MAHATMA GANDHI UNIVERSITY
of
MEDICAL SCIENCES & TECHNOLOGY
JAIPUR

Syllabus

MS – OPHTHALMOLOGY

(3 Years Post Graduate Degree Course)

Notice

1. Amendment made by the Medical Council of India in Rules/Regulations of Post Graduate Medical Courses shall automatically apply to the Rules/Regulations of the Mahatma Gandhi University of Medical Sciences & Technology (MGUMST), Jaipur.

2. The University reserves the right to make changes in the syllabus/books/guidelines, fees-structure or any other information at any time without prior notice. The decision of the University shall be binding on all.

3. The Jurisdiction of all court cases shall be Jaipur Bench of Hon'ble Rajasthan High Court only.

RULES & REGULATIONS
MS OPHTHALMOLOGY (9200)
(3 Years Post Graduate degree course)

TITLE OF THE COURSE:
It shall be called Master of Surgery.

ELIGIBILITY FOR ADMISSION:
No candidate of any category (including NRI quota) shall be eligible for admission to MD/MS courses, if he or she has not qualified NEET PG (MD/MS) conducted by National Board of Examinations or any other Authority appointed by the Government of India for the purpose.

(1) **General Seats**

(a) Every student, selected for admission to postgraduate medical course shall possess recognized MBBS degree or equivalent qualification and should have obtained permanent Registration with the Medical Council of India, or any of the State Medical Councils or should obtain the same within one month from the date of his/her admission, failing which the admission of the candidate shall be cancelled;

(b) Completed satisfactorily one year's rotatory internship or would be completing the same before the date announced by the University for that specific year as per MCI rules after passing 3rd professional MBBS Part II Examination satisfactorily.

(c) In the case of a foreign national, the Medical Council of India may, on payment of the prescribed fee for registration, grant temporary registration for the duration of the postgraduate training restricted to the medical college/institution to which he/she is admitted for the time being exclusively for postgraduate studies; however temporary registration to such foreign national shall be subject to the condition that such person is duly registered as medical practitioner in his/her own country from which he has obtained his basic medical qualification and that his degree is recognized by the corresponding Medical Council or concerned authority.

(2) **NRI Seats**

(a) Students from other countries should possess passport, visa and exchange permits valid for the period of their course of study in this Institution and should also observe the regulations of both central and state governments regarding residential permits and obtain no-objection certificate from the same.

(b) The candidate should have a provisional "Student Visa". If he comes on any other visa and is selected for admission, he will have to first obtain a student visa from his country and then only he will be allowed to join the course. Therefore it is imperative to obtain provisional student visa before coming for Counseling.

(c) This clause is applicable to NRI/Foreign Students only.

CRITERIA FOR SELECTION FOR ADMISSION:

(1) NRI Quota

15% of the total seats are earmarked for Foreign National / PIO / OCI/ NRI / Ward of NRI/NRI sponsored candidates who would be admitted on the basis of merit obtained in NEET PG or any other criteria laid down by Central Government/MCI.

(2) **Remaining Seats (Other than NRI Quota Seats)**

(a) Admissions to the remaining 85% of the seats shall be made on the basis of the merit obtained at the NEET conducted by the National Board of Examinations or any other Authority appointed by the Government of India for the purpose.
(b) The admission policy may be changed according to the law prevailing at the time of admission.

COUNSELING/INTERVIEW:

(1) Candidates in order of merit will be called for Counseling/Interview and for verification of original documents and identity by personal appearance.
(2) Counseling will be performed and the placement will be done on merit-cum-choice basis by the Admission Board appointed by the Government of Rajasthan.

RESERVATION:

Reservation shall be applicable as per policy of the State Government in terms of scheduled caste, scheduled tribe, back ward class, special back ward class, women and handicapped persons.

ELIGIBILITY AND ENROLMENT:

Every candidate who is admitted to MD/MS course in Mahatma Gandhi Medical College & Hospital shall be required to get himself/herself enrolled and registered with the Mahatma Gandhi University of Medical Sciences & Technology after paying the prescribed eligibility and enrolment fees.

The candidate shall have to submit an application to the MGUMST for the enrolment/eligibility along with the following original documents with the prescribed fees (upto November 30 of the year of admission without late fees and upto December 31 of the year of admission with late fees) –

(a) MBBS pass Marks sheet/Degree certificate issued by the University (Ist MBBS to Final MBBS)
(b) Certificate regarding the recognition of medical college by the Medical Council of India.
(c) Completion of the Rotatory Internship certificate from a recognized college.
(d) Migration certificate issued by the concerned University.
(e) Date of Birth Certificate
(f) Certificate regarding registration with Rajasthan Medical Council / Medical Council of India / Other State Medical Council.

REGISTRATION

Every candidate who is admitted to MD/MS course in Mahatma Gandhi Medical College & Hospital shall be required to get himself/herself registered with the Mahatma Gandhi University of Medical Sciences & Technology after paying the prescribed registration fees.

The candidate shall have to submit an application to the MGUMST for registration with the prescribed fees (upto November 30 of the year of admission without late fees upto December 31 of the year of admission with late fees).

DURATION OF COURSE:

The course shall be of 3 years duration from the date of commencement of academic session.

PERIOD OF TRAINING:

The period of training for obtaining Post graduate degrees (MD/MS) shall be three completed years including the period of examination.

MIGRATION:
No application for migration to other Medical Colleges will be entertained from the students already admitted to the MD/MS course at this Institute.

METHODS OF TRAINING FOR MD/MS:
Method of training for MD/MS courses shall be as laid down by the Medical Council of India.

ONLINE COURSE IN RESEARCH METHODS

i. All postgraduate students shall complete an online course in Research Methods to be conducted by an Institute(s) that may be designated by the Medical Council of India by way of public notice, including on its website and by Circular to all Medical Colleges. The students shall have to register on the portal of the designated institution or any other institute as indicated in the public notice.
ii. The students have to complete the course by the end of their 2nd semester.
iii. The online certificate generated on successful completion of the course and examination thereafter, will be taken as proof of completion of this course
iv. The successful completion of the online research methods course with proof of its completion shall be essential before the candidate is allowed to appear for the final examination of the respective postgraduate course.
v. This requirement will be applicable for all postgraduate students admitted from the academic year 2019-20 onwards

ATTENDANCE, PROGRESS AND CONDUCT:

(1) **Attendance:**

(a) 80% attendance in each course is compulsory. Any one failing to achieve this, shall not be allowed to appear in the University examination.

(b) A candidate pursuing MD/MS course shall reside in the campus and work in the respective department of the institution for the full period as a full time student. No candidate is permitted to run a clinic/work in clinic/laboratory/ nursing home while studying postgraduate course. No candidate shall join any other course of study or appear for any other examination conducted by this university or any other university in India or abroad during the period of registration. Each year shall be taken as a unit for the purpose of calculating attendance.

(c) Every candidate shall attend symposia, seminars, conferences, journal review meetings, grand rounds, CPC, CCR, case presentation, clinics and lectures during each year as prescribed by the department and not absent himself / herself from work without valid reasons. Candidates should not be absent continuously as the course is a full time one.

(2) **Monitoring Progress of Studies- Work diary/Log Book:**

(a) Every candidate shall maintain a work diary in which his/her participation in the entire training program conducted by the department such as reviews, seminars, etc. has to be chronologically entered.

(b) The work scrutinized and certified by the Head of the Department and Head of the Institution is to be presented in the University practical/clinical examination.

(3) **Periodic tests:**

There shall be periodic tests as prescribed by the Medical Council of India and/ or the Board of Management of the University, tests shall include written papers, practical/clinical and viva voce.

(4) **Records:**
Records and marks obtained in tests will be maintained by the Head of the Department and will be made available to the University when called for.

THESIS:

(1) Every candidate pursuing MD/MS degree course is required to carry out work on research project under the guidance of a recognized post graduate teacher. Then such a work shall be submitted in the form of a Thesis.
(2) The Thesis is aimed to train a postgraduate student in research methods & techniques.
(3) It includes identification of a problem, formulation of a hypothesis, designing of a study, getting acquainted with recent advances, review of literature, collection of data, critical analysis, comparison of results and drawing conclusions.
(4) Every candidate shall submit to the Registrar of the University in the prescribed format a Plan of Thesis containing particulars of proposed Thesis work within six months of the date of commencement of the course on or before the dates notified by the University.
(5) The Plan of Thesis shall be sent through proper channel.
(6) Thesis topic and plan shall be approved by the Institutional Ethics Committee before sending the same to the University for registration.
(7) Synopsis will be reviewed and the Thesis topic will be registered by the University.
(8) No change in the thesis topic or guide shall be made without prior notice and permission from the University.
(9) The Guide, Head of the Department and head of the institution shall certify the thesis. Three printed copies and one soft copy of the thesis thus prepared shall be submitted by the candidate to the Principal. While retaining the soft copy in his office, the Principal shall send the three printed copies of the thesis to the Registrar six months before MD/MS University Examinations. Examiners appointed by the University shall evaluate the thesis. Approval of Thesis at least by two examiners is an essential pre-condition for a candidate to appear in the University Examination.
(10) Guide: The academic qualification and teaching experience required for recognition by this University as a guide for thesis work is as laid down by Medical Council of India/Mahatma Gandhi University of Medical Sciences & Technology, Jaipur.
(11) Co-guide: A co-guide may be included provided the work requires substantial contribution from a sister department or from another institution recognized for teaching/training by Mahatma Gandhi University of Medical Sciences & Technology, Jaipur/Medical Council of India. The co-guide shall be a recognized postgraduate teacher.
(12) 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.

ELIGIBILITY TO APPEAR FOR UNIVERSITY EXAMINATION:

The following requirements shall be fulfilled by every candidate to become eligible to appear for the final examination:

(1) Attendance: Every candidate shall have fulfilled the requirement of 80% attendance prescribed by the University during each academic year of the postgraduate course. (as per MCI rules)
(2) Progress and Conduct: Every candidate shall have participated in seminars, journal review meetings, symposia, conferences, case presentations, clinics and didactic lectures during each year as designed by the department.

(3) Work diary and Logbook: Every candidate shall maintain a work diary for recording his/her participation in the training program conducted in the department. The work diary and logbook shall be verified and certified by the Department Head and Head of the Institution.
(4) Every student would be required to present one poster presentation, to read one paper at a National/State Conference and to have one research paper which should be published/accepted for publication/ sent for publication to an indexed journal during the period of his/her post graduate studies so as to make him/her eligible to appear at the Post Graduate Degree Examination.
(5) Every student would be required to appear in and qualify the Pre-University Post graduate degree Mock examination. Post graduate students who fail to appear in or do not qualify the Pre-University Post graduate degree Mock examination shall not be permitted to appear in the final examination of the University.

The certification of satisfactory progress by the Head of the Department/ Institution shall be based on (1), (2), (3), (4) and (5) criteria mentioned above.

ASSESSMENT:

(1) The progress of work of the candidates shall be assessed periodically by the respective guides and report submitted to the Head of the Institution through the Head of the Department at the end of every six months. The assessment report may also be conveyed in writing to the candidate who may also be advised of his/her shortcomings, if any.
(2) In case the report indicate that a candidate is incapable of continuing to do the work of the desired standard and complete it within the prescribed period, the Head of the Institution may recommend cancellation of his/her registration at any time to the University.
(3) Formative Assessment:
    (a) General Principles
        i. The assessment is valid, objective, constructive and reliable.
        ii. It covers cognitive, psychomotor and affective domains.
        iii. Formative, continuing and summative (final) assessment is also conducted.
        iv. Thesis is also assessed separately.
    (b) Internal Assessment
        i. The internal assessment is continuous as well as periodical. The former is based on the feedback from the senior residents and the consultants concerned. Assessment is held periodically.
        ii. Internal assessment will not count towards pass/fail at the end of the program, but will provide feedback to the candidate.
        iii. The performance of the Postgraduate student during the training period should be monitored throughout the course and duly recorded in the log books as evidence of the ability and daily work of the student.
        iv. Marks should be allotted out of 100 as under
            1) Personal Attributes - 20 marks
                a. Behavior and Emotional Stability: Dependable, disciplined, dedicated, stable in emergency situations, shows positive approach.
                b. Motivation and Initiative: Takes on responsibility, innovative, enterprising, does not shirk duties or leave any work pending.
                c. Honesty and Integrity: Truthful, admits mistakes, does not cook up information, has ethical conduct, exhibits good moral values, loyal to the institution.
            2) Clinical Work - 20 marks

a Availability: Punctual, available continuously on duty, responds promptly on calls and takes proper permission for leave.
b Diligence: Dedicated, hardworking, does not shirk duties, leaves no work pending, does not sit idle, competent in clinical case work up and management.
c Academic Ability: Intelligent, shows sound knowledge and skills, participates adequately in academic activities and performs well in oral presentation and departmental tests.
d Clinical Performance: Proficient in clinical presentations and case discussion during rounds and OPD work up. Preparing Documents of the case history/examination and progress notes in the file (daily notes, round discussion, investigations and management) Skill of performing bed side procedures and handling emergencies.

3) Academic Activities - 20 marks
Performance during presentation at Journal club/ Seminar/Case discussion/Stat meeting and other academic sessions. Proficiency in skills as mentioned in job responsibilities.
4) End of term theory examination - 20 marks
End of term theory examination conducted at end of 1st, 2nd year and after 2 years 9 months.
5) End of term practical examination - 20 marks
a. End of term practical/oral examinations after 2 years 9 months.
b. Marks for personal attributes and clinical work should be given annually by all the consultants under whom the resident was posted during the year. Average of the three years should be put as the final marks out of 20.
c. Marks for academic activity should be given by the all consultants who have attended the session presented by the resident.
d. The Internal assessment should be presented to the Board of examiners for due consideration at the time of Final Examinations.
e. Yearly (end of 1st, 2nd & 3rd year) theory and practical examination will be conducted by internal examiners and each candidate will enter details of theory paper, cases allotted (2 long & 2 short) and viva.
f. Log book to be brought at the time of final practical examination.

APPOINTMENT OF EXAMINERS:
Appointment of paper setters, thesis evaluators, answer books evaluators and practical & viva voce examiners shall be made as per regulations of the Medical Council of India.

SCHEME OF EXAMINATION:
Scheme of examination in respect of all the subjects of MD/MS shall be as under :
(1) The examination for MD/MS shall be held at the end of three Academic Years.
(2) Examinations shall be organized on the basis of marking system.
(3) The period of training for obtaining MD/MS degrees shall be three completed years including the period of examination.
(4) The University shall conduct not more than two examinations in a year for any subject with an interval of not less than 4 months and not more than 6 months between the two examinations.
(5) The examinations shall consist of:
(a) Thesis :

i. Thesis shall be submitted at least six months before the main Theory examinations.
ii. The thesis shall be examined by a minimum of three examiners – one Internal and two External examiners who shall not be the examiners for Theory and Clinical/Practical.
iii. In departments where besides the two earmarked practical/clinical examiners no one else is a qualified P.G. teacher, in that case the Thesis shall be sent to the third external examiner who shall actually be in place of the internal examiner.
iv. Only on the acceptance of the thesis by any two examiners, the candidate shall be eligible to appear for the final examination.
v. A candidate whose thesis has been once approved by the examiners will not be required to submit the Thesis afresh, even if he/she fails in theory and/or practical of the examination of the same branch.
vi. In case the Thesis submitted by a candidate is rejected, he/she should be required to submit a fresh Thesis.

(b) Theory papers:
i. There shall be four theory papers.
ii. Out of these, one shall be of Basic Sciences and one shall be of Recent Advances.
iii. Each theory paper examination shall be of three hours duration.
iv. Each theory paper shall carry maximum 100 marks.
v. The question papers shall be set by the External Examiners.
vi. There will be a set pattern of question papers.
Every question paper shall contain three questions. All the questions shall be compulsory, having no choice.
Question No. 1 shall be of long answer type carrying 20 marks.
Question No. 2 shall have two parts of 15 marks each. Each part will be required to be answered in detail.
Question No. 3 shall be of five short notes carrying 10 marks each.
vii. The answer books of theory paper examination shall be evaluated by two External and two internal examiners. Out of the four paper setters, the two paper setters will be given answer books pertaining to their papers and the answer books of the remaining two papers will be evaluated by two Internal Examiners. It will be decided by the President as to which paper is to be assigned to which Internal Examiner for evaluation.
viii. A candidate will be required to pass theory and practical examinations separately in terms of the governing provisions pertaining to the scheme of examination in the post graduate regulations. The examinee should obtain minimum 40% marks in each theory paper and not less than 50% marks cumulatively in all the four papers for degree examination to be cleared as "passed" at the said Degree examination.

(c) Clinical/ Practical & Oral examinations:
i. Clinical/Practical and Oral Examination of 400 marks will be conducted by at least four examiners, out of which two (50%) shall be External Examiners.
ii. A candidate will be required to secure at least 50% (viz. 200/400) marks in the Practical including clinical and viva voce examinations.

(6) If a candidate fails in one or more theory paper(s) or practical, he/she shall have to reappear in the whole examination i.e. in all theory papers as well as practical.

GRACE MARKS

No grace marks will be provided in MD/MS examinations.

REVALUATION / SCRUTINY:

No Revaluation shall be permitted in the MD/MS examinations. However, the student can apply for scrutiny of the answer books as per University Rules.

GUIDELINES FOR COMPETENCY BASED POSTGRADUATE TRAINING PROGRAMME FOR MS IN OPHTHALMOLOGY (9200)

Preamble:
The purpose of PG education is to create specialists who would provide high quality health care and advance the cause of science through research & training.

The purpose of this programme is to standardize Ophthalmology teaching at post graduate level throughout the country so that it will benefit in achieving uniformity in post graduate and undergraduate teaching as well as result in creating competent ophthalmic surgeons with appropriate expertise.

The purpose of this document is to provide teachers and learners illustrative guidelines to achieve defined outcomes through learning and assessment. This document was prepared by various subject-content specialists. The Reconciliation Board of the Academic Committee has attempted to render uniformity without compromise to purpose and content of the document. Compromise in purity of syntax has been made in order to preserve the purpose and content. This has necessitated retention of "domains of learning" under the heading "competencies".

SUBJECT SPECIFIC 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:

- 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.
- 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.
- 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.
- The student should be able to integrate the preventive methods with the curative and rehabilitative measures in the comprehensive management of the disease.
- The student should be familiar with common eye problems occurring in rural areas and be able to deal with them effectively.
- The student should also be made aware of Mobile Ophthalmic Unit and its working and components.
- The student should be familiar with the current developments in Ophthalmic Sciences.
- 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.
- 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.
- The student should reach the conclusions by logical deduction and should be able to assess evidence both as to its reliability and its relevance.
- The student should have basic knowledge of medico-legal aspects of medicine.

- The student should be familiar with patient counseling and proper consent taking.

SUBJECT SPECIFIC COMPETENCIES

A post graduate student upon successfully qualifying in the M.S. (Ophthalmology) examination should be able to:

- 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.
- Periodically self assess his or her performance and keep abreast with ongoing advances in the field and apply the same in his/her practice.
- Be aware of her/his own limitations to the application of the specialty in situations, which warrant referral to more qualified centers or individuals.
- 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.
- Contribute as an individual/group towards the fulfillment of national objectives with regard to prevention of blindness.
- 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.

- **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.

- **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.

- **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.

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

- **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.

- **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:

- 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.

- 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.
- 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**

- **Slit lamp Examination**
  - Diffuse examination
  - Focal examination
  - Retroillumination – direct and indirect
  - Sclerotic scatter
  - Specular reflection
  - Staining modalities and interpretation
- **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**

- **Tonometry**
  - Tonometry - Applanation/Identation/Non-contact
- **Gonioscopy**
  - Gonioscopy grading of the anterior chamber angle
- **Tear/ Lacrimal function tests**
  - Staining- fluorescein and Rose Bengal
  - Schirmer test/tear film break up time
  - Syringing
  - Dacrocystography
- **Corneal**
  - Corneal scraping and cauterization
  - Smear preparation and interpretation (Gram's stain /KOH)
  - Media inoculation
  - Keratometry - performance and interpretation
  - Pachymetry
  - Corneal topography - if available
- **Colour Vision evaluation**
  - Ishihara pseudoisochromatic plates
  - Farnsworth Munsell, if available
- **Refraction**
  - Retinoscopy- Streak/ Priestley Smith
  - Use of Jackson's cross-cylinder
  - Subjective and objective refraction
  - Prescription of glasses

- **Diagnosis and assessment of Squint**
  - Ocular position and motility examination
  - Synoptophore usage
  - Lees screen usage
  - Diplopia charting
  - Assessment of strabismus - cover tests/prisms bars
  - Amblyopia diagnosis and treatment
  - Assessment of convergence, accommodation, stereopsis, suppression
- **Exophthalmometry**
  - Usage of Hertel's exophthalmometer - proptosis measurement
- **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
- **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**:

- **Fundus photography**
- **Fluorescein angiography**
- **Ophthalmic ultrasound A-scan/B scan**
- **Automated perimetry for glaucoma and neurological lesions**
- **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
- **OCT and UBM**
- **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**

- Must know and can perform independently
  - Ocular anaesthesia:

        - Retrobulbar anaesthesia
        - Peribulbar anaesthesia
        - Facial blocks- O'Brein / Atkinson/Van lint and modifications
        - Frontal blocks
        - Infra orbital blocks
        - Blocks for sac surgery
- 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
        - Dacryocystectomy
        - Dacryocystorhinostomy
        - 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
- 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
        - Standard ECCE (extracapsular cataract extraction; first year) with or without IOL implantation
        - Small incision ECCE with or without IOL implantation and/or Phacoemulsification with PC IOL implantation
        - Intracapsular cataract extraction (second year)
        - Cataract with Phacoemusification (third year)
        - 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
- Should have performed/assisted the following microscopic surgeries
    - Keratoplasty
        - Therapeutic and optical
    - Glaucoma surgery
        - Pharmacological modulation of trabeculectomy
        - Trabeculotomy
        - Goniotomy
        - Glaucoma valve implant surgery
- Desirable to be able to perform following laser procedures
    - Yag Capsulotomy
    - Laser iridotomy
    - Focal and panretinal photocoagulation
- 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 post-operative 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 post graduate 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. She/he is required to be proficient in some operations and show familiarity with others.

SYLLABUS

Course contents:
These are only broad guidelines and are illustrative, there may be overlap between sections.

- **Basic Sciences:**
    - Orbital and ocular anatomy
        - Gross anatomy
        - Histology
        - Embryology
    - Ocular Physiology
    - Ocular Pathology
    - Ocular Biochemistry
- General biochemistry, biochemistry applicable to ocular function
    - Ocular Microbiology
- General Microbiology, specific microbiology applicable to the eye
    - Immunology with particular reference to ocular immunology
    - Genetics in ophthalmology
    - Community Eye Health

- **Optics**

- Basic physics of optics
- Applied ophthalmic optics
- Applied optics including optical devices
- Disorders of Refraction

- **Clinical Ophthalmology**
  - Disorders of the lids
  - Disorders of the lacrimal system
  - Disorders of the Conjunctiva
  - Disorders of the Sclera
  - Disorders of the Cornea
  - Disorders of the Uveal Tract
  - Disorders of the Lens
  - Disorders of the Retina
  - Disorders of the Optic Nerve and Visual Pathway
  - Disorders of the Orbit
  - Glaucoma
  - Neuro-ophthalmology
  - Paediatric ophthalmology
  - Ocular involvement in systemic disease
  - Immune ocular disorders
  - Strabismus and Amblyopia
  - Ocular oncology
  - All surgeries related to anatomical Structures

TEACHING AND LEARNING METHODS

Teaching Methodology:
The theoretical knowledge is imparted to the post graduate student through distinct courses of lecture demonstrations, seminars, symposia and inter- and intra-departmental 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:

- **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.

- **Clinical Case discussion**
  - 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. The choice and manner of presentation and discussion varies widely and is left to the discretion of the department. 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.

- In addition to bedside teaching rounds, at least 5-hr of formal teaching per week are necessary.
- 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.
- 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.
- Case presentation at other in-hospital multidisciplinary forums.
- The postgraduate students shall be required to participate in the teaching and training programme of undergraduate students and interns.
- Department should encourage e-learning activities.

- **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.

- **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.
  - Aim
  - Methods
  - Observations
  - Discussions and
  - 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.

- A postgraduate student of a postgraduate degree course in broad specialities/super specialities 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.

- 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.

- **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.

  Relevance of beds and admissions in Ophthalmology has really gone down at present, as most of the surgical and special investigative procedures are being performed on out-patient basis. Most of the teaching has to be imparted in out-patients department and special Clinics.

- **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

- **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

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

- 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.

- 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.

ASSESSMENT

FORMATIVE ASSESSMENT, ie, during the training
Formative assessment should be continual and should assess medical knowledge, patient care, procedural & academic skills, interpersonal skills, professionalism, self directed learning and ability to practice in the system.

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

The student to be assessed periodically as per categories listed in postgraduate student appraisal form (**Annexure I**)

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:**
   Every post graduate student shall carry out work on an assigned research project under the guidance of a recognised Post Graduate Teacher, the result of which shall be written up and submitted in the form of a Thesis. Work for writing the Thesis is aimed at contributing to the development of a spirit of enquiry, besides exposing the post graduate student to the techniques of research, critical analysis, acquaintance with the latest advances in medical science and the manner of identifying and consulting available literature.

2. **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. The examination for M.D./ 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.
   Paper I: Basic Sciences related to Ophthalmology, Refraction & Optics
   Paper II: Clinical Ophthalmology
   Paper III: Systemic Diseases in Relation to Ophthalmology
   Paper IV: Recent Advances in Ophthalmology and Community Ophthalmology

3. **Clinical/Practical and oral/viva voce examination**

   Clinical
   - 1 Long case
   - 2 Short cases with different problems
   - 2 Fundus cases
   - 1 refraction case

   Oral/Viva voce Examination shall be comprehensive enough to test the post graduate student's overall knowledge of the subject and shall include:
   - Instruments
   - Pathology specimens

- Drugs, X-rays, USG/OCT/CT/MRI Scans, etc.
- Visual fields and other ophthalmic diagnostic charts

Recommended Reading:

Books (latest edition)

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

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

Journals

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

Annexure - I

Postgraduate Students Appraisal Form
Pre / Para /Clinical Disciplines

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 strongly recommended.

SIGNATURE OF ASSESSEE | SIGNATURE OF CONSULTANT | SIGNATURE OF HOD

MODEL PAPER

MS-9201 **Ophthal-I**

MS Examination Month, Year
OPHTHALMOLOGY

Paper – I
Basic Sciences related to Ophthalmology, Refraction & Optics

Time: Three Hours
Maximum Marks: 100

Attempt all questions
All the parts of one question should be answered at one place in sequential order.
Draw diagrams wherever necessary

Q.1 Discuss the secretion and drainage of acqueous humour. 20

Q.2 Write short notes on: 2x15=30
a) Antifungal drugs.
b) Factors maintaining transparency of cornea.

Q.3 Write short notes on: 5x10=50
a) Optical coherence tomography.
b) Jackson's cross cylinder.
c) Uses of prism in ophthalmology.
d) Specular microscopy.
e) Embryological development of retina.

MODEL PAPER

MS-9202 **Ophthal-II**

MS Examination Month, Year
OPHTHALMOLOGY

Paper – II
Clinical Ophthalmology

Time: Three Hours
Maximum Marks: 100

Attempt all questions
All the parts of one question should be answered at one place in sequential order.
Draw diagrams wherever necessary

Q.1 Describe etiopathogenesis, clinical features and management of optic neuritis. 20

Q.2 Write short notes on: 2x15=30
a) Various surgical procedures for glaucoma.
b) Blunt trauma to the eye.

Q3 Write short notes on: 5x10=50
a) Management of Eales' disease.
b) Management of retinopathy of prematurity.
c) Management of ARMD.
d) Surgical procedures for ocular surface reconstruction.
e) IOL power calculation in children.

MODEL PAPER

MS-9203 **Ophthal-III**

MS Examination Month, Year
OPHTHALMOLOGY

Paper – III
Systemic Diseases in Relation to Ophthalmology

Time: Three Hours
Maximum Marks: 100

Attempt all questions
All the parts of one question should be answered at one place in sequential order.
Draw diagrams wherever necessary

Q.1 What are the ocular features of HIV disease? What is the impact of HAART on ocular features? 20

Q.2 Write short notes on: 2x15=30
a) Ocular & systemic manifestation of homocystinuria.
b) Ocular manifestation of multiple sclerosis and its management.

Q.3 Write short notes on: 5x10=50
a) Ocular manifestation in neurofibromatosis.
b) Ocular manifestation in nutritional deficiency.
c) Ocular manifestation in pregnancy.
d) Intraocular cysticercosis.
e) Dysthyroid ophthalmopathy.

MODEL PAPER

MS-9204 **Ophthal-IV**

MS Examination Month, Year
OPHTHALMOLOGY

Paper – IV
Recent Advances in Ophthalmology and Community Ophthalmology

Time: Three Hours
Maximum Marks: 100

Attempt all questions
All the parts of one question should be answered at one place in sequential order.
Draw diagrams wherever necessary

Q.1 Describe the various refractive surgery procedures for myopia, hypermetropia and astigmatism. 20

Q.2 Write short notes on: 2x15=30
a) Role of laser in ophthalmology.
b) Component keratoplasty.

Q.3 Write short notes on: 5x10=50
a) Femtosecond laser cataract surgery.
b) Vision 20/20.
c) Guidelines for eye camps for cataract surgery.
d) How will you calculate sample size and plan survey for cataract blindness?
e) Write the definition of blindness as per WHO standards. Enumerate important causes of blindness as per 4 important surveys in India.