the basics of open sky vitrectomy (anterior segment as management of cataract surgery complication	-	-	-	-
Procedure	Nature of activity * & number			
	O	A	PA	PI
iv. Assist vitrectomy surgeon if facility exists				
k. Keratoplasty				
i. Assisting or doing penetrating keratoplasty (therapeutic, optical)	-	-	-	-
ii. Lamellar keratectomy		-	-	-
i. Glaucoma surgery				
i. Trabeculectomy	-	-	-	-
ii.Trabeculectomy				
iii. Goniotomy				
iv. Cyclocryotherapy and other cyclodestructive procedures	-	-	-	-
m. Surface ocular procedures				
i. Pterygium excision with modifications	-	-	-	-
ii. Conjunctival grafting	-	-	-	-
iii. Biopsy of cornea and conjunctiva	-	-	-	-
iv. Amniotic membrane grafting	-	-	-	-

Procedure	Nature of activity * & number			
	O	A	PA	PI
2. Outpatient:				
a. Manual diagnostic procedures such as syringing, corneal scraping, conjunctival swab collection, conjunctival scraping etc.	-	-	-	-
b. Conjunctival and corneal foreign body removal on the slit lamp	-	-	-	-
c. Chalazion incision and curettage	-	-	-	-
d. Biopsy of small lid and tumours	-	-	3	-
e. Suture removal skin, conjunctival, corneal and corneoscleral	-	-	-	-
f. Subconjunctival injection	-	-	-	-
g. Posterior sub-Tenon's injection	-	-	-	-
h. Artificial eye fitting	-	-	-	-
i. Laser procedures		-	-	-
i. Laser Capsulotomy		-	-	-
ii. Laser iridotomy		-	-	-
iii. Laser trabeculoplasty		-	-	-
iv. Panretinal photocoagulation		-	-	-
v. Focal photocoagulation		-	-	-

* The procedures that the student should have:

O = Washed and observed
A = Assisted the operating surgeon
PA = Performed with Assistance
PI = Performed Independently

Essential Research Skills

1. Basic statistical knowledge

    a. Ability to undertake clinical & basic research
    b. Descriptive and Inferential statistics
    c. Ability to publish results of one's work
2. Ability to constructively criticize publications in the field and without
3. This could be achieved during the course by attending regularly journal clubs etc where selected articles could be taken and evaluated for content quality and presentation.

Other skills required

1. Contact lenses
    a. Assessment
    b. RGP fitting
    c. Soft lens fitting

2. Low vision aids
    a. The basics of fitting with knowledge of availability & cost
3. Community ophthalmology
    a. Ability to organize institutional screening
    b. Ability to organize peripheral eye screening camps
    c. Knowledge and ability to execute guidelines of National Program for Prevention of Blindness
4. Presentation
    a. Ability to present one's work effectively at various scientific for a particularly free papers in scientific conferences within allotted framework of time.
5. Organisation
    a. Ability to organize meetings, seminars and symposia
    b. Ability to get along with colleagues and work as a team with the other members of the department.
    c. Ability to interact with and work as a team with other disciplines that may exist in the same hospital.
6. Communication skills
    a. With patients
    b. With colleagues
7. Record keeping
    a. The ability to maintain record as scientifically as possible
    b. Knowledge of computer software is helpful
8. Teaching
    a. The ability to pass on skills acquired to one's juniors, theoretical, procedural and surgical

Year – wise structured training schedule

First year:

1. Log Book

2. Theoretical knowledge

a. Basic science should be addressed during this period
b. It is useful to have an internal examination of the basic sciences at the end of the first year, which will decide appearance at the final examination.
c. Clinical ophthalmology

3. Clinical examination and diagnostics

a. The basic of history taking, order and correct methods of examination and recording have to be learnt during this time.
b. Clinical and surgical decision making is encouraged under supervision.

4. Diagnostics

a. All procedures in bold should as far as possible be done and the student should be fairly conversant with most of the techniques marked in bold.

5. Surgery

a. Extra ocular surgery including
    i. Destructive procedures must have been done independently with or without assistance
    ii. Local Anaesthesia (retrobulbar and peribulbar blocks)
    iii. Subconjunctival injections
    iv. Assisting for squint surgery
    v. Assisting for lid surgery. Tarsorrhapy should be performed independently as also the simpler oculoplastic procedures.
    vi. Chalazion and Pterygium surgery
    vii. Lid and corneal foreign body removal, suture removal on the slit lamp etc.
    viii. At the end of the first year, the student should have participated as assistant in most of the intra ocular procedures as an assistant.
    ix. Cataract surgery:
        - Cataract surgery should be approached in stages, emphasis to be given on microscopic surgery
        - At the end of the first year, the student should be able to do standard extracapsular cataract extraction at least under guidance.

Second year:

1. Theoretical knowledge:

a. Stress will be laid on clinical ophthalmology

2. Clinical examination and diagnostics

a. The student is encouraged to take diagnostic investigational and therapeutic decisions on his/ own. He/ she should be able to manage most of the common problems that arise without guidance. However, the degree of freedom allowed in decision making is left to the confidence of the teacher in the student's abilities. It is to be encouraged. May require guidance for more complex cases.

3. Diagnostics

a. The student should be conversant and at ease with most if not all the diagnostic procedures outlined in bold. Other procedures are optional skills if facility is available in the department. This is particularly so for th Master's candidate. However, as far as possible, it is advisable to make all such facility available in the department.

4. Surgical skills

a. At the end of the second year, the student should capable of operating, without assistance, but under supervision, all varieties of cataract except congenital cataract. He/ she should also know the management of cataract induced complications and cataract surgical complications (management of vitreous loss.
b. He/ she should have performed the basic antiglaucoma procedures such as trabeculectomy either with assistance or under supervision.
c. Extra ocular surgery such as squint surgery could be performed with assistance.
d. In addition, Lacrimal sac surgery such as dacryocystectomy and dacryocystorhinostomy should be possible with assistance or under supervision.
e. In addition, the Master's candidate should ideally have assisted in the other surgery such as retinal surgery, vitrectomy, orbit surgery, advanced oculoplastic surgery etc.

5. Conferences and workshops

a. The candidate should have attended one or two regional workshops and one nations conference if possible. Presentation of a free paper at these venues is to be encouraged.

6. Submission of Log Book at the end of 2nd year

Third year:

1. Theoretical knowledge:

a. Should be thorough with basic clinical ophthalmology with extensive and intensive reading.

2. Clinical examination and diagnostics

a. Should be conversant with all aspects of clinical examination and decision making. Independent decision making and investigational and management freedom should be given at this stage for the more usual situations. However, complex cases could be discussed with consultant and degree of freedom of decision making is left to the consultant's discretion.

3. Surgical skills

a. Routine skills are honed during this period
b. Cataract surgery should be done independently without supervision or assistance.
c. Antiglaucoma surgery may be done.
d. Can assist other procedures such as Retinal surgery, orbit surgery etc. The choice of doing the surgery with assistance and supervision should be left to the discretion of the consultant.

4. Conferences and workshops

a. The candidate by this time should have attended at least one national conference. He/ she should be given time off to attend regional workshops and conferences particularly those dealing with the state of art.

Rotation and Posting in other Departments

In institutions where subspecilaities are not being usually performed. (eg. VR surgery, orbit surgery etc.), students could be deputed for a month or so in institutions in which these specialities are highly developed.

For an MS student, optional rotation postings to allied departments would include
Plastic Surgery
Neurology / Neurosurgery
Intensive Care
ENT

However, posting to these allied specialities would depend upon the head of department's discretion. The total duration of posting should not exceed 4 months.

Teaching - Learning Activities

1. Clinical Case discussions

a. Every effort should be made to include as wide a variety of cases as possible over two years with multiple repetitions.

b. Case discussions on the patient's records written by the student is to be encouraged as it helps exercise the student's diagnostic and decision making skills.
c. Case presentation at other in-hospital multidisciplinary forum may be done.

2. Seminars

a. Seminars should be conducted at least once weekly. The topics selected should be repeated once in 2 years so as to cover as wide a range of topics as possible.
b. Seminars could be individual presentations or a continuum (large topic) with many candidates participating.
c. Each candidate shall present at least four seminar a year and a total of 12 seminars in 3 years

3. Journal Clubs

a. This also should be a once a week or once in two week exercise. The topics selected should be current. It could be done topic wise or journal wise. Indexed journals are recommended
b. Each candidate shall present journal allotted at least four times in a year and a total of 12 such presentations be made in 3 years

4. CPC

Clinico pathological exercises (CPCs), are useful and should be done.

5. Lectures

a. Lectures to candidates should be in the form of instructional course at the beginning of the academic term. These would include topics such as dark room techniques, fundus fluorescein angiography, evaluation of perimetry, squint evaluation and management, slit lamp examination with accessories such as gonioscopy etc.
b. Lectures could also be arranged round the year on subspecialty topics.
c. During the course, the candidates should have one lecture / one seminar on National programs (eg.National Programme for Control of Blindness, Trachoma program etc.), International assistance schemes for execution of national program (DAN-PCB, Lion's International, Christoffel-Blinden Mission etc). These would be addressed to include a few lectures on other non-ophthalmic National programs being undertaken in the country.

6. Research Activities

A candidate should learn to be conversant with journal browsing, medline search etc. to help in project and clinical and research work.

7. Dissertation & research meetings:

Departmental meetings should be held to overview research work done particularly satisfactory conduct and progress of dissertation topics. These could be conducted once in 3 months either as an additional activity or in lieu of a journal club.

8. Teaching skills:

Every postgraduate student should be involved in undergraduate teaching also. One or two theory classes for undergraduates could be attended and one or two theory classes could be taken for undergraduates for selected topics. Undergraduate clinical teaching is another teaching skill that the student should pick up during one course. At least five to six undergraduate clinical classes should be taken by the final year student (MS) before his/ her course is over. This may be supervised by a consultant if necessary.

9. Orientation program:

All postgraduates from all specialties should have an introductory program in the institution where they are informed about candidate responsibilities, working systems, library usage, lab protocols etc.

Specific orientation regarding the departmental working could be made as an introductory talk in the department concerned.

10. Dissertation or Thesis:

1. The dissertation is aimed to train a postgraduate student in research methods and techniques. It includes identification of problem, formulation of a hypothesis, search and review of literature getting acquainted with recent advances, designing of a research study, collection of data, critical analysis, comparison of results and drawing conclusions. PG students should maintain a log book (rough) from first day and it should be verified in every one or two months. Thesis should be submitted at the end of the second year and it is extendable to 6 more months (ie., upto 2 ½ years)
2. Every candidate shall submit to University in the prescribed proforma, a synopsis containing particulars of proposed dissertation work within six months from the date of commencement of the course on or before the dates notified by the University.
3. Such synopsis will be reviewed and the dissertation topic will be registered by the University. No changes in the dissertation topic or guide shall be made without prior approval of the University.
4. The dissertation should be written under the following headings:
   i. Introduction
   ii. Aims or Objectives of study
   iii. Review of Literature
   iv. Material and Methods
   v. Results
   vi. Discussion
   vii. Conclusion
   viii. Summary
   ix. References

x. Tables
xi. Annexure

5. The written text of dissertation shall be not less than 50 pages and shall not exceed 150pages excluding references, tables, questionnaires and other Checklists. It should be neatly typed in double line spacing on one side of paper (A4 size, 8.27" x 11.69") and bound properly. Spiral binding should be avoided. The dissertation shall be certified by the guide, head of the department and head of the Institution.

6. Four copies of dissertation thus prepared shall be submitted to the University, six months before final examination on or before the dates notified by the University.

7. The dissertation shall be valued by examiners appointed by the University. Approval of dissertation work is an essential precondition for a candidate to appear in the University examination.

8. **Guide:** The academic qualification and teaching experience required for recognition by this University as a guide for dissertation work shall be as per Medical Council of India Minimum Qualifications for Teachers in Medical Institutions regulations, 1998. Teachers in a medical college/ institution having a total of eight years teaching experience out of which atleast five yeas teaching experience as Lecturer or Assistant Professor gained after obtaining postgraduate degree, shall be recognized as postgraduate teachers.

A Co-guide may be included provided the work requires substantial contribution from a sister department or from another medical institution recognized for teaching/ training by the University/ Medical Council of India. The co-guide shall be a recognized postgraduate teacher.

7. **Change of guide:** In the event of a registered guide leaving the college for any reason or in the event of death of guide, guide may be changed with prior permission from the university.

Monitoring of teaching and learning activities

It is essential to monitor the learning progress of each candidate through continuous appraisal and regular assessment. It not only also helps teachers to evaluate students, but also students to evaluate themselves. The monitoring be done by the staff of the department based on participation of students in various teaching/ learning activities. It may be structured and assessment be done using checklist that assess various aspects.

The learning out comes to be assessed should included: (i) Personal Attitudes, (ii) Acquisition of Knowledge, (iii) Clinical and operative skills, (iv) Teaching skills and (v) Dissertation.

i) **Personal Attitudes.** The essential items are:

- Caring attitudes
- Initiative
- Organisation ability
- Potential to cope with stressful situations and undertake responsibility
- Trust worthiness and reliability
- To understand and communicate intelligibly with patients and others
- To behave in a manner which establishes professional relationships with patients and colleagues
- Ability to work in team
- A critical enquiring approach to the acquisition of knowledge

The methods used mainly consist of observation. It is appreciated that these items require a degree of subjective assessment by the guide, supervisors and peers.

ii) Clinical skills

Day to Day work : Skills in outpatient and ward work should be assessed periodically. The assessment should include the candidates' sincerity and punctuality, analytical ability and communication skills

Clinical meetings : Candidates should periodically present cases to his peers and faculty members. This should be assessed using a check list

Clinical and Procedural skills: The candidate should be given graded responsibility to enable learning by apprenticeship. The performance is assessed by the guide by direct observation. Particulars are recorded by the student in the log book.

iv) Teaching skills: Candidates should be encouraged to teach undergraduate medical students and paramedical students, if any. This performance should be based on assessment by the faculty members of the department and from feedback from the undergraduate students

(v) Acquisition of knowledge: The methods used comprise of 'Log book' which records participation in various teaching / learning activities by the students. The number of activities attended and the number in which presentations are made are to be recorded. The logbook should periodically be validated by the supervisors. Some of the activities are listed. The list is not complete. Institutions may include additional activities, if so, desired.

(vi) Work diary / Log book – Every candidate shall maintain a work diary and record his/ her participation in the training programmes conducted by the department such as journal reviews, seminars, etc. Special mention may be made of the presentations by the candidate as well as details of clinical or laboratory procedures, if any conducted by the candidate. The work diary shall be scrutinized and certified by the Head of the

Department and Head of the Institution, and presented in the university practical / clinical examination.

(vii) Periodic tests: The departments may conduct three test, two of them be annual tests, one at the end of first year and the other in the second year. The third test may be held three months before the final examination. The tests may include written papers, practicals / clinicals and viva voce.

Scheme of examination:

1. Theory (Written)

There shall be four question papers, each of three hours duration, carrying 100 marks. Each paper shall consist of two long essay questions each carrying 20 marks and six short essay type of questions each carrying 10 marks.

Details of distribution of topics for each paper will be as follows:

Paper I: I Basic & Applied Sciences (Course Code: U15MSOP01)

CO1: Knowledge of the Anatomy of the eye & orbit

CO2: Knowledge about Ocular physiology

CO3: Knowledge about Ophthalmic pathology

CO4: Knowledge about Microbiology & Immunology
Biochemistry relevant to ophthalmology

CO5: Knowledge about Geometric and ophthalmic optics

The Basic Sciences:

1. **Orbital and Ocular anatomy**
    a. Gross anatomy
    b. Histology
2. Ocular Physiology
    a. Pathology
3. Ocular pathology:
    a. Gross pathology
    b. Histopathology.
4. Biochemistry
    a. General biochemistry,
    b. **Biochemistry applicable to ocular function**.
5. Microbiology
    a. Specific microbiology applicable to the eye
    b. Immunology with particular reference to ocular immunology

Paper II: Optics and Refraction & Ophthalmic Medicine (Course Code: U15MSOP02)

CO1: Knowledge and skill in objective and Subjective Refraction
CO2: Knowledge about various instruments used in optometry
CO3: Knowledge and practical skill in Low vision aid and Contact lens
CO4: Knowledge about optics of various lenses and instruments used in ophthalmology

CO5: Knowledge about various ophthalmic medications there uses mechanism of actions and side effects.

Refraction

Retinoscopy
Streak Retinoscopy
Use of trial set
Use of Jackson's cross-cylinder
Subjective and objective refraction
Subjective refraction in pediatric age group
Prescription of glasses for all types of refractive errors
Use of amsler grid
Use of prism in analyzing squint
Knowledge of manufacture, fitting & dispensing of glasses

Autorefractometry

Use of and interpretation of autorefractometer

Geometric and ophthalmic optics

a. Basic physical optics
b. Ophthalmic optics
c. Applied optics including optical devices

Paper III: Clinical Ophthalmology (Course Code: U15MSOP03)

CO1: Theoritical and Practical knowledge of cataract and its management
CO2: Knowledge and diagnostic skill in Stabismus management. Knowledge about treatment for Strabismus and Amblyopia
CO3: Theoritical and Practical knowledge of glaucoma and its management

CO4: Knowledge about diseases on Sclera, Uvea, Retina and competence in managing them
CO5: Knowledge about Corneal and conjunctival diseases and competence in management

a. Disorders of the Orbit
b. Disorders of the Lids
c. Disorders of the Lacrimal system
d. Disorders of lens
e. Disorders of Glaucoma
f. Disorders of Retina
g. Disorders of the Uvea
h. Orbital tumours
i. Ophthalmological manifestations of systemic diseases

Fundus photography & fundus fluorescein angiography (FFA, FAG)

Doing and evaluating stereoscopic fundus photographs
Performance of and interpretation of FFA
Performance of indirect fluorescein angioscopy
Autofluorescence
Optical Coherence Tomography

Tonometry

Applanation
Indentation (commonly Schiotz)

Assessment of Epiphora

Jone's dye test
Syringing – performance & interpretation

Dry eye evaluation

Schirmer test
Rose Bengal staining
Tear film breakup time
Tear meniscus evaluation

Corneal ulceration

Taking a corneal scraping
Inoculation into media
Evaluation of Gram's stain
Evaluation of KOH preparation

Corneal wedge biopsy

Direct ophthalmoscopy

Distant direct
Media assessment
Use of filters provided

Indirect ophthalmoscopy

Scleral depression
Fundus drawing capability

Diagnosis & assessment of Squint

Ocular position and motility examination
Versions, ductions and vergences
Convergence facility estimation
Cover/ Uncover/ Alternate cover test
Use of prism bars or free prisms in assessment of squint
Use of Synaptophore
Use of Bagolini's striated glasses / red filters / Maddox rod
Use of Worth's four dot test
Use & interpretation of the Hess chart / Lees' screen
Performance & interpretaion of diplopia charting
Diagnosis of amblyopia

Paper IV: Recent Advances (Course Code: U15MSOP04)

CO1: Updated Knowledge in Recent advances in Ophthalmic diagnostic modalities

CO2: Updated Knowledge in Recent advances in Ophthalmic surgeries
CO3: Knowledge about the recent published research papers in ophthalmology
CO4: Knowledge about newer ocular implants
CO5: Knowledge about latest Lasers and its various role in disease management in ophthalmology

a. Recent Advances
b. Systemic ophthalmology
c. Community Ophthalmology
d. Neuroophthalmology

Interpretation of plain skull films

PA-20 (Caldwell's view)
PNS (Water's view)

Lateral
Submentovertical
Optic canal views
Localisation of intra ocular and intra orbital FBs

Interpretations of contrast studies
Performance & interpretation of dacryocystograms
Performance and interpretations of orbital venograms
Interpretation of carotid angiograms

Interpretation of CT –Scan & MRI Scans
Orbital CT interpretation & orbital MRI evaluation
Brain CT interpretation

Understanding of current techniques & specialized investigations
OCT
UBM
ERG / VEP

Soft Skills: (MSOP5) – Elective Course

CO1: Research Methodolgy knowledge
CO2: Communication skills with patients and caregivers.
CO3: Ability to work as a member of a healthcare team.
CO4: Attitude towards constantly updating subject knowledge and skills.

Note : The distribution of chapters / topics shown against the papers are suggestive only.

2. Clinical Examination : 200 marks

1. Long case:

a. Duration : 45 minutes – 1 hour
b. Marks : 50 marks
c. Type of case :

i. Neuro ophthalmology
ii. Proptosis
iii. Sclerokeratouveitis
iv. Uveitis with complications
v. Lens induced complications
vi. Glaucoma

2. Short cases

a. Two short cases of 25 marks each
b. Duration: 10 minutes- 15 minutes

3. Fundus cases

a. Two fundus cases
b. Duration: 10 minutes – 15 minutes each
c. Marks: 25 marks each
d. Type of cases:
   i. Rhegmatogenous retinal detachment
   ii. Diabetic retinopathy, background & proliferative
   iii. Vasculitis
   iv. Tractional RD
   v. Hypertensive retinopathy and combination of the same with DR
   vi. Mass lesions
   vii. High myopia with degeneration
   viii. Coloboma choroids, simple or with detachment
   ix. Posterior uveitis, Retinitis etc.
   x. Pigmentary Retinopathy

4. Refraction:

a. Two refraction cases of 25 marks each

3. Viva voce: 100 marks

a. Students will be examined by all the examiners together about students comprehension of the components of course contents, analytical approach and interpretation of data. This section will carry 80 marks. The examination will include the following:

b. Pedagogy Exercise: (20 Marks)

A topic be given to each candidate before the clinical examination. Each will make a presentation on the topic for 8 to 10 minutes.

c. During the viva-voce discussion on dissertation may be held. No marks are assigned as it would have been evaluated separately.

4. Maximum marks

Theory	Practical	Viva	Grand Total
400	200	100	700

Recommended Books and Journals:

Recommended books:

1. Parson's Diseases of eye
2. Duane's System of Ophthalmology
3. Jakobiec Series
4. Peyman's Series
5. Pathology gross specimens Duke-Elder's System of Ophthalmology
6. American Academy Series
7. Podos & Yanoff Series
8. Jack Kanski: Clinical Opthalmology
9. Cornea:
    a. Smolin & Thoft
    b. Grayson
    c. Kaufman & Leibowitz
10. Glaucoma
    a. Bruce Shields Text Book of Glaucoma
    b. Krupin & Shields Series on Glaucoma
    c. Becker & Schaeffer's Text Book of Glaucoma
    d. Anderson's Computerised Perimetry
    e. Harrington's Text Book of Perimetry
    f. Leiberman and Drake: Computerised perimetry
11. Retinal disease:
    a. Stephen Ryan's Retina
    b. Ron Michel: Retina; Detachment
    c. Steve Charles: Basic Vitrectomy
12. Ultra Sound:
    a. Sandra Byrne & Ronald Green: Ophthalmic Ultrasound
13. Uvea:
    a. Nussenblatt & Palestine
    b. Smith & Nozik
14. Neuroophthalmology:

a. Walsh & Hoyt

15. Orbital disease:
    a. Rootman's diseases of the orbit
    b. Jakobiec & Snow – Diseases of the orbit
16. Tumours:
    a. Jerry Shields – Diagnosis and management of orbital tumours
    b. Jerry shields – Diagnosis and management of ocular tumours
17. Strabismus:
    a. Gunter von Noorden
    b. Mein & Trimble
18. Ophthalmic Pathology:
    a. Yanoff & Fine
    b. Zimmerman
19. Pharmacology:
    a. Havener
20. Anatomy:
    a. Wolff
    b. Snell's
21. Physiology
    a. Adler's Physiology of the eye
22. Biochemistry:
    a. Standard text books
23. Immunology:
    a. Ocular Immunology
24. Paediatric ophthalmology
    a. Keeneth Wright
25. Refraction:
    a. Duke Elder's practice of refraction
    b. Elkington & Frank