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SYLLABUS FOR OPHTHLAMOLOGY
FOR POST-GRADUATE DEGREE COURSE

(MS - Ophthalmology)

DEPARTMENT OF OPHTHALMOLOGY

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1: SYLLABUS OF POST GRADUATE DEGREE & DIPLOMA COURSES IN THE SUBJECT OF M.S (OPHTHALMOLOGY)

1.1: GOALS: -

1.1.1: The goals of post graduate medical education shall be to produce competent specialists and teachers.

1.1.2: Who shall recognize the health needs of the community, and carry out professional obligations ethically and in keeping with the objectives of the national policy.

1.1.3: Who shall have mastered most of the competencies, pertaining to the speciality, that are required to be practiced at the secondary and the tertiary levels of the health care delivery system;

1.1.4: Who shall be aware of the contemporary advance and developments in the discipline concerned;

1.1.5: Who shall have required a spirit of scientific inquiry and is oriented to the principles of research methodology and epidemiology;

1.1.6: Who shall develops skills as a self-directed learner, recognize continuing education needs; select & use appropriate learning resources.

1.1.7: Who shall learn basic concepts of research methodology & epidemiology and be able to critical analyze relevant published research literature.

LEARNING OBJECTIVES

Programme Objectives

The clinical post graduate training programmes are intended at developing in a student a blend of qualities that of a clinical specialist, a teacher and a researcher. These programmes are organized such that a post graduate student should possess the following qualities, knowledge and skills:

a. The student should possess basic knowledge of the structure, function and development of the human body as related to ophthalmology, of the factors which may disturb these mechanisms and the disorders of structure and function which may result thereafter.

b. The student should be able to practice and handle most day-to-day problems independently in ophthalmology. The student should recognize the limitations of his/her own clinical knowledge and know when to seek further help.

c. The student should understand the effects of environment on health and be familiar with the epidemiology of at least the more common diseases in the field of ophthalmology.

d. The student should be able to integrate the preventive methods with the curative and rehabilitative measures in the comprehensive management of the disease.

e. The student should be familiar with common eye problems occurring in rural areas and be able to deal with them effectively.

f. The student should also be made aware of Mobile Ophthalmic Unit and its working and components.

g. The student should be familiar with the current developments in Ophthalmic Sciences.

h. The student should be able to plan educational programmes in Ophthalmology in association with senior colleagues and be familiar with the modern methods of teaching and evaluation.

i. The student should be able to identify a problem for research, plan a rational approach to its solution, execute it and critically evaluate his/her data in the light of existing knowledge.

j. The student should reach the conclusions by logical deduction and should be able to assess evidence both as to its reliability and its relevance.
k. The student should have basic knowledge of medico-legal aspects of medicine.
l. The student should be familiar with patient counseling and proper consent taking.

COMPETENCIES

A post graduate student upon successfully qualifying in the M.S. (Ophthalmology) examination should be able to:
a) Offer to the community, the current quality of 'standard of care' in ophthalmic diagnosis as well as therapeutics, medical or surgical, in most of the common situations encountered at the level of health services.
b) Periodically self assess his or her performance and keep abreast with ongoing advances in the field and apply the same in his/her practice.
c) Be aware of her/his own limitations to the application of the specialty in situations, which warrant referral to more qualified centers or individuals.
d) Apply research and epidemiological methods during his/her practice. The post graduate student should be able to present or publish work done by him/her.
e) Contribute as an individual/group towards the fulfillment of national objectives with regard to prevention of blindness.
f) Effectively communicate with patients or relatives so as to educate them sufficiently and give them the full benefit of informed consent to treatment and ensure compliance.

At the end of the course, the student should have acquired knowledge in the following:

A. Cognitive domain
Basic Medical Sciences:
- Attain understanding of the structure and function of the eye and its parts in health and disease.
- Attain understanding and application of knowledge of the structure and function of the parts of Central Nervous System and other parts of the body with influence or control on the structure and function of the eye.
- Attain understanding of and develop competence in executing common general laboratory procedures employed in diagnosis and research in Ophthalmology.

1. Clinical Ophthalmology:
Given adequate opportunity to work on the basis of graded responsibilities in outpatients, inpatient and operation theatres on a rational basis in the clinical sections from the day of entry to the completion of the training programme, the students should be able to:
- Acquire scientific and rational approach to the diagnosis of ophthalmic cases presented.
- Acquire understanding of and develop inquisitiveness to investigate to establish cause and effect of the disease.
- To manage and treat all types of ophthalmic cases.
- To competently handle and execute safely all routine surgical procedures on lens, glaucoma, lid, sac, adnexa, retina and muscle anomalies.
- To competently handle all ophthalmic medical and surgical emergencies.
- To be familiar with micro-surgery and special surgical techniques.
- To demonstrate the knowledge of the pharmacological (including toxic) aspects of drugs used in ophthalmic practice and drugs commonly used in general diseases affecting the eyes.

2. Refraction:
- Acquire competence in assessment of refractive errors and prescription of glasses for all types of refraction problems.
- Acquire basic knowledge of manufacture and fitting of glasses and competence of judging the accuracy and defects of the dispensed glasses.

3. Ophthalmic super-specialties:

Given an opportunity to work on a rotational basis in various special clinics of sub-specialties of ophthalmology, if possible, the student should be able to:
- Examine, diagnose and demonstrate understanding of management of the problems of neuro-ophthalmology and refer appropriate cases to neurology and neuro-surgery.
- Examine, diagnose and demonstrate understanding of management of (medical and surgical) complicated problems in the field of (a) lens, (b) glaucoma, c) cornea, (d) retina, (e) pediatric ophthalmology, (f) oculoplasty, (g) uvea, and (I) genetic problems in ophthalmology.
- To demonstrate understanding of the manufacture, and competence in prescription and dispensing of contact lenses and ocular prosthesis.

5. Ophthalmic pathological/microbiological/biochemical sciences
- Be able to interpret the diagnosis in correlation with the clinical data and routine materials received in such cases.

6. Community Ophthalmology
Eye camps may be conducted where the PG students are posted for imparting training to according to a set methodology. The community and school surveys may also be conducted by the post graduate students. The post graduate students are given an opportunity to participate in surveys, eye camps. They should be able to guide rehabilitation workers in the organisation and training of the blinds in art of daily living and in the vocational training of the blind leading to gainful employment.

7. Research :
- Recognise a research problem.
- State the objectives in terms of what is expected to be achieved in the end.
- Plan a rational approach with appropriate controls with full awareness of the statistical validity of the size of the material.
- Spell out the methodology and carry out most of the technical procedures required for the study.
- Accurately and objectively record on systematic lines results and observation made.
- Analyze the data with the aid of an appropriate statistical analysis.
- Interpret the observations in the light of existing knowledge and highlight in what ways the study has advanced existing knowledge on the subject and what further remains to be done.
- Write a thesis in accordance with the prescribed instructions.
- Write at least one scientific paper as expected of International Standards from the material of this thesis.

B. Affective Domain:
1. Should be able to function as a part of a team, develop an attitude of cooperation with colleagues, and interact with the patient and the clinician or other colleagues to provide the best possible diagnosis or opinion.
2. Always adopt ethical principles and maintain proper etiquette in dealings with

patients, relatives and other health personnel and to respect the rights of the patient including the right to information and second opinion.
3. Develop communication skills to word reports and professional opinion as well as to interact with patients, relatives, peers and paramedical staff, and for effective teaching.

C. Psychomotor domain
At the end of the course, the student should acquire following clinical skills:
Essential diagnostic skills:
I. Examination techniques along with interpretation
1. Slit lamp Examination
i. Diffuse examination
ii. Focal examination
iii. Retroillumination – direct and indirect
iv. Sclerotic scatter
v. Specular reflection
vi. Staining modalities and interpretation
2. Fundus evaluation
Direct/Indirect ophthamoscopy
Fundus drawing
3-mirror examination of the fundus
78-D/90-D/60-D examination
Amsler's charting

II. Basic investigations along with their interpretation

1. Tonometry
Tonometry - Applanation/Identation/Non-contact

2. Gonioscopy
Gonioscopy grading of the anterior chamber angle

3. Tear/ Lacrimal function tests
i. Staining- fluorescein and Rose Bengal
ii. Schirmer test/tear film break up time
iii. Syringing
iv. Dacrocystography

4. Corneal
Corneal scraping and cauterization
Smear preparation and interpretation (Gram's stain /KOH)
Media inoculation
Keratometry - performance and interpretation
Pachymetry
Corneal topography interpretation

5. Colour Vision evaluation
Ishihara pseudoisochromatic plates
Farnsworth Munsell, if available

6. Refraction
i. Retinoscopy- Streak/ Priestley Smith
ii. Use of Jackson's cross-cylinder

iii. Subjective and objective refraction
iv. Prescription of glasses

7. Diagnosis and assessment of Squint

i. Ocular position and motility examination
ii. Synoptophore usage
iii. Lees screen usage
iv. Diplopia charting
v. Assessment of strabismus - cover tests/prisms bars
vi. Amblyopia diagnosis and treatment
vii. Assessment of convergence, accommodation, stereopsis, suppression

8. Exophthalmometry
Usage of Hertel's exophthalmometer - proptosis measurement

9. Contact lenses
Fitting and assessment of RGP and soft lenses
Subjective verification of over refraction
Complications arising of contact lens use
Educating the patient regarding CL usage and imparting relevant knowledge of the complications arising thereon

10. Low Vision Aids
Knowledge of basic optical devices available and relative advantages and disadvantages of each.
The basics of fitting with knowledge of availability & cost

III. The post graduate must be well versed with the following investigative modalities although the student may or may not perform it individually. But, she/he should be able to interpret results of the following tests:
1. Fundus photography
2. Fluorescein angiography
3. Ophthalmic ultrasound A-scan/B scan
4. Automated perimetry for glaucoma and neurological lesions
5. Radiological tests - X rays - Antero posterior/ Lateral view
PNS (Water's view) / Optic canal views
Localisation of intra-ocular and intra-orbital FBs
Interpretations of -USG/ CT/ MRI Scans
6. OCT and UBM
7. ERG, EOG, and VEP

IV. Minor surgical procedures – Must know and perform independently
Conjunctival and corneal foreign body removal on the slit lamp
Chalazion incision and curettage
Pterygium excision
Biopsy of small lid tumours
Suture removal- skin/conjunctival/corneal/ corneoscleral
Tarsorrhaphy
Subconjunctival injection
Retrobulbar, parabulbar anaesthesia
Posterior Sub-Tenon's injections
Artificial eye fitting

V. Surgical procedures

1. Must know and can perform independently
a. Ocular anaesthesia:
Retrobulbar anaesthesia
Peribulbar anaesthesia
Facial blocks- O'Brein / Atkinson/Van lint and modifications
Frontal blocks
Infra orbital blocks
Blocks for sac surgery
2. Must be able to independently perform and deal with complications arising from the following surgeries :
Lid Surgery - Tarsorrhaphy
Ectropion and entropion
Lid repair following trauma
Epilation
Destructive procedures
Evisceration with or without implant
Enucleation with or without implant
Sac surgery
i. Dacryocystectomy
ii. Dacryocystorhinostomy
iii. Probing for congenital obstruction of nasolacrimal duct
Strabismus surgery
Recession and resection procedures on the horizontal recti.
Orbit surgery
Incision and drainage via anterior orbitotomy for abscess
Cyclocryotherapy/Cyclophotocoagulation
3. PG Students should be well conversant with use of operating microscope and must be able to perform the surgeries listed below competently under the same:
Cataract surgery
i. Standard ECCE (extracapsular cataract extraction; first year) with or without IOL implantation
ii. Small incision ECCE with or without IOL implantation and/or Phacoemulsification with PC IOL implantation
iii. Intracapsular cataract extraction (second year)
iv. Cataract with Phacoemusification (third year)
v. Secondary AC or PC IOL implantation
Vitrectomy/Scleral buckling
Intra-vitreal and intra-cameral (anterior chamber) injection techniques and doses of drugs for the same
Needs to know the basis of open sky vitrectomy (anterior segment) as well as management of cataract surgery complications.
Assisting vitrectomy and scleral buckling procedures
Ocular surface procedures
Pterygium excision with modifications
Conjunctival cyst excision/foreign body removal
Corneal foreign body removal
Conjunctival flap/ peritomy
Glaucoma
Trabeculectomy
Corneal
Repair of corneo - scleral perforations
Corneal suture removal
Application of glue and bandage contact lens
4. Should have performed/assisted the following microscopic surgeries

i. Keratoplasty
Therapeutic and optical
ii Glaucoma surgery
Pharmacological modulation of trabeculectomy
Trabeculotomy
Goniotomy
Glaucoma valve implant surgery
5. Desirable to be able to perform following laser procedures
   Yag Capsulotomy
   Laser iridotomy
   Focal and panretinal photocoagulation
6. Should have assisted/knowledge of Keratorefractive procedures

Operations:
The PG is provided with an opportunity to perform operations both extra-ocular and intra-ocular with the assistance of the senior post graduate students and/or under the direct supervision of a faculty member. The student is provided with an opportunity to learn special and complex operations by assisting the senior post graduate student or the faculty in operations of cases of the specialty and be responsible for the postoperative care of these cases.
In **first phase**, the post graduate student is given training in preparations of cases for operation, pre-medication and regional anaesthetic blocks.
In the **next phase**, the postgraduate student assists the operating surgeon during the operations.
In the **third phase**, the post graduate student operates independently assisted by senior post graduate student or a faculty member.

Surgical Skills of PG students to be assessed as per OSCAR Score

1.3: INTEGRATION OF TEACHING

1.3.1: Postgraduate Medical Education in broad specialities shall be of three years duration in the case of degree course and two years in the case of Diploma course after MBBS and in the of super specialities the duration shall be of 3 years after MD/MS with the exceptions wherever indicated.
1.3.2: Postgraduate curriculum shall be competency based.
1.3.3: Learning in postgraduate programme shall be essentially autonomous and self-directed.
1.3.4: A combination of both formative and summative assessment is vital for the successful completion of the PG programme.
1.3.5: A modular approach to the course curriculum is essential for achieving a systemic exposure to the various sub-specialities concerned with a discipline.

2: TRAINING SCHEDULE: -
2.1: The period of training for MS shall be three years viz. 6 academic terms of 6 months each after registration as Post-Graduate Student.
2.2: The period of training for DOMS course will be two years viz. 4 academic terms of 6 months each after registration as Post–Graduate student.
2.3: No exemption/concession in the above-mentioned period of training shall be granted.

TEACHING AND LEARNING METHODS
The theoretical knowledge is imparted to the post graduate student through distinct courses of lecture demonstrations, seminars, symposia and inter- and intradepartmental meetings. The students are exposed to recent advances through discussions in journal clubs and participation in CMEs, and symposia.

The post graduate students are imparted clinical training in several ways:

1. ***Group Discussion***

The junior post graduate students may present the symposium to their senior postgraduates where it is fully discussed before finally being discussed in front of the faculty or senior eye specialists. A free and fair discussion is encouraged. These discussions enable the post graduate students to prepare for a general discussion in the class.

2***. Clinical Case discussion***

a. Bedside discussion on the rounds and outpatient teaching take their toll with patient management. Therefore in addition to these, clinical case discussions should form part of a department's schedule at a fixed time every week. This could range from 1-2 hours and could be held at least once a week. Every effort should be made to include as wide a variety of cases as possible over three years with multiple repetitions. Problem oriented approach is better as it aids in decision making skills.

b. In addition to bedside teaching rounds, at least 5-hr of formal teaching per week are necessary.

c. Consultant case presentation is another approach which should be encouraged as it aids in solving complex problems and also is forum for discussion of interesting cases.

d. 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. It also helps the consultant in critical evaluation of the student's progress academically.

e. Case presentation at other in-hospital multidisciplinary forums.

f. The postgraduate students shall be required to participate in the teaching and training programme of undergraduate students and interns.

g. Department should encourage e-learning activities.

3. Seminars

Seminars should be conducted at least once weekly. The duration should be at least one hour. The topics selected should be repeated once in 3 years so as to cover as wide a range of topics as possible. Seminars could be individual presentations or a continuum (large topic) with many post graduate students participating.

4. Journal clubs

Journals are reviewed in particular covering all articles in that subject over a 6 months period and are discussed by the post graduate student under the following headings.

1) Aim 2) Methods 3) Observations

4) Discussions and 5) Conclusions

The post graduate student to whom the journal is allotted presents the journal summaries to the senior postgraduates. They are expected to show their understanding of the aspects covered in the article and clarify any of the points raised in the article, offer criticisms and evaluate the article in the light of known literature.

5. A postgraduate student of a postgraduate degree course would be required to present one poster presentation, to read one paper at a national/state conference and to present one research paper which should be published/accepted for publication/sent for publication during the period of his postgraduate studies so as to make him eligible to appear at the postgraduate degree examination.

6. Out-Patients: For the first six months of the training programme, post graduate students may be attached to a faculty member to be able to pick up methods of history taking and ocular examination in ophthalmic practice. During this period the post graduate student may also be oriented to the common ophthalmic problems. After 6 months, the clinical post graduate student may work

independently, where he receives new and old cases including refractions and prescribes for them. The post graduate students are attached to a senior post graduate student and faculty member whom they can consult in case of difficulty.

7. Wards: Each post graduate student may be allotted beds in the in-patient section depending upon the total bed capacity and the number of the post graduates. The whole concept is to provide the post graduate student increasing opportunity to work with increasing responsibility according to seniority. A detailed history and case record is to be maintained by the post graduate student.

8. Rotations: Specialty clinics

The student may rotate in the following subspecialty clinics:

Anterior segment and cataract
Glaucoma
Oculoplastics
Paediatric ophthalmology and strabismus
Retina and Uvea
Cornea, Contact lens and low vision
Neuroophthalmology
Refractive Clinic

9. Practicals in Ocular Histopathology

The post graduate students may be provided with fully stained slides of the ocular tissues along with relevant clinical data and discuss the diagnosis and differential diagnosis on the basis of the information provided

10. Attend accredited scientific meetings (CME, Symposia, and Conferences).

11. Additional sessions on basic sciences, biostatistics, research methodology, teaching methodology, hospital waste management, health economics, medical ethics and legal issues related to ophthalmology practice are suggested.

13. Maintenance of **log book**: Log books shall be checked and assessed periodically by the faculty members imparting the training.

During the training programme, patient safety is of paramount importance; therefore, skills are to be learnt initially on the models, later to be performed under supervision followed by performing independently; for this purpose, provision of surgical skills laboratories in medical colleges is mandatory.

METHODS OF TRAINING: -

The training of Post-Graduate for Degree/Diploma should be of the Residency pattern with patient care. The participation of the students in all facets of the educational process i.e. lectures, lecture-demonstration, symposia, seminars, journal clubs etc. should be insisted upon and training in basic medical sciences and laboratory and experimental work emphasized.

Candidate pursuing Degree/Diploma courses should work in the concerned department of the Institution for the full period on a full time basis.

In organization of Post-Graduate training, Clinical, Practical, laboratory, Clinico-Pathological conferences, post-mortem work, seminars, etc. and facilities offered by other Clinical and Basic Sciences department should be made available to Post-Graduate students. The co-ordination Committee of the college will be responsible to implement a coordinated Post-Graduate training programme of lectures, lecture-demonstration, group discussions, seminars, clinical meetings, clinico-pathological programmes etc. The Post-Graduate departments should submit the departmental programme at the beginning of each academic term to the Co-ordination committee for approval.

During the course of studies the department should so arrange the training that the student should see large number of clinical cases, perform all types of minor and cataract operations & assist in all types of major eye operations so that at the end of the training period the student has acquired the knowledge and skills expected from a specialist in the field of ophthalmology.

The Post-Graduate students are required to keep record of their clinical, laboratory, operative work, etc., countersigned by teachers under whose guidance the work was done.

The Post-Graduate students should do emergency duties, night duties and attend work in causalities and wards pertaining to ophthalmology.

During the period of clinical training the Post-Graduate student should maintain regular contact with his/her thesis guide and while doing clinical training should continue the research work.

80% attendance in the clinical posting is mandatory for grant of terms. The Post-Graduate students must keep record of work done. The Head of the Department is required to submit to the University through the Dean six monthly report of the work of the candidates.

4: POST GRADUATE TRAINING SCHEDULE:

- The student must be kept abreast with the latest development in the field of medicine particularly in their own subject.
- The teaching programme should be divided into following subheads to achieve team work as well as confidence in independent presentation.
- Symposium - once a month by a team.
- Seminar - once in two week by individual.
- Journal club: once in two week
- Long case presentation - once a week
- Short & spot case discussions- once a week
- Histo-pathological slides discussion - once in two week
- Lecture demonstration by the faculty - once a month
- Grand round of the wards - once a week
- Theory test – once a month

FORMATIVE ASSESSMENT, ie., during the training

General Principles

Internal Assessment should be frequent, cover all domains of learning and used to provide feedback to improve learning; it should also cover professionalism and communication skills. The Internal Assessment should be conducted in theory and clinical examination.

Quarterly assessment during the MS training should be based on following educational activities:

1. Journal based / recent advances learning
2. Patient based /Laboratory or Skill based learning
3. Self directed learning and teaching
4. Departmental and interdepartmental learning activity
5. External and Outreach Activities / CMEs

SUMMATIVE ASSESSMENT, ie., assessment at the end of training

The summative examination would be carried out as per the Rules given in **POSTGRADUATE MEDICAL EDUCATION REGULATIONS, 2000.**

The Post Graduate examination shall be in three parts:

1. THESIS/DISSERTATION:

Aims: To instil spirit of scientific enquiry

Objectives: To teach the basic concept of research methodology& epidemiology , to train the student to critically analyze relevant published research papers

General Guidelines:

The thesis/dissertation is compulsory for candidates registered for M.S.

The subject of thesis along with a synopsis (about 200 words) countersigned by the Post Graduate teacher, Head of the Department and the Head of the Institution should be submitted to the University within 4 months of registration as Post- Graduate student. A penalty of Rs 50/- will be levied after the due date.

The subject and plan of work of the thesis should not be same as that of a thesis, which has been accepted by the University in the past three years.

If a work required for the thesis entails collaboration with other department or specialties, the collaborative portion of work will be supervised by a co- guide designated by the Head of the institution. A co-guide should normally be a Post-Graduate teacher in his own specialty. In cases where there is guide and a co-guide for a thesis, the certificate required for submission of the thesis should be signed both by the guide and the co-guide.

The subject of thesis should as far as possible reflect the research priorities of the Post-Graduate department where the work is being done. The Dean of the college while submitting the topic of thesis to the University for approval should make sure that the institution provides all facilities for the research work.

The candidate should submit to the University six monthly progress report of thesis and his other Post-Graduate work through his Post-Graduate teacher, Head of the Department and the Head of Institution.

If the progress of a candidate's work including thesis work is not satisfactory, the University on recommendation of Head of the Department, Head of the Institution and the Dean of faculty of Medicine may not grant that particular term and the period of training will be extended by the number of terms not granted.

Should be submitted to the University 6 months before the date of written, oral, clinical, practical examination. Approval of thesis is a precondition for permission to appear in the rest of the examination.

The thesis will be examined for acceptance by two examiners one internal and one external who shall not be examiner for the theory and clinical examination. Each will assign marks out of 100. The examiners will send the marks directly to the University. To qualify for appearing in the theory, clinical and practical parts of the exam. Candidate must receive a minimum of 50 marks out of 100 from each examiner. Thesis marks however, will not be taken into consideration in the final mark sheet.

If a student has submitted his examination form as also his thesis previously, he will be permitted to take examination within a period of 4 years any time in future provided the thesis has been accepted. The terms satisfactorily kept by him/her are valid in future, only for a period of 4 years subsequent to submission of his/her thesis after which he/she will have to undergo Post-Graduate training again for 4 terms to be eligible for appearing for the theory, clinical and practical examination.

9: METHOD OF EVALUATION OF STUDENTS :

DETAILED SYLLABUS:

Syllabus for PG in ophthalmology is attached as appendix "A" to this letter**.**

1. Theory Examination:

The examinations shall be organised on the basis of 'Grading'or 'Marking system' to evaluate and to certify post graduate student's level of knowledge, skill and competence at the end of the training. Obtaining a minimum of 50% marks in 'Theory' as well as 'Practical' separately shall be mandatory for passing examination as a whole. The examination for MS shall be held at the end of 3rd academic year. An academic term shall mean six month's training period.

There shall be four theory papers.

TITLE OF THE THEORY PAPERS WITH CONTENTS (M.S.)

Paper I: Basic Sciences in Relation to Ophthalmology:	3 Hrs	100 Marks
Paper II: Opthalmic Medicine and Surgery	3 Hrs	100 Marks
Paper III: Ophthtalmology in Relation to Medicine & Surgery and Community Ophthalmology	3 Hrs	100 Marks
Paper IV: Recent Advances in Ophthalmology	: 3 Hrs	100 Marks
	TOTAL MARKS	400

(Questions should be self explanatory & exhaustive)

PATTERN OF THEORY PAPERS: - for (M.S.**)**

Paper - I to IV

		M.S.
(a) Section 1 :- 2 LAQ	25X 2	= 50
(b) Section 2:- 5 Short Questions	10 X 5	= 50
Total		**100**

Total marks for theory for MS 400

2. PRACTICAL:

Clinical Cases: -

		M.S.
(a) Structured long case	1	100 marks
(b) Short case	2	50 marks each =100
(c) Ward rounds -	4	25 marks each=100

4 cases (25 marks each)

(A spectrum of pre –operative, post-operative and emergency case scenarios)

Marks Distribution for clinical cases -

	Anterior Segment	Fundus
(a) Clinical Findings +Diagnosis	25	25
(b) Management & Discussion	15	15
(c) Over All Professional Competence	10	10

Viva :-

	M.S.
(a)Instruments & Surgical Viva -	25 Marks
(b)Optics & Refraction -	25 Marks
(c)Special Investigations Specimen, Slides, & X-rays, ultrasound B scan , CT scan, MRI -	25 Marks
(d) Ocular Therapeutics -	25 Marks
Total	**100 Marks**

- **Clinical cases 300, Viva100, total marks 400 for MS (Ophthalmology)**

9: METHOD OF EVALUATION OF STUDENTS :

Nil suggested as common scheme of evaluation of student have already been formed & approved by faculty of medicine as mentioned in your letter. However internal assessment scheme is recommended as below:

Internal Assessment Protocol

There should internal assessment at the end of each semester for degree students.
The marks allotted in each semester out of total 80 should be as follows :

MS

	THEORY	PRACTICAL	OVERALL PERFORMANCE	TOTAL MARKS
AT THE END OF 1st YEAR	10	10	5	25
AT THE END OF 2nd YEAR	10	10	5	25
AT THE END OF 3rd YEAR	10	10	10	30
TOTAL				80

Appendix A

SUGGESTED SYLLABUS OF POST GRADUATE COURSE IN OPHTHALMOLOGY

1: PAPER I - Basic Sciences in Relation to Ophthalmology:

1.2.1: ANATOMY

(a). Anatomy & embryology of the eye
(b). Anatomy of orbit
(c). Anatomy of ocular adnexae
(d). Extraocular muscles action & nerve supply

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1.2.2: PHYSIOLOGY

(a). Ocular circulation
(b). Ciliary epithelium & aqueous humour dynamics
(c). Intraocular pressure
(d). Accommodation & Presbyopia
(e). Pupil
(f). Color vision
(g). Central visual pathways
(h). Binocular vision
(i). Physiology of vision.

1.2.3 : Ocular Pathology
1.2.4 : Ocular Biochemistry
1.2.5 : Ocular Micro -Biology
1.2.6 : Immunology with particular reference to Ocular Immunology
1.2.7 : Genetics in Ophthalmology
1.2.8 : Ocular Oncology

1.2.9: OPTICS & REFRACTION

(a) Physical optics
(b) Geometric optics & clinical refraction
(c) Applied optics including optical devices
(d) Disorders of Refraction
(e) Contact lenses.
(f) Low vision.
(g) Aberrations

2: PAPER II - : Opthalmic Medicine and Surgery

2.1: Diseases Of The Eye

2.1.1: Anterior Segment Diseases.

a) Disorders of the conjunctiva
b) Disorders of the ocular adnexa
c) Corneal diseases
d) Eye banking & keratoplasty
e) Disorders of the Sclera
f) Disorder of the lacrimal system
g) Disorder of the Uval tract
h) Lens, cataract & its management.
i) Intraocular lenses.
j) Glaucoma.

2.1.2: Posterior Segment Diseases

a) Hereditary retinal & choroidal diseases.
b) Acquired macular diseases
c) Retinoblastoma & leukokoria
d) Diabetic retinopathy.

e) Vascular anomalies of the Retina.
f) Peripheral retinal neovascularization.
g) Vitreal diseases.
h) Disorders of the Optic Nerve & Visual Pathway
i) Congential anomalies & Intraocular tumours.

2.2: Diseases Of The Orbit

2.2.1: Orbital & Adnexa Tumours: -

a) Orbital tumours & treatment
b) Tumours & related lesion of the eyelid & conjunctiva

2.3: Oculoplasty

2.3.1: Basic occulopastic surgery
2.3.2: Enucleation & evisceration
2.3.3: Craniofacial anomalies
2.3.4 : Strabismus & Amblyopia

2.4: Paediatric Ophthalmology
2.5: OCULAR EMERGENCY & TRAUMA
2.6: OCULAR ANAESTHESIA & SURGERIES

2.6.1: Anaesthesia

a) Surface, infiltration, regional anesthesia
b) Premedication, sedation for local anesthesia
c) Premedication for general anesthesia
d) Akinesia & intraocular tension during anesthesia
e) Cardio pulmonary complication with anesthesia
f) Cardiac arrest & local anaesthetic emergency

2.6.2: Operative Surgeries

2.7: OCULAR THERAPEUTICS & TOXICITY

2.7.1: OCULAR DIAGNOSTIC & OPERATIVE INSTRUMENT

i) Radiology in ophthalmologic diagnosis.
ii) Ultrasonography – A scan & B scan.
iii) Fluorescein angiography.
iv) ERG & EOG.
v) Pachymeter.
vi) Autoperimeter.
vii) Autorefractometer.
viii) Applantion tonometery.
ix) Direct Ophthalmoscope.
x) Indirect ophthalmoscope.
xi) VEP.
xii) Operating microscope.
xiii) Slit lamp.
xiv) Keratometer.

xv) Specular microscope.

3: PAPER III - Ophthtalmology in Relation to Medicine & Surgery and Community Ophthalmology

3.1: Ophthalmology Related To Medicine & Surgery And Community / Ophthalmology

3.1.1: Ocular Manifestations Of Systemic Diseases:

a. Diabetes mellitus.
b. Hypertension.
c. Infectious diseases like: - aids, tuberculosis, sarcodosis, leprosy, etc.
d. Haemotological diseases.
e. Connective tissue disorders.
f. Hyperlipoproteinemias, amyloidosis.
g. Immune Ocular Disorders

3.1.2: Inborn metabolic disorders & the eye.

3.1.3: Genetics & eye diseases.

3.1.4: Retinal vascular occlusions.

3.1.5: Neuro-ophthalmology.

a) Ophthalmic manifestation of brain tumours.
b) Ophthalmic manifestation of vascular diseases of brain.
c) Optic nerve disease.
d) Migraine.

3.1.6: Community Ophthalmology & National Programmes

4: PAPER IV - Recent Advances in Ophthalmology

4.1: Recent Trends / Advances In Ophthalmology

4.1.1: Recent Advances In Surgical Management Of Cataract.
a) Phacoemulsification.
b) Newer intraocular lens implant.
4.1.2: Recent advances in diagnostic procedures, medical & surgical management of glaucoma.
4.1.3: Recent advances in lasers in ophthalmology
4.1.4: Recent advances in vitreous substitutes & perfluorocarbons.
4.1.5: Recent advances in retinal detachment surgery.
4.1.6: Recent advances in ultrasonography.
4.1.7: Recent advances in indocyanine green angiography
4.1.8: Recent advances in optical coherence tomography.
4.1.9: Newer antibiotics, antifungals & antivirals.
4.1.10:AntiVEGF therapy

Recommended Reading:

Books (latest edition)

1. Ophthalmic Surgery: Principles and Techniques. Blackwell Science.
Albert DM.
2. Principles and Practice of Ophthalmology. Albert DM, Jakobiec. W B Saunders
3. Principles & Practice of Ophthalmology. Gholam A Paymen
4. The Current American Academy of Ophthalmology Basic and Clinical Science Course (13 volumes)
5. Duke Elder's Practice of Refraction. Abrams D. Churchill Livingstone.
6. Text book of Ophthalmology. Yanoff and Duker
7. Retina. Stephen J Ryan:
8. Ophthalmic Ultrasound: Sandra Byrne and Ronald Green.
9. Cornea: Fundamentals, Diagnosis, and Management. Krachmer JH, Mannis MJ, Holland EJ. Mosby Elsevier.
10. Ophthalmology. Yanoff N, Duker JS. Mosby Elsevier.
11. Review of Ophthalmology. Friedman NJ, Kaiser PK, Trattler WB. Elseview Saunders, Philadelphia.
12. Corneal Transplantation. Vajpayee RB. Jaypee Brothers Medical Publishers (P) Ltd, New Delhi.
13. Fundamentals of Clinical Ophthalmology Series. Coster D. Cornea. Blackwell Publishing Limited.
14. The Contact Lens Manual. A practical guide to fitting. Gasson A, Morris A J. Butterworth Heinemann Elsevier.
15. Steinert's cataract surgery.
16. Shields Text book of glaucoma
17. Smith and Nozik : Uvea
18. Rootman's diseases of the orbit
19. Eyelid, conjunctival and orbital tumors. An atlas and textbook. Shields JA, Shields CL. Philadelphia: Lippincott Williams & Wilkins.
20. Intraocular tumors. An atlas and textbook. Shields JA, Shields CL.
21. Pediatric Ophthalmology. Taylor and Hoyt: Saunders Ltd.
22. Management of Strabismus and Amblyopia. Pratt-Johnson and Tilson: Thieme Verlag.
23. Handbook of Pediatric Eye and Systemic disease. Wright, Spiegel and Thompson.
24. BinocularVision and Ocular Motility. Theory and Management of Strabismus. Von Noorden GK. Mosby.
25. Surgical Management of Strabismus. Helveston:
26. Strabismus: A Decision Making Approach. Von Noorden and Helveston:
27. Thyroid Eye Diseases. Char DR. Williams and Wilkins, Baltimore.
17
28. A Manual of Systematic Eyelid Surgery.Collin JRO (ed). Churchill Livingstone, Edinburgh.
29. Refractive Surgery. Agarwal A, Agarwal A, Jacob Soosan. Jaypee.
30. LASIK Complications, Prevention and management. Gimbel HV, Penno EEA. Slack Inc.
31. Management of Complications of Refractive Surgery. Alio JL, Azar DT. Springer.
32. Quality of Vision: Essential Optics for the Cataract and Refractive Surgeon. Holladay JT. Slack Inc.
33. Ocular Pharmacology: Havener
34. Anatomy: Wolff 's Anatomy of the Eye and Orbit
35. Physiology: Adler's Physiology of the Eye

36. Textbook of Ophthalmology (2 volumes). Easty DL, Sparrow JM.Oxford Oxford Medical Publications.
37. The Eye. Basic Sciences in Practice. Forrester JV, Dick AD, McMenamin PG, Lee WR. W B Saunders.
38. A Stereoscopic Atlas of Macular Diseases: Diagnosis and Treatment. Gass JDM.
39. Neuroophthalmology. Glaser JS. LipincottWilliams & Wilkins. .
40. Clinical Ophthalmic Pathology. Harry J, Misson G. Butterworth/Heinemann.
41. Inherited Retinal Diseases. A Diagnostic Guide. Jimenez Sierra JM, Ogden TE, Van Boemel GB. Mosby.
42. Clinical Ophthalmology. Kanski JJ. Butterworth/Heinemann.
43. ABC of Resuscitation. Colquhoun, M. C., Evans, T. R., Handley, A. J. BMJ Publishing Group.
44. Walsh and Hoyt's Clinical Neuroophthalmology (5 volumes). Miller NR, Newman NJ, Williams and Wilkins.
45. The human eye. Oyster CW Sinauer Associates. Sunderland. Massachusetts
46. Paediatric Ophthalmology. Taylor D. Blackwell Science.
47. Decision Making in Ophthalmology. Van Heuven WAJ, Zwann J. Mosby.
48. Parsons' Diseases of the eye. Sihota and Tandon.
49. Wills Eye Manual
50. International Council of Ophthalmology Residency Curriculum available at http://www.icoph.org/

Journals

03-05 international Journals and 02 national (all indexed) journals

Annexure 1

Post Graduate Students Appraisal Form

Name of the Department /Unit :
Name of the PG Student :
Period of Training : FROM …….TO…….

Sr. No.	PARTICULARS	Not Satisfactory	Satisfactory	More Than Satisfactory	Remarks
		1 2 3	4 5 6	7 8 9	
1.	Journal based/recent advances learning				
2.	Patient based/Laboratory or Skill based learning				
3.	Self directed learning and teaching				
4.	Departmental and interdepartmental learning activity				
5.	External and Outreach Activities/ CMEs				
6.	Thesis/ Research Work				
7.	Log Book Maintenance				

Publications Yes/ No

Remarks*_____
_____
_____
_____

*REMARKS: Any significant positive or negative attributes of a postgraduate student to be mentioned. For score less than 4 in any category, remediation must be suggested. Individual feedback to postgraduate student is recommended.

SIGNATURE OF ASSESSEE SIGNATURE OF CONSULTANT SIGNATURE OF HOD